Rational Numbers and Square Roots

Calculators may not be used on quizzes of the unit test for the first unit.

This booklet belongs to:_____

LESSON #	DATE	QUESTIONS FROM NOTES	Questions that I find difficult
1.		Pg.	
2.		Pg.	
3.		Pg.	
4.		Pg.	
5.		Pg.	
6.		Pg.	
7.		Pg.	
8.		Pg.	
9.		Pg.	
10.		Pg.	
11.		Pg.	
12.		Pg.	
13.		REVIEW	
14.		**TEST**	

Your teacher has important instructions for you to write down below.

Numeracy, Including Rational numbers and Square roots

It may be a good idea to split this into two chapters. Breaking after lesson 3 or 4 may be a nice place to do that.

ILO	No	Daily Topic	Key Idea
The first 18 pages are review and have been added to ensure a smooth transition into the WNCP Math 9 curriculum.	1.	Numbers Systems, Write numbers	Place the numbers 2, 3.5, π, 2/9, 0, -4 in to the following categories real number, rational number… Write the 1245.036 in words Round 5.2498 to the nearest hundredth.
	2.	Integers→ 4 operations	Evaluate. $-5-1+(-2)-5=$ Evaluate. $-(-1)(-1)(-1)(-1)=$ Evaluate. $-70\div 5=$
	3.	Integers→BEDMAS	Evaluate. $5-3(4-3\times 2)^2=$
A3 demonstrate an understanding of rational numbers by – comparing and ordering rational numbers – solving problems that involve arithmetic operations on rational numbers	4.	• 19-22: Decimals→ 4 operations • Solve a given problem involving operations on rational numbers in fraction form and decimal form	Evaluate. $102.04+54.35=$ Evaluate. $72.9\times 66.12=$ Evaluate. $434\div 7.8=$ Evaluate. $62.74-61.29=$
	5.	23-27: Equivalent Fractions, Mixed number, improper fractions and converting.	
	6.	27-30: Comparing and Ordering Rational Numbers. • Order a given set of rational numbers, in fraction and decimal form, by placing them on a number line (e.g., - 0.666…, 0.5, - 5/8) • Identify a rational number that is between two given rational numbers	Order the following rational numbers from least to greatest: $4,-3.5,\frac{21}{6},-\frac{24}{7},-1$
	7.	31-34 Adding Subtracting Fractions • Solve a given problem involving operations on rational numbers in fraction form and decimal form	Evaluate: $-\frac{4}{3}+\frac{3}{4}=$ & Evaluate: $3-\frac{3}{4}=$
	8.	35-39: Multiplying Fractions • Solve a given problem involving operations on rational numbers in fraction form and decimal form	Evaluate. $2\frac{1}{4}\times\frac{8}{3}=$ & Evaluate. $\frac{1}{4}\div\frac{5}{8}=$
A4 explain and apply the order of operations, including exponents, with and without technology	9.	40-42: Bedmas with fractions • Solve a given problem by applying the order of operations without the use of technology • Solve a given problem by applying the order of operations with the use of technology (This will be covered in later chapters) • Identify the error in applying the order of operations in a given incorrect solution	Evaluate. $\frac{20}{40}-\frac{21}{40}\times\frac{80}{7}=$ Evaluate. $\left(\frac{5}{3}\right)^2-\frac{12}{20}=$
A5 determine the square root of positive rational numbers that are perfect squares	10.	43-46: Rational Square roots • Determine whether or not a given rational number is a square number and explain the reasoning • Determine the square root of a given positive rational number that is a perfect square • Identify the error made in a given calculation of a square root (e.g., Is 3.2 the square root of 6.4?) • Determine a positive rational number given the square root of that positive rational number	Evaluate. $\sqrt{\frac{25}{36}}$
A6 determine an approximate square root of positive rational numbers that are non-perfect squares	11.	47-49: Irrational Square roots • Estimate the square root of a given rational number that is not a perfect square, using the roots of perfect squares as benchmarks • Determine an approximate square root of a given rational number that is not a perfect square using technology (e.g., calculator, computer) (later) • Explain why the square root of a given rational number as shown on a calculator may be an approximation (later) • Identify a number with a square root that is between two given numbers	Approximate $\sqrt{40},\sqrt{0.34}$
	12.	50: Chapter Review and Practice Test • Help students develop sound study habits. • Many students will graduate high school saying they do not know how to study for math tests.	
	13.	Go over the practice Test	
	14.	Unit Evaluation	

Definitions

	Definition	Example(s)
Real numbers	These are all the numbers that can be placed on a number line.	
Natural numbers	The counting numbers. 1,2,3,4…but not zero.	
Whole numbers	The counting numbers and zero.	
Integers	Positive and negative whole numbers and zero.	
Rational numbers	Are numbers made up of fractions, integers and decimals whose decimal stops or repeats. A number than can be written as a ratio of two integers. (The denominator can not be zero.)	
Irrational numbers	A number whose decimal does not stop or repeat. A number than can not be written as ratio of two integers.	
Evaluate	Find the answer.	
Sum	The answer to an addition question.	
Difference	The answer to a subtraction question.	
Product	The answer to a multiplication question.	
Quotient	The answer to a division question.	
BEDMAS	The order in which operations in math are completed.	
Reduce	Divide out common factors.	
Common denominator	Two fraction have common denominators if their denominators are the same.	
Reciprocal	Two numbers are reciprocals of each other if one fraction is the flip of the other.	
Opposite numbers	Two numbers are opposites if they are the same distance from zero. i.e. 7 and -7.	
Decimal	A decimal is a part of a whole.	
Improper fraction	A fraction where the numerator is bigger than the denominator.	
Mixed number	A combination of a whole number and a proper fraction.	

Numbers Systems, Write numbers

	Definition	Example
1. Real numbers	All numbers that can be placed on the number line.	
2. Rational numbers	Numbers that can be written as a fraction where both numbers are integers and the denominator is not zero.	
3. Integers	Positive & negative whole numbers and zero	
4. Whole numbers	Positive numbers without decimals and zero.	
5. Natural numbers	Positive numbers without decimals not including zero.	
6. Irrational numbers	Numbers where the decimals do not repeat or stop	

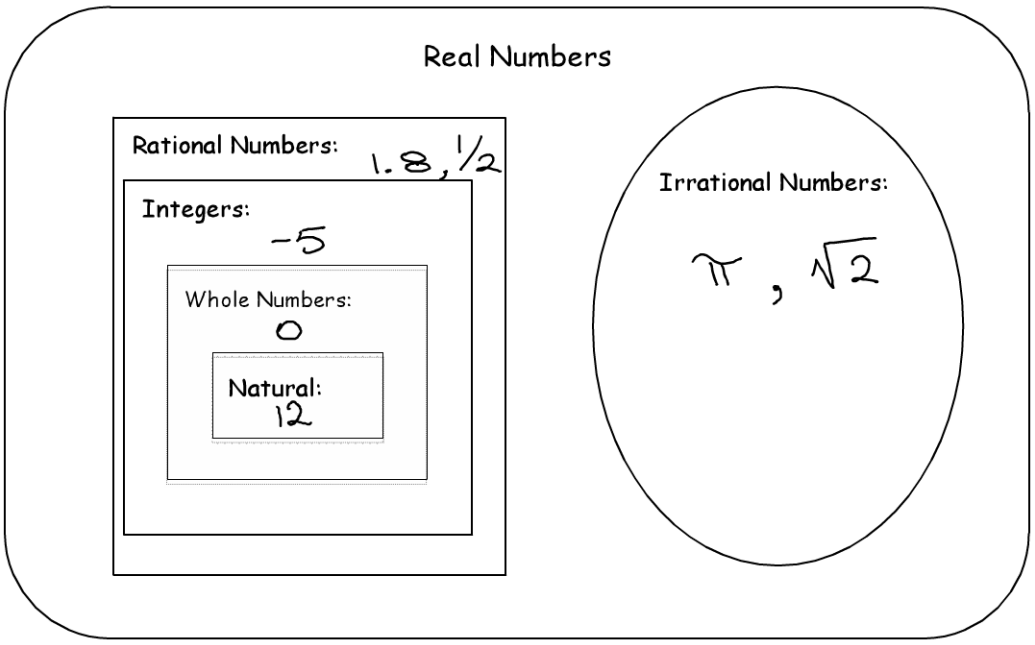
For each of the numbers below check all the boxes that describe the number:

	8	-100	$4.\overline{31}$	$\frac{2}{3}$	0	π	-1.7	$-5\frac{1}{4}$
7. Real numbers	✓	✓	✓	✓	✓		✓	✓
8. Rational numbers	✓	✓	✓	✓	✓		✓	✓
9. Integers	✓	✓			✓			
10. Natural numbers	✓							
11. Whole numbers	✓				✓			
12. Irrational numbers	✗					✓		

13. True of False? A real number is always a whole number. False
14. True of False? A natural number is always a rational number. True
15. True of False? An integer is always a rational number. True
16. True of False? A real number is always an integer. False
17. True of False? An integer is always a natural number. False
18. True of False? An irrational number is always a real number. True

19. Place each number in the most efficient spot. Use each number only once.

- -5, π, $\frac{1}{2}$, 1.8, 12, 0, $\sqrt{2}$,



Take a moment to review the place-value chart.

Place-value chart.

1	2	3	4	5	6	7	8	9	.	1	2	3	4
Hundred millions	Ten millions	Millions	Hundred Thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths	Ten thousandths

Place Value Review

20. Many people use personal checks to pay for things instead of using cash. What are some advantages of using cheque over cash?

Convenience, Security, Record Keeping

21. Write a cheque to Jason Loo for $37*.

22. *Each cheque requires that the dollar amount be written in both numeric and written form. Why might that be a good idea?

Better accuracy. Less chance that someone may add an extra zero; e.g. $109 becomes $1090

Challenge #1: Find the errors and make the necessary corrections.

23. 37	*Thirty seven* Thirty - seven
24. 405 000	*Four hundred and five thousand* Four hundred five thousand
25. 6.03	*Six point zero three* Six and three hundredths
26. 56 800.012	*Fifty-six thousand eight-hundred and twelve hundredths*

Write each of the numbers in words.

	Proper	Common mistakes
37	Thirty-seven	Thirty seven (The hyphen is needed)
405 000	Four hundred five thousand	Four hundred and five thousand (The and is not needed)
6.03	Six and three hundredths	Six point zero three (Use the word and.)
56 800.012	Fifty-six thousand, eight hundred and twelve thousandths	

- Hyphens are used to separate the tens and ones or ten thousands and thousands....columns.
- "And" means a decimal has happened.
- "and" is only used when a decimal has happened.

Mark each of the following right or wrong. If there is an error, correct it.

27. 436	Four hundred ~~and~~ thirty-six
28. 37 002	Thirty-seven thousand two ← Add hyphen.
29. 500 011	Five hundred thousand eleven ✓
30. 610 000 005	Six hundred ten million ~~and~~ five
31. 2 453	Twenty-four hundred fifty-three ✓
32. 51.09	Fifty-one and nine hundred~~s~~ hundredths
33. 271	Two hundred ~~and~~ seventy-one ← hyphen
34. 17 300	Seven~~t~~een thousand three hundred

Write the following in words(spelling counts).

35. 900 704	Nine hundred thousand seven hundred four
36. 80 006 001	Eighty million thousand six hundred one
37. 72 000 000 000	Seventy-two billion
38. 16.102	Sixteen and one hundred two thousandths
39. 0.059	Fifty-nine thousandths
40. 1.0022	One and twenty-two ten thousandths
41. 500.005	Five hundred and five thousandths

Rounding Review

Give an example in the real world where it makes sense to round 2.8 to 3.

Give an example in the real world where it is not appropriate to round 2.8 to 3.

42. **Round 5.2498 to the nearest tenth.**

Solution:
- The 2 is in the tenths place. Is the answer 5.2 or 5.3?
- If the number to the right of 2 is a five or more round up. Otherwise round down.
- Another way to think about it is, 24 is closer to 20 than it is to 30.
- The answer is 5.2

43. **Round 5.2498 to the nearest hundredth.**

Solution: 5.25

44. **Round 5.2498 to the nearest thousandth.**

Solution: 5.250

Round each number to the designated place value.

45. **Round 2.467 to the nearest tenth.** 2.5	46. **Round 7.447 to the nearest tenth.** 7.4	47. **Round 2.057 to the nearest tenth.** 2.1	48. **Round 8.057 to the nearest hundredth.** 8.06
49. **Round 2.297 to the nearest hundredth.** 2.30	50. **Round 2.952 to the nearest tenth.** 3.0	51. **Round 4.956 to the nearest hundredth.** 4.96	52. **Round 2.84 to the nearest tenth.** 2.8
53. **Round 8.427 to the nearest tenth.** 8.4	54. **Round 0.457 to the nearest tenth.** 0.5	55. **Round 3.049 to the nearest tenth.** 3.0	56. **Round 0.957 to the nearest hundredth.** 0.96

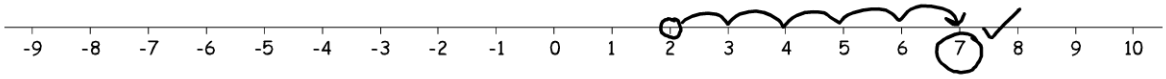
Integers and Operations Math 8 Review

List as many situations as you can where people like negative numbers.

List as many situations as you can where people do not like negative numbers.

The number line is a visual tool that can be used to demonstrate your understanding.

57. Evaluate 2 + 5 using the number line. Start at positive two, use arrows and circle your answer.



58. Evaluate 2 – 5 using the number line.

59. Evaluate 2 - (-5) using the number line.

60. Evaluate 2 + (-5) using the number line.

61. Evaluate -2 – 5 using the number line.

Observations:

62. 2 + 5 is equivalent to which of the following:	63. 2 - 5 is equivalent to which of the following:	64. -2 - 5 is equivalent to which of the following:
• 2 - 5 • 2 - (-5) • -2 - 5 • 2 + (+5)	• 2 + 5 • 2 + (-5) • -2 + 5 • -5 + 2	• -2 + (-5) • 2 + (-5) • -5 - 2 • -5 + 2

Adding and Subtracting Integers

Subtraction moves left on the number line. Example. $2-5=-3$ and $-2-5=-7$ Subtracting 5 moves 5 units left on the number line.	**Addition** moves right on the number line. Example $2+5=7$ and $-2+5=3$ Adding 5 moves 5 units right on the number line.
Subtracting a negative number has the same impact as adding. Example $2-(-5)=7$ and $-2-(-5)=3$ and $-2+5=3$ ▪ Adding moves right. Subtracting moves left. Subtracting a negative moves right.	

Evaluate and check your answers. (These questions could be done verbally in class.)

65. $4+9=$ 13	66. $-4+9=$ 5	67. $4-9=$ -5	68. $4+(-9)=$ -5	69. $-4-9=$ -13
70. $-12+9=$ -3	71. $-8-17=$ -25	72. $13-(-6)=$ 19	73. $-8+(-1)=$ -9	74. $-5-19=$ -24
75. $13-15=$ -2	76. $-4-15=$ -19	77. $4-(-23)=$ 27	78. $15+(-9)=$ 6	79. $-7-(-9)=$ 2

Use an integer to represent each of the following situations.

80. Vincent's bank account currently has a balance of negative four dollars. If he withdraws another nineteen dollars, what will his bank balance be?

$-4-19=-23$

81. Billy plays two rounds of golf. His score in the first round is minus five and his score on the second round is plus 3. What will his final score be after two days?

$-5+3=-2$

82. Getbeeger wants to gain some weight. He starts eating well and working out and gains nine pounds over an 8 month time period. Unfortunately at the start of the ninth month he got the flu and lost 7 pounds. Use an integer to describe his total weight gain.

$9-7=2$

83. Sandeesa bought six one-dollar raffle tickets and won five dollars. Use an integer to represent her total winnings. $6 \times \$1 = \$6$

$\$5-\$6=-\$1 \equiv -1$

84. In a town called "Wehtucold", the average temperature during the day is negative 41 degrees Celsius. At night, the temperature drops another 12 degrees. What is the temperature at night?

$-41-12=-53$

What does evaluate mean? Find the answer

Evaluate.

85. $3 - 5 + (-4) =$

$= 3 - 9$

$= -6$

86. $8 - 3 - (-7) =$

$= 8 - 3 + 7$

$= 15 - 3$

$= 12$

87. $-4 + (-1) - 4 =$

$= -4 - 1 - 4$

$= -9$

88. $11 - 2 - (-9) =$

$= 11 - 2 + 9$

$= 20 - 2$

$= 18$

89. $13 - 4 + (-8) =$

$= 13 - 4 - 8$

$= 13 - 12$

$= 1$

90. $-9 + (-2) - 8 =$

$= -9 - 2 - 8$

$= -19$

91. $7 - 2 + (-5) - (-1) =$

$= 7 - 2 - 5 + 1$

$= 8 - 7$

$= 1$

92. $2 - 8 - 4 - (-6) =$

$= 2 - 8 - 4 + 6$

$= 8$

93. $-5 - 1 + (-2) - 5 =$

$= -6 - 2 - 5$

$= -13$

Mark the following right or wrong. If it is incorrect make the appropriate corrections

94. $6 - 2 + -4 + (-5) - (-2) =$

$= 4 + 9 + 2$

$= 15$

Wrong
Ans -3

95. $12 - (-8) - 4 + (-5) =$

$= 12 + 8 - 4 - 5$

$= 12 + 4 - 5$

$= 16 - 5$

$= 11$

96. $-15 - 3 - 2 + (-3) - 4 =$

$= -18 - 1 - 4$

$= -19 - 4$

$= -23$

Wrong
-27

Explain the rules of how to add and subtract integers.

(People who take the time to explain things tend to have a deeper understanding than those that do not.)

Fill in the multiplication table.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

97. The numbers in the bolded boxes are called perfect square numbers. Why might this be?

Evaluate.

98. $2 \times 5 =$	99. $-2 \times 5 =$	100. $2 \times (-5) =$	101. $-2 \times (-5) =$	102. $2(-7) =$
10	-10	-10	10	-14

What are the rules for multiplying integers?

Multiplying and Dividing Integers Review

A positive times a positive is a positive.	A negative times a positive is a negative.	A negative times a negative is a positive.	A positive times a negative is a negative.
$(+) \times (+) = +$	$(-) \times (+) = -$	$(-) \times (-) = +$	$(+) \times (-) = -$

Evaluate. (These questions could be done verbally in class.)

103. $4 \times 6 =$ 24	104. $-8(3) =$ -24	105. $(-11)(-5) =$ 55	106. $-2 \times 23 =$ -46
107. $-55 \div 5 =$ -11	108. $-5 \div (5) =$ -1	109. $(44) \div (-4) =$ -11	110. $-20 \div 4 =$ -5
111. $-9 \times -5 =$ 45	112. $-5(5) =$ -25	113. $(9)(-4) =$ -36	114. $-20 \times 3 =$ -60

Evaluate.

115. $(1)(1) =$ 1	116. $(1)(-1) =$ -1	117. $(-1)(-1) =$ 1
118. $(-1)(-1)(-1) =$ -1	119. $(-1)(-1)(-1)(-1) =$ 1	120. $-(-1)(-1)(-1)(-1) =$ -1

Answer the following with a yes or a no.

121. If two negative numbers are multiplied together will their product be positive?	Yes
122. If three negative numbers are multiplied together will their product be positive?	No
123. If four negative numbers are multiplied together will their product be positive?	Yes
124. If an even number of negative numbers are multiplied together will their product be positive?	Yes
125. If an odd number of negative numbers are multiplied, together will their product be positive?	No

Which of the following are true or false? If a statement is false, provide an example to prove your point.

126. (T/F) The product of positive numbers is always positive.

True

127. (T/F) The sum of positive numbers is always positive.

True

128. (T/F) The quotient of a negative number and a positive number is always negative.

True

129. (T/F) The sum of a negative number and a positive number is always positive.

False

$-3+1=-2$

130. (T/F) The sum of two negative numbers is always positive.

False

$-2+(-3)=-5$

131. (T/F) The product of negative numbers is always positive.

True

132. (T/F) Subtracting a negative number from a negative number is always negative.

False

$-2-(-5)=3$

133. (T/F) Adding a large positive number to a negative number is always positive.

False

$(-101)+100=-1$

Determine whether each product is positive or negative. Do not evaluate.

134. $(-31)(-14)(-91)=$

Negative ✓

135. $(-12)(-51)(-19)(-1)=$

Positive

136. $-(-101)(-1)(-1)(-199)=$

Negative

137. $(-11)(-2)(-12)(2)(-31)=$

Positive

138. $(-1)(11)(-1)(51)(-1)(-2)=$

Positive

139. $(-5)(-92)(-1)(-19)(-2)=$

Negative

Find the product.

140. $2\times 3\times 1=$

6

141. $-2\times 5\times(-1)=$

$=-10\times -1$

$=10$

142. $-4\times(-3)\times(-1)=$

$=12\times -1$

$=-12$

143. $-1\times(-2)\times 3\times(-1)=$

$=2\times -3$

$=-6$

144. $1\times(-2)\times 5\times(-1)=$

$=-2\times -5$

$=10$

145. $-1\times(-1)\times(-1)\times(-4)=$

$=1\times 4$

$=4$

146. $(-1)(-2)(-1)(2)(-1)(-2)=$

$=2\times -2\times 2$

$=-4\times 2$

$=-8$

147. $(-1)(1)(-1)(5)(-1)(-2)=$

$=-1\times -5\times 2$

$=5\times 2$

$=10$

148. $(-5)(-2)(-1)(-1)(-2)=$

$=10\times 1\times -2$

$=10\times -2$

$=-20$

Order of Operations Introduction

How would your school be different if there were no rules? Give 3 examples.

If there were no rules in math, list as many possible answers as you can to the following question: (Be creative!)

$$23 + 2 \times 4$$

149. What does BEDMAS Stand for?

B - brackets
E - exponents
D - Division
M - Multiplication
A - Addition
S - Subtraction.

150. Challenge #2:

Evaluate. $5 - 3(4 - 3 \times 2)^2 =$

$= 5 - 3(4 - 6)^2$

$= 5 - 3(-2)^2$ $(-2)^2 = -2 \times -2 = 4$

$= 5 - 3(4)$

$= 5 - 12$

$= -7$

151. Challenge #3:

Evaluate. $3 + 5((5 - 3) \times 3^2)$

$= 3 + 5((2) \times 3^2)$

$= 3 + 5(2 \times 9)$

$= 3 + 5(18)$

$= 3 + 90$

$= 93$

Order of Operations Review

152. BEDMAS and some nicknames.

The entire world has agreed to complete math problems in the following order:			Using the letters B,E,D,M,A,S, come up with 3 other words that would also be true.			
			Most famous	Alternate 1	Alternate 2	Alternate 3
Step 1	B	Brackets.	B	B	B	B
Step 2	E	Exponents.	E	E	E	E
Step 3	D or M	Division or Multiplication. Do whatever operation comes first working left to right.	D	M	M	D
			M	D	D	M
Step 4	A or S	Addition or Subtraction. Do whatever operation comes first working left to right.	A	A	S	S
			S	S	A	A

Possible solution strategy:

153. Evaluate. $5-3\left(4-3\times 2\right)^2$

Brackets first. Multiply before subtracting.

$5-3(4-6)^2$

Subtract inside the brackets only.

$5-3(-2)^2$

Exponents.

$5-3\times 4$

Multiply.

$5-12$

Subtract.

-7

154. Evaluate. $3+5((5-3)\times 3^2)$

Complete the brackets inside the brackets first.

$3+5\left[(2)\times 3^2\right]$

Exponents.

$3+5\left[(2)\times 9\right]$

Multiply inside the brackets.

$3+5(18)$

Multiply

$3+90$

Add.

93

Evaluate.

155. $20-3\times 2=$

$= 20-6$

$= 14$

156. $20-(5+2)=$

$= 20-7$

$= 13$

157. $20+2(20-15)=$

$= 20+2(5)$

$= 20+10$

$= 30$

158. $20\times 2\div 5=$

$= 40\div 5$ $\quad 20\times 0.4$

$= 8$ or $= 8$

159. $(20-3)\times 2=$

$= 17\times 2$

$= 34$

160. $20-(5-2)=$

$= 20-(3)$

$= 20-3$

$= 17$

161. $20+2(2-3\times 2)=$

$= 20+2(2-6)$

$= 20+2(-4)$

$= 20+(-8)$

$= +12$

162. $20\times(4\div 2)=$

$= 20\times(2)$

$= 40$

Evaluate.

163. $-12-3(-2)=$
$=-12+6$
$=-6$

164. $-8-(-5+2)=$
$=-8-(-3)$
$=-8+3$
$=-5$

165. $12-2(10-15)=$
$=12-2(-5)$
$=12+10$
$=22$

166. $2-4\times(-5)\div 10=$
$=2-(-20\div 10)$
$=2-(-2)$
$=2+2=4$

167. $-\left[20+(-3)\right]\times 2=$
$=-[20-3]\times 2$
$=-[17]\times 2$
$=-34$

168. $-20-\left[5-(-2)\right]=$
$=-20-[5+2]$
$=-20-[7]$
$=-20-7$
$=-27$

169. $-8-2(-2-3\times 2)=$
$=-8-2(-2-6)$
$=-8-2(-8)$
$=-8+16$
$=8$

170. $1-20\times(-8\div 2)=$
$=1-20\times(-4)$
$=1+80$
$=81$

Just to make sure☺→ 5^2 means (5x5) and equals 25. 5^2 does not equal (5x2).

171. Challenge #4: Evaluate each of the following:

$3^2=9$ $\quad -3^2=-9$ $\quad -1\times 3^2=-9$ $\quad (-3)^2=9$

Which question above are people most likely to make a silly mistake on?
-3^2 ; Because one might accidentally think it means $(-3)(-3)$; it means $-(3\times 3)$.

Evaluate.

172. $(5-2)^2=$
$=(3)^2$
$=3\times 3$
$=9$

173. $(-5+2)^2=$
$=(-3)^2$
$=-3\times -3$
$=9$

174. $(5-6)^3=$
$=(-1)^3$
$=-1\times -1\times -1$
$=-1$

175. $(85-86)^4=$
$=(-1)^4$
$=-1\times -1\times -1\times -1$
$=1$

176. $(235-236)^6=$
$=(-1)^6$
$=-1\times -1\times -1\times -1\times -1\times -1$
$=1$

177. $(185-186)^{40}=$
$=(-1)^{40}$
$=1$

178. $(995-996)^{301}=$
$=(-1)^{301}$
$=-1$

179. $(1085-1086)^{40056}=$
$=(-1)^{40056}$
$=1$

180. $5-(5-2)^2=$
$=5-(3)^2$
$=5-9$
$=-4$

181. $7+(-5+2)^2=$
$=7+(-3)^2$
$=7+9$
$=16$

182. $2(5-6)^3=$
$=2(-1)^3$
$=2(-1)$
$=-2$

183. $-3(85-86)^4=$
$=-3(-1)^4$
$=-3(1)$
$=-3$

184. $(5-2)^2\div(-3)=$
$=(3)^2\div(-3)$
$=9\div(-3)$
$=-3$

185. $-2(-5+2)^2+1=$
$=-2(-3)^2+1$
$=-2(9)+1$
$=-18+1$
$=-17$

186. $5-2(15-16)^3=$
$=5-2(-1)^3$
$=5-2(-1)$
$=5+2$
$=7$

187. $12-10(85-86)^4=$
$=12-10(-1)^4$
$=12-10(1)$
$=12-10=2$

Evaluate.

188. $(2)^2+(3)^2=$

$= 4+9$

$= 13$

189. $(-2)^2+(2)^2=$

$= 4+4$

$= 8$

190. $(2)^2-(-3)^2=$

$= 4-(9)$

$= 4-9$

$= -5$

191. $-(-2)^2+(-2)^3=$

$= -(4)+(-8)$

$= -4-8$

$= -12$

192. $-(2)^2+(-3)^2=$

$= -(4)+(9)$

$= -4+9$

$= 5$

193. $(-2)^2+(3)^2=$

$= 4+9$

$= 13$

194. $(3)^2-(-2)^2=$

$= 9-(4)$

$= 9-4$

$= 5$

195. $(-2)^2-(2)^2=$

$= 4-(4)$

$= 4-4$

$= 0$

Evaluate.

196. $3\times 2-5(4-3\times 2)^3+1$

$= 6-5(4-6)^3+1$

$= 6-5(-2)^3+1$

$= 6-5(-8)+1$

$= 6+40+1$

$= 47$

197. $2-2(-4-3\times 2)^2(2)$

$= 2-2(-4-6)^2(2)$

$= 2-2(-10)^2(2)$

$= 2-2(100)(2)$

$= 2-(200)(2)$

$= 2-400$

$= -398$

198. $8\div(2-4)(9-5\times 2)^3+1$

$= 8\div(-2)(9-10)^3+1$

$= 8\div(-2)(-1)^3+1$

$= 8\div(-2)(-1)+1$

$= 8\div(2)+1$

$= 8\div 2+1$

$= 4+1$

$= 5$

Mark the following right or wrong. Make corrections where appropriate.

199. $-5\times 2-4(2-3\times 2)^2-4$

$= -10-4(-2)^2-4$

$= -10-4(4)-4$

$= -10-16-4$

$= -30$

Mark the following right or wrong. Make corrections where appropriate.

200. $5-2\left[-(-4+3)\times 2\right]^2\times 10$

$= 3\left[-(-1)\times 2\right]^2\times 10$

$= 3[\ 4\ ]\times 10$

$= 120$

201. Jordan played 5 rounds of golf. His scores were as follows: $-3,+1,+5,-2,+4$. What is his average per round?

Total Score:

$-3+1+5+(-2)+4$

$= 5$

$\text{Average per round} = \dfrac{\text{Total Score}}{\text{No. of rounds}}$

$\therefore \text{Average} = \dfrac{5}{5} = 1$

Rational Numbers: Decimals and the Four Operations

202. Challenge #5: Estimate and then evaluate.

$82.34 - 6.89 =$

Estimation: $82 - 7 = 75$

Evaluation:
$$\begin{array}{r} 82.34 \\ -\ 6.89 \\ \hline 75.45 \end{array}$$

Write down the steps to evaluate the challenge to the left.

① Round numbers to whole numbers.

② Subtract for Estimation.

203. Challenge #6: Estimate and then evaluate.

$72.84 + 6.59 =$

Estimation : $73 + 7 = 80$

Evaluation .
$$\begin{array}{r} 72.84 \\ +\ 6.59 \\ \hline 79.43 \end{array}$$

Write down the steps to evaluate the challenge to the left.

204. Challenge #7: Estimate and then evaluate.

$2.34 \times 6.8 =$

Estimation: $2 \times 7 = 14$
or $2.3 \times 7 = 16.1$

Evaluation:
$$\begin{array}{r} 2.34 \\ \times\ \ 6.8 \\ \hline 1872 \\ +\ 1404\,0 \\ \hline 15.912 \end{array}$$

Write down the steps to evaluate the challenge to the left.

205. Challenge #8: Estimate and then evaluate.

$234 \div 6.1 =$

Estimation : $234 \div 6 = 39$

Evaluation : $234 \div 6.1 =$
38.36

Write down the steps to evaluate the challenge to the left.

Decimals and Operations Math 8 Review

Estimate and then evaluate.

206. 82.34 – 6.89 =

Solution:

82.34
−6.89
75.45

207. 72.84 + 6.59 =

Solution:

72.84
+6.59
79.43

208. 72.94 – 66.59 =

72.94
−66.59
6.35

209. 112.04 + 50.19 =

112.04
+ 50.19
162.23

210. 67.84 – 46.86 =

67.84
- 46.86
20.98

211. 61.34 + 76.29 =

61.34
+ 76.29
137.63

212. 102.04 + 54.35 =

102.04
54.35
156.39

Right or wrong? Fix it.

213. 62.74 – 61.29 =

62.74
-61.29
1.55

62.74
-61.29
1.45

Evaluate.

214. Vanteegwa just bought a pair of jeans for $62.84, a Polo shirt for $46.57 and 2 pairs of socks for $12.57. How much will this cost him?

Total Cost =
Cost of Jeans + Polo + Socks.

62.84
46.57
+ 12.57
$121.98 - Total Cost.

215. Vinton just received three interest cheques from his investments. The cheques total $62.84, $46.29 and $35.07. Determine the sum of his investment interest.

62.84
46.29
35.07
144.20

216. Cathy's first three bank transactions were as follows:
Deposit:$62.84
Debit: $12.98
Deposit: $84.05
Determine her new balance.

Deposit is positive
Negative is negative

62.84
+ 84.05
146.89 → Total of Deposits
− 12.98 → Minus Debit
$133.91 = Balance

Estimate and then determine the product.

217. $2.34 \times 6.8 =$

234
68
1872
14040
15.912
3 decimals

15.912

218. $62.8 \times 46.2 =$

Estimation
63
x 46
378
2520
2898

Evaluation
62.8
x 46.2
1256
37680
+ 251200
2901.36

219. $72.9 \times 66.12 =$

Est.
73
x 66
438
4380
4818

Eval.
66.12
x 72.9
594108
132240
+ 4628400
4820.048

220. $112.04 \times 50.19 =$

Est.
112
x 50
5600

Eval.
112.04
x 50.19
1008336
112040
000000
+ 5602000
5623.2876

221. $15.3 \times 6.8 =$

Est.
15
x 7
105

Eval.
15.3
x 6.8
12224
91800
104.04

222. $-22.7 \times 4.2 =$

Est.
-23
x 4
-92

Eval.
-22.7
x 4.2
4514
90280
-95.34

223. $-32.9(-26.2) =$

Est.
-33
x -26
198
660
+858

Eval.
-32.9
x -26.2
6518
197540
65800
861.98

224. $112 \times (-0.29) =$

Est.
112
x -0.3
-33.6

Eval.
112
x -0.29
1008
2240
-32.48

Estimate and then evaluate each quotient. Round your answer to 1 decimal place.

225. $234 \div 6 =$

39
6 | 234
18
5

226. $1204 \div 5 =$

240
5 | 1204.0
10
20
20
040

227. $24 \div 7 =$

3.42
7 | 24.00
21
30
28
20
14

$3.42 = 3.4$

228. $-534 \div 8 =$

-66.75
8 | -534.0
48
54
48
60
56
40
40
00

-66.75
$= -66.8$

Do not evaluate. Will the answer be positive or negative?

229. Will the answer to $-4.32 - (-2.95)$ be positive or negative. Explain your thinking.

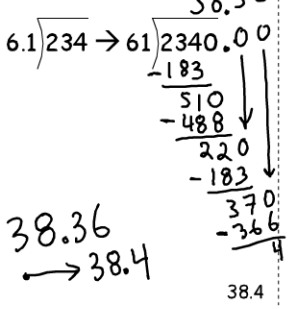
Negative. An odd number of negative signs means the result is negative.

230. Will the answer to $-2 + (-4.2) \times (-2.9)$ be positive or negative. Explain your thinking.

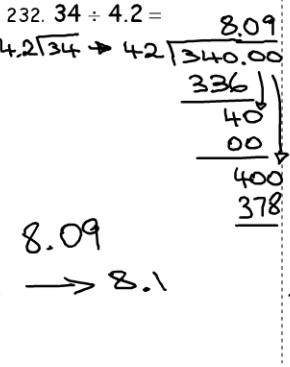
Positive. An even number of negative signs ensures a positive number, which is this will be greater than 2. Therefore positive

Estimate and then evaluate each quotient. Round your answer to 1 decimal place.

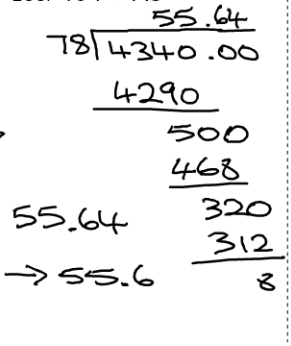
231. $234 \div 6.1 =$



232. $34 \div 4.2 =$

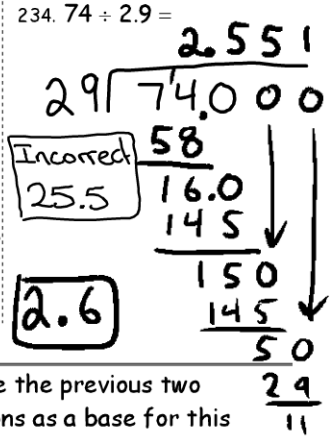


233. $434 \div 7.8 =$



Fix the mistake.

234. $74 \div 2.9 =$



235. Jayme has been hired to put in all the baseboards in work in a 6-unit apartment complex. Each unit requires 48.6 meters of baseboards. If each unit is identical, how many meters of baseboards does he need to buy?

48.6m
× 6
291.6m

236. Use the previous question as a base for this question. Jayme can only find baseboards in 3.7meter lengths. How many baseboards does he need to buy? $291.6m \div 3.7m$

78.81
37 2916.00
2886
300
296
40
37
78.81 → 79 Base Boards

237. Use the previous two questions as a base for this question. How many meters of baseboard are left over?

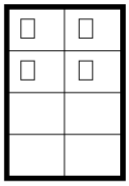
Given $x = -3.56$, $y = 8.86$, $z = -2.23$, Use the values of x,y and z to estimate the following:

MATCH		MATCH	
238. F $x + y$	A. Close to -30.	243. K $x \div z$	H. In between -5 and -6.
239. A $x \times y$	B. Close to -24	244. H $z + x$	I. In between -6 and -7
240. B $z \times y$	C. Close to -16	245. I $x \times z$	J. In between 0 and 1
241. D $x - y$	D. A little more than negative 13.	246. J $z \div y$	K. In between 1 and 2.
242. E $x \div y$	E. A little more than negative half.	247. N $y - z$	L. In between 7 and 8.
	F. A little more than 5.		M. In between 8 and 10
	G. A little less than positive 8.		N. In between 10 and 12.

Equivalent Fractions, Mixed Numbers and Improper Fractions

Equivalent Fractions

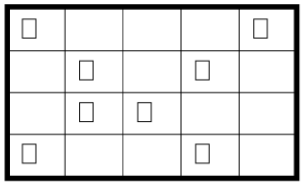
248. **Challenge #9:**
What fraction of the box has apples in it?



List as many correct fractions as you can?

$\frac{1}{2}, \frac{2}{4}, \frac{4}{8}, \ldots$

249. **Challenge #10:**
What fraction of the box has apples in it?

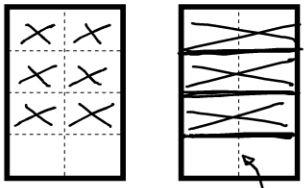


List your answer in lowest terms.

$\frac{8}{20} = \frac{4}{10} = \frac{2}{5}$

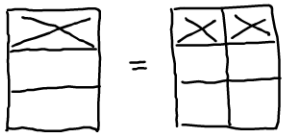
250. **Challenge #11:**
Use a picture to show that

$\frac{6}{8} = \frac{3}{4}$

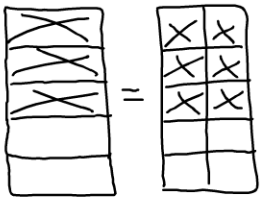


Draw a picture to explain equivalent fractions.

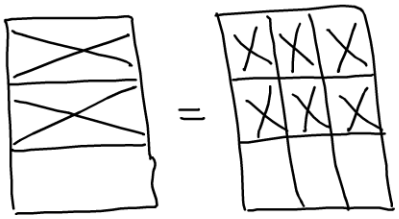
251. Draw a picture to show that $\frac{1}{3}$ is equivalent to $\frac{2}{6}$.



252. Draw a picture to show that $\frac{3}{5}$ is equivalent to $\frac{6}{10}$.



253. Draw a picture to show that $\frac{2}{3}$ is equivalent to $\frac{6}{9}$.



Write each fraction in lowest terms.

254. Reduce. $\frac{6}{10} =$

Solution. $\frac{6}{10} = \frac{2 \times 3}{2 \times 5} = \frac{\cancel{2} \times 3}{\cancel{2} \times 5} = \frac{3}{5}$

255. Reduce. $\frac{14}{35} =$

$\frac{14}{35} = \frac{2 \times 7}{5 \times 7} = \frac{2 \times \cancel{7}}{5 \times \cancel{7}}$

$= \frac{2}{5}$

256. Reduce. $\frac{9}{30} =$

$\frac{9}{30} = \frac{\cancel{3} \times 3}{\cancel{3} \times 10}$

$= 3/10$

257. Reduce.

$-\frac{24}{40} = -\frac{3 \times \cancel{8}}{5 \times \cancel{8}}$

$= -\frac{3}{5}$

258. Reduce.

$3\frac{2}{12} = 3\frac{\cancel{2} \times 1}{\cancel{2} \times 6}$

$= 3\frac{1}{6}$

259. Reduce.

$5\frac{15}{27} = 5\frac{3 \times 5}{3 \times 9}$

$= 5\frac{5}{9}$

260. Reduce.

$-9\frac{2}{48} = -9\frac{2 \times 1}{2 \times 24}$

$= -9\frac{1}{24}$

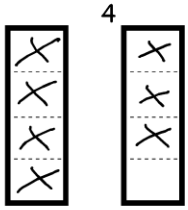
261. Which number is larger? $-\frac{6}{25}$ or $-\frac{28}{100}$

Express $-6/25$ as $?/100$

$\frac{-6}{25} \times \frac{4}{4} = \frac{-24}{100}$ $\therefore -\frac{6}{25}$ is larger

Mixed and Improper Fractions

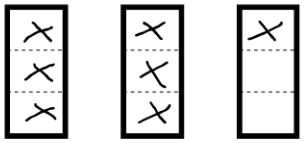
262. **Challenge #12:**
Shade the boxes below to represent $1\frac{3}{4}$.



How many quarters did you shade?

$1\frac{3}{4} = \frac{7}{4}$

263. **Challenge #13:**
Shade the boxes below to represent $2\frac{1}{3}$.

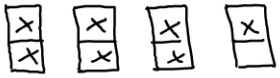


How many thirds did you shade?

$2\frac{1}{3} = \frac{7}{3}$

264. **Challenge #14:**
Does $-3\frac{1}{2} = -\frac{5}{2}$ or $-3\frac{1}{2} = -\frac{7}{2}$?
Explain and/or draw a picture.

1 2 3 ½



$\therefore -3\frac{1}{2} = -\frac{7}{2}$

265. **What is a mixed number?**
A whole #, plus a fraction

266. **What is an improper fraction?**
A fraction where the top is bigger than the bottom.

267. **Challenge #15:** Convert $\frac{9}{4}$ into a mixed number.

$4\overline{)9.0}$ → 2.25

8

10

8

20

$2.25 = 2\frac{1}{4}$

268. **Challenge #16:** Convert $-3\frac{2}{5}$ into an improper fraction.

Change -3 to fifths.

$-\frac{3}{1} \times \frac{5}{5} = \frac{-15}{5}$

So; $\frac{-15}{5} - \frac{2}{5}$

$= -\frac{17}{5}$

Write each improper fraction as a mixed number.

269. $\frac{9}{4}$

Solution:
4 goes into 9 two times with one left over.

$\frac{9}{4} = 2\frac{1}{4}$

270. $\frac{19}{5} = 3\frac{4}{5}$ ($5 \times 3 = 15$ with 4 left over)

271. $-\frac{23}{7} = -3\frac{2}{7}$

272. $\frac{17}{2} = 8\frac{1}{2}$

273. $-\frac{57}{10} = -5\frac{7}{10}$

274. $-\frac{31}{7} = -4\frac{3}{7}$

275. $\frac{46}{5} = 9\frac{1}{5}$

276. **Which number is larger?**
$-\frac{34}{11}$ or $-3\frac{2}{11}$

$-3\frac{2}{11} = -\frac{35}{11}$

$\therefore -\frac{34}{11}$ is larger

Write each mixed number as an improper fraction.

277. $-3\frac{2}{5}$

Solution:
5 times 3 plus 2 is 17.

$-3\frac{2}{5} = -\frac{17}{5}$

278. $-1\frac{1}{5} = -\frac{6}{5}$

279. $4\frac{1}{3} = \frac{13}{3}$

280. $-2\frac{5}{6} = -\frac{17}{6}$

281. $2\frac{2}{7} = \frac{16}{7}$

282. $1\frac{1}{8} = \frac{9}{8}$

283. $-4\frac{2}{5} = -22/5$

284. **Which number is smaller?**
$1\frac{2}{3}$ or $\frac{4}{3}$ $\Rightarrow \frac{5}{3}$ or $\frac{4}{3}$ $\therefore 4/3$ is smaller

Converting between fractions and decimals

285. Challenge #17: Convert each of the fractions to decimals

$\frac{19}{100}$ = 0.19	$\frac{7}{10}$ = 0.7	$\frac{1}{5}$ = 0.2	$\frac{7}{20}$ 0.35	$\frac{3}{25}$ 0.12

286. Challenge #18: Convert $\frac{1}{8}$ to a decimal. Round to 3 decimals.

$$8\overline{)1.000}\quad 0.125$$

$$8 \quad 20 \quad 16 \quad 40 \quad 40 \quad 00$$

$\therefore \frac{1}{8} = 0.125$

Write each fraction as a decimal. Round your answer to the nearest hundredth.

287. $\frac{3}{5}$ =

Solution:
Divide 5 into 3.

$5\overline{)3} \rightarrow 5\overline{)3.0000}$

288. $\frac{7}{6}$ =

$$6\overline{)7.000}\quad 1.166$$

$6 \quad 10 \quad 6 \quad 40 \quad 36 \quad 40 \quad 36$

$\therefore 1.166 \rightarrow 1.17$

289. $\frac{7}{8}$ =

$$8\overline{)7.000}\quad 0.875$$

$64 \quad 60 \quad 56 \quad 40 \quad 40 \quad 00$

$\therefore 0.875 \rightarrow 0.88$

290. $\frac{9}{5}$ =

$$5\overline{)9.00}\quad 1.8$$

$5 \quad 40 \quad 40$

1.80

Write each fraction as a decimal. Round your answer to the nearest hundredth.

291. $\frac{2}{9}$ =

$$9\overline{)2.00}\quad 0.222$$

$18 \quad 20 \quad 18 \quad 20 \quad 18 \quad 2$

$0.222 \rightarrow 0.22$

292. $\frac{2}{8}$ =

$$8\overline{)2.00}\quad 0.25$$

$16 \quad 40$

293. $\frac{5}{8}$ =

$$8\overline{)5.000}\quad 0.625$$

$48 \quad 20 \quad 16 \quad 40$

$0.625 \rightarrow 0.63$

294. $\frac{9}{4}$ =

$$4\overline{)9.00}\quad 2.25$$

$8 \quad 10 \quad 8 \quad 20 \quad 20$

2.25

Write each fraction as a decimal. Round your answer to the nearest hundredth.

295. $\frac{11}{4}$ =

$4\overline{)11.00}$ → 2.75; 8; 30; 28; 20; 20; 0

296. $\frac{7}{9}$ =

$9\overline{)7.000}$ → 0.777; 63; 70; 63; 70; 63; 7

0.777 → 0.78

297. $\frac{8}{10}$ =

$10\overline{)8.0}$ → 0.8; 80; 0

0.8

298. $\frac{4}{5}$ =

$5\overline{)4.00}$ → 0.8; 40; 0

299. $\frac{3}{5}$ =

$5\overline{)3.00}$ → 0.6; 30; 0.

300. $\frac{6}{25}$ =

$25\overline{)6.00}$ → 0.24; 50; 100; 100; 0.

301. $\frac{7}{50}$ =

$50\overline{)700}$ → 0.14; 50; 200; 200; 0

302. $\frac{12}{20}$ =

$20\overline{)12.00}$ → 0.6; 120; 0

303. Look at the answers to 291 and 296. What do you notice?

Repeating decimal.

304. What do you think the decimal equivalent of $\frac{1}{9}$ would be? What about $\frac{12}{99}$?

0.111.....

0.1212....

Write each decimal as a quotient of two integers in lowest terms.

305. 0.5 **Solution:** $0.5 = \frac{5}{10}$	306. 0.6 $= \frac{6}{10}$	307. 0.23 $= \frac{23}{100}$	308. 0.25 $= \frac{25}{100} = \frac{25 \times 1}{25 \times 4} = \frac{1}{4}$
309. 0.65 $= \frac{65}{100} = \frac{5 \times 13}{5 \times 20} = \frac{13}{20}$	310. 0.555... $= \frac{555}{1000} = \frac{5}{9}$	311. 0.777... $= \frac{7}{9}$	312. 0.2323... $= \frac{23}{99}$
313. 0.2525... $= \frac{25}{99}$	314. 0.6565... $= \frac{65}{99}$	315. 0.35 $= \frac{35}{100} = \frac{5 \times 7}{5 \times 20} = \frac{7}{20}$	316. 0.333... $= \frac{3}{9} = \frac{1}{3}$
317. 0.250 $= \frac{25}{100} = \frac{25 \times 1}{25 \times 4} = \frac{1}{4}$	318. 0.2323... $= \frac{23}{99}$	319. 0.48 $= \frac{48}{100} = \frac{4 \times 12}{4 \times 25} = \frac{12}{25}$	320. 0.222... $= \frac{2}{9}$
Right or Wrong? Fix it. 321. 0.125 $= \frac{125}{100} = \frac{25}{20} = \frac{5}{4}$ ✓ Wrong $= \frac{125}{1000} = \frac{25 \times 5}{25 \times 40} = \frac{5}{40} = \frac{1}{8}$	**Right or Wrong? Fix it.** 322. 0.1212... $= \frac{12}{99} = \frac{4}{33}$ ✓ Correct.	**Right or Wrong? Fix it.** 323. 0.45 Wrong. $\frac{45}{100} = \frac{45}{100} = \frac{5 \times 9}{5 \times 20} = \frac{9}{20}$ $= \frac{9}{25}$ ✓	**Right or Wrong? Fix it.** 324. 0.4545... $= \frac{4545}{9999} = \frac{1515}{3333} = \frac{505}{1111} \div \frac{101}{101} = \frac{5}{11}$ ✓ Correct.

Explain what patterns you saw and how you can do these problems in your head!
(Students who take the time to explain what they are doing are more successful in higher grades.)

Ordering and Comparing Rational Numbers

325. Challenge #19: Please help Vincent. He just dropped all his drill bits on the floor. Drill bit cases arrange the bits in order from smallest to biggest. Match the letters to the drill bit sizes

$\frac{3}{8}, \frac{3}{4}, \frac{1}{2}, \frac{7}{8}, \frac{11}{16}, \frac{32}{32}, \frac{1}{8}, \frac{13}{16}$

A, S, T, O, N, I, S, H

326. Challenge #20: Arrange the following numbers from smallest to biggest.

$-0.24, -\frac{1}{4}, -\frac{25}{99}, 0.1$

$-\frac{1}{4} = -0.25$

$-\frac{25}{99} = -0.2525\ldots$

$-\frac{25}{99}, -\frac{1}{4}, -0.24, 0.1$

Write down the steps to complete the challenge to the left.

327. Challenge #21: Find three rational numbers between $-\frac{4}{6}$ and -0.25.

$-\frac{4}{6} = -0.666$

-0.666 to -0.25

Examples: $-0.65; -0.5,$

$-0.4; -0.26.$

Write down the steps to complete the challenge to the left.

With each pair, circle the number that is closest to zero.

328. $-4\frac{1}{2}$ or -4.8

329. -9.3 or 8.9

330. -19 or -18.2

331. $\frac{2}{3}$ or $\frac{3}{9}$

Which rational number is smaller? Circle your answer.

332. $-4\frac{1}{2}$ or -4.8

333. -9.3 or 8.9

334. -19 or -18.2

335. $\frac{2}{3}$ or $\frac{3}{9}$

Which rational number in each pair is bigger? Circle your answer.

336. $-\frac{8}{25}$ or -0.33

$-\frac{8}{25} = -0.32$

$\therefore -\frac{8}{25}$

337. $5.\overline{3}$ or 5.333

Same

338. $-2\frac{3}{20}$ or -0.33

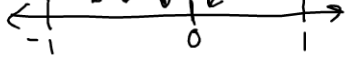
339. $-1.4\overline{5}$ or -1.5

Arrange the following numbers from smallest to biggest.

340. $-0.24, -\frac{1}{4}, -\frac{25}{99}, 0.1$

Possible solution

$-0.24, -0.25, -0.2525\ldots, 0.1$



$-\frac{25}{99}, -\frac{1}{4}, -0.24, 0.1$

341. $2, -8\frac{2}{3}, -\frac{87}{10}, -8.5$

$-8\frac{2}{3} = -8.666$

$-\frac{87}{10} = -8.7$

$\therefore -\frac{87}{10}, -8\frac{2}{3}, -8.5, 2$

342. $2\frac{5}{7}, 2\frac{9}{14}, 2\frac{5}{9}, 2\frac{1}{3}$

$2\frac{5}{7} = 2.72$

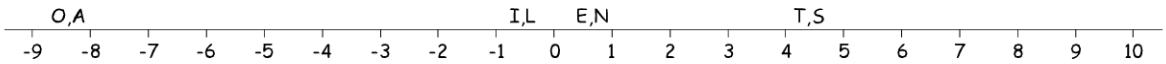
$2\frac{9}{14} = 2.64$

$2\frac{5}{9} = 2.555\ldots.$

$2\frac{1}{3} = 2.333$

$\therefore 2\frac{1}{3}, 2\frac{5}{9}, 2\frac{9}{14}, 2\frac{5}{7}$

343. Match the letters with the best number below.



E, L, A, T, I, O, N, S,

$\frac{4}{5}, -\frac{2}{3}, -\frac{81}{10}, 4\frac{2}{7}$, -0.7, -8.4, 0.85, 4.34

Opposite Numbers: Numbers that are **opposite** are the same distance from zero.

344. True of false. Numbers are opposites if they are the same distance from zero.

True

345. What is the opposite of 8?

-8

346. What is the opposite of $\frac{7}{11}$?

$-7/11$

347. What is the opposite of $-2.\overline{7}$?

$+2.777\ldots$

True or False: If the statement is false, provide an example to support your answer.

348. True or false. If two opposite numbers are multiplied by the same positive number, their products will also be opposites.

True

349. True or false. If two opposite numbers are both increased by the same positive value, their sums will be opposites. False

$10+5=15$

$-10+5=-5$

350. True or false. If A is bigger than B, then the opposite of A will be bigger than the opposite of B. False

$10 > 8$

But, $-10 < -8$

351. If $A > B$ then which of the following is true:

- $-A > -B$
- $-A = -B$
- $-A < -B$

$-A < -B$

List three rational numbers between each pair.

352. $-\frac{4}{6}$ and -0.25

A possible solution.

$-0.\overline{66}$ -0.6 -0.5 -0.3 -0.25

$-\frac{4}{6}$? ? ? $-\frac{1}{4}$

353. $-\frac{3}{8}$ and $-\frac{1}{16}$

$-\frac{3}{8} = \frac{-6}{16}$

$\therefore \frac{-6}{16}$ to $-\frac{1}{16}$

Ex: $\frac{-5}{16}, \frac{-4}{16}, \frac{-3}{32}, -$

Right or wrong? Fix it.

354. 2.7 and $2\frac{7}{8}$

$2.8, 2\frac{13}{16}, 2\frac{15}{16}$

Wrong. $2\frac{15}{16}$ is too big.

Finding the right drill bit.

355. Jono needs to find the right drill bit. He knows that the quarter inch drill bit is too small and the five-sixteenths drill bit is too big. Help him find the right drill bit.

$\frac{1}{4} < \frac{9}{32} < \frac{5}{16}$

$\frac{8}{32}$ $\frac{10}{32}$

Ans: $\frac{9}{32}$

356. Wire comes in different diameters and as the thickness increases so does the cost. Fanlan thinks one eighths wire is too thin and the quarter inch wire is too expensive. Help him find a wire that is in between these diameters.

$\frac{1}{8} < \frac{help}{16} < \frac{1}{4}$

$\frac{2}{16} < \frac{3}{16} < \frac{4}{16}$

Ans: $3/16$

357. Vladdy needs to find the right drill bit. He knows that the five-sixteenths drill bit is too small and the three eights drill bit is too big. Help him find the right drill bit.

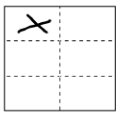
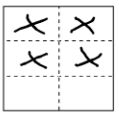
$\frac{5}{16} < \frac{help}{32} < \frac{3}{8}$

$\frac{10}{32} < \frac{11}{32} < \frac{12}{32}$

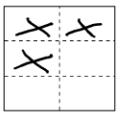
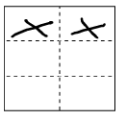
Ans: $\frac{11}{32}$

Operations and Fractions Math 8 Review

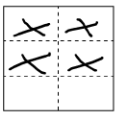
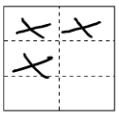
Use the pictures below to help explain how to add and subtract fractions.

358. $\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$

359. $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

360. $\frac{2}{3} - \frac{1}{2} = \frac{1}{6}$

What must you make sure you have before adding or subtracting fractions?

That the number below the fractions are equal.

361. Challenge #22: Estimate and then evaluate.

$$\frac{1}{5} + \frac{3}{5} =$$

$$= \frac{4}{5}$$

Write down the steps to evaluate the challenge to the left.

362. Challenge #23: Estimate and then evaluate.

$$\frac{1}{2} + \frac{3}{5} =$$

$\frac{1}{2} = \frac{5}{10}$ and $\frac{3}{5} = \frac{6}{10}$

$\therefore \frac{5}{10} + \frac{6}{10} = \frac{11}{10}$

Write down the steps to evaluate the challenge to the left.

① Convert Denominators to the same value

② Add fractions, numerators only.

363. Challenge #24: Estimate and then evaluate.

$$2\frac{1}{2} + 1\frac{3}{5} =$$

$2\frac{1}{2} = \frac{5}{2} = \frac{5 \times 5}{2 \times 5} = \frac{25}{10}$

$1\frac{3}{5} = \frac{8}{5} = \frac{8 \times 2}{5 \times 2} = \frac{16}{10}$

$\therefore \frac{25}{10} + \frac{16}{10} = \frac{41}{10}$

Write down the steps to evaluate the challenge to the left.

Summary of Fraction Rules

	Addition	Subtraction	Multiplication	Division
	$3\frac{1}{2}+\frac{6}{7}$	$3\frac{1}{2}-\frac{6}{7}$	$3\frac{1}{2}\times\frac{6}{7}$	$3\frac{1}{2}\div\frac{6}{7}$
Step 1	Convert mixed number to improper fractions.			
	$\frac{7}{2}+\frac{6}{7}$	$\frac{7}{2}-\frac{6}{7}$	$\frac{7}{2}\times\frac{6}{7}$	$\frac{7}{2}\div\frac{6}{7}$
Step 2	Create equivalent fractions with common denominators.		Numerator times numerator and denominator times denominator.	Multiply the first fraction by the reciprocal of the second fraction.
	$\frac{7\times7}{2\times7}+\frac{6\times2}{7\times2}$ $=\frac{49}{14}+\frac{12}{14}$	$\frac{7\times7}{2\times7}-\frac{6\times2}{7\times2}$ $=\frac{49}{14}-\frac{12}{14}$	$\frac{7\times6}{2\times7}$	$\frac{7}{2}\times\frac{7}{6}$
Step 3	Add numerators.	Subtract numerators.	Reduce numerator and denominator.	Reduce numerator and denominator.
	$\frac{61}{14}$	$\frac{37}{14}$	$\frac{\cancel{7}\times6}{2\times\cancel{7}}=\frac{6}{2}=3$	$\frac{49}{12}$

Evaluate and leave your answer in lowest terms.

364. $\frac{1}{5}+\frac{3}{5}=$

Solution:
Since there is already a common denominator:

$\frac{1}{5}+\frac{3}{5}=\frac{4}{5}$

365. $\frac{1}{5}-\frac{3}{5}=$

$-\frac{2}{5}$

366. $\frac{-4}{5}+\frac{-3}{5}=$

$\frac{-7}{5}$

367. $-\frac{2}{5}-\frac{-3}{5}=$

$=-\frac{2}{5}+\frac{3}{5}$

$=\frac{1}{5}$

368. $\frac{1}{2}+\frac{3}{5}=$

Solution:
Create a common denominator.

$=\frac{1\times5}{2\times5}+\frac{3\times2}{5\times2}$

$=\frac{5}{10}+\frac{6}{10}=\frac{11}{10}$

369. $\frac{1}{5}-\frac{3}{4}=$

$\frac{1\times4}{5\times4}-\frac{3\times5}{4\times5}$

$=\frac{4}{20}-\frac{15}{20}$

$=-\frac{11}{20}$

370. $-\frac{4}{3}+\frac{3}{4}=$

$-\frac{4\times4}{3\times4}+\frac{3\times3}{4\times3}$

$=\frac{-16}{12}+\frac{9}{12}$

$=\frac{-7}{12}$

371. $-\frac{2}{3}-\frac{-3}{5}=$

$=-\frac{2\times5}{3\times5}+\frac{3\times3}{5\times3}$

$=\frac{-10}{15}+\frac{9}{15}$

$=\frac{-1}{15}$

372. Which of the following are true? How do you know? Prove it☺

a) $-\frac{8}{2}=\frac{-8}{2}$, b) $-\frac{8}{2}=\frac{8}{-2}$, c) $-\frac{8}{2}=\frac{-8}{-2}$, d) $\frac{-8}{2}=\frac{8}{-2}$

a, b, d. for c) $\frac{-8}{-2}=\frac{8}{2}$; $-\frac{8}{2}\neq\frac{8}{2}$ ∴ False

373. Which of the following are equivalent?

$$\text{a)}\ \frac{2}{-9}+\frac{1}{9},\quad \text{b)}\ \frac{-2}{9}+\frac{1}{-9},\quad \text{c)}\ \frac{-2}{9}-\frac{1}{-9},\quad \text{d)}\ \frac{-2}{9}+\frac{-1}{-9},\quad \text{e)}\ \frac{-2}{9}-\frac{1}{9}$$

a, c, d. & b, e.

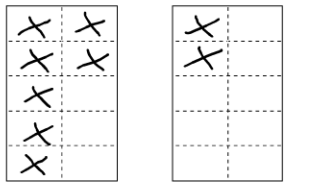
374. Does moving the negative sign from the denominator to the numerator change the value of the fraction?

No.

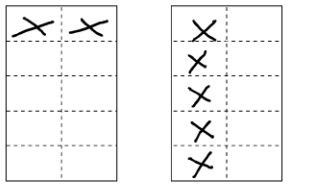
You decide!

375. Consider the possible strategies to the right for evaluating $\frac{1}{3}+\frac{1}{6}$. Which strategy do you like the best?	"Wonda's strategy" $\frac{1}{3}+\frac{1}{6}$ $\rightarrow \frac{2}{6}+\frac{1}{6}$ $\rightarrow \frac{3}{6}=\frac{1}{2}$	"Bethula's Strategy" $\frac{1}{3}+\frac{1}{6}$ $\rightarrow \frac{6}{18}+\frac{3}{18}$ $\rightarrow \frac{9}{18}=\frac{1}{2}$

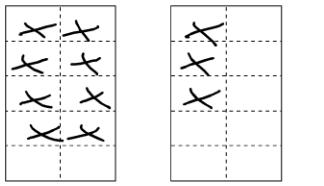
Modify the pictures to explain how to add and subtract fractions.



376. $\frac{7}{10} + \frac{2}{10} = \frac{9}{10}$



377. $\frac{1}{5} + \frac{1}{2} = \frac{7}{10}$



378. $\frac{4}{5} - \frac{3}{10} = \frac{5}{10}$

379. What must you make sure you have before adding or subtracting fractions?

Common denominators.

Keep it simple!

Always move the negative signs to the numerator.

$$\frac{2}{-5}+\frac{1}{5}\rightarrow \frac{-2}{5}+\frac{1}{5},\quad \text{or}\ -\frac{2}{5}+\frac{1}{5}\rightarrow \frac{-2}{5}+\frac{1}{5}$$

Evaluate.

380. $\frac{-4}{5}+\frac{3}{-2}=$

$= \frac{-4\times2}{5\times2} - \frac{3\times5}{2\times5}$

$= -\frac{8}{10} - \frac{15}{10}$

$= -\frac{23}{10}$

381. $\frac{9}{2}-(-0.6)=$

$-0.6 = \frac{6}{10}$.

$\therefore \frac{9}{2} - \left(-\frac{6}{10}\right)$

$= \frac{9}{2} + \frac{6}{10}$

$= \frac{9\times5}{2\times5} + \frac{6}{10}$

$= \frac{45}{10} + \frac{6}{10} = \frac{51}{10}$

382. $3-\frac{3}{4}=$

$= \frac{3}{1} - \frac{3}{4}$

$= \frac{3\times4}{1\times4} - \frac{3}{4}$

$= \frac{12}{4} - \frac{3}{4}$

$= \frac{9}{4}$

383. $-5+\frac{3}{4}=$

$\frac{-5}{1} + \frac{3}{4}$

$= \frac{-5\times4}{1\times4} + \frac{3}{4}$

$= \frac{-20}{4} + \frac{3}{4}$

$= \frac{-17}{4}$

384. $2\frac{1}{2}+1\frac{3}{5}=$

Solution:
Convert the mixed numbers to improper fractions and created common denominators and add fractions.

Sol: 41/10

385. $-2\frac{1}{5}-1.75=$

$-\frac{11}{5} - 1\frac{3}{4}$

$= -\frac{11}{5} - \frac{7}{4}$

$= \frac{-11\times4}{5\times4} - \frac{7\times5}{4\times5}$

$= \frac{-44}{20} - \frac{35}{20}$

$= \frac{-79}{20}$

386. If $x=\frac{4}{-3}$ and $y=1\frac{3}{4}$, determine a value for x+y.

$\frac{4}{-3} + 1\frac{3}{4}$

$= -\frac{4}{3} + \frac{7}{4}$

$= \frac{-4\times4}{3\times4} + \frac{7\times3}{4\times3}$

$= \frac{-16}{12} + \frac{21}{12} = \frac{5}{12}$

Right or wrong? Fix it.

387. $\frac{8}{-1}-\frac{-3}{5}=$

Wrong
$-37/5$

$= \frac{8}{-1} - \frac{-3}{5}$

$= \frac{40}{-5} - \frac{-3}{5}$

$= \frac{40}{-5} + \frac{3}{5}$

$= \frac{43}{-5}$ ✓

388. Jayda is sitting in her tree fort $2\frac{1}{5}$ meters above the ground. Bilinter is sitting in his tree fort $3\frac{1}{3}$ m above the ground. How much higher in the air is Bilinter?

$3\frac{1}{3} - 2\frac{1}{5}$

$= \frac{10}{3} - \frac{11}{5}$

$= \frac{10\times5}{3\times5} - \frac{11\times3}{5\times3}$

$= \frac{50}{15} - \frac{33}{15}$

$= + \frac{17}{15}$

$= 1\frac{2}{15}$ m.

389. Sasha has 24 feet of baseboard material. He has measured his bedroom and needs the following lengths to finish the room: $5\frac{1}{2}$ feet, $11\frac{3}{16}$ feet and $12\frac{1}{8}$ feet. How much more baseboard material does he need to buy?

$5\frac{1}{2} + 11\frac{3}{16} + 12\frac{1}{8}$

$= 28 + \frac{1}{2} + \frac{3}{16} + \frac{1}{8}$

$= 28 + \frac{1\times8}{2\times8} + \frac{3}{16} + \frac{1\times2}{8\times2}$

$= 28 + \frac{8}{16} + \frac{3}{16} + \frac{2}{16}$

$= 28 + \frac{13}{16}$

$= 28\frac{13}{16}$

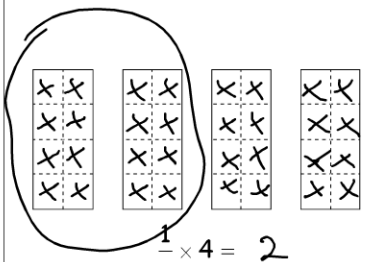
$\therefore 28\frac{13}{16} - 24$

$= 4\frac{13}{16}$ ft.

Multiplying and Dividing Fractions

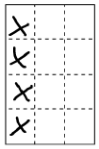
Modify the pictures to explain each of the math problems below.

390. One half of 4.



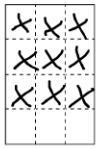
$\frac{1}{2} \times 4 = 2$

391. One half of one third.



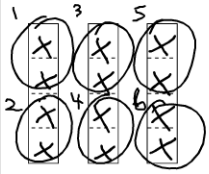
$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

392. Two thirds of three fourths.



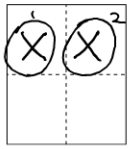
$\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$

393. How many times does a half divide into three?



$3 \div \frac{1}{2} = 6$

394. How many times does a quarter divide into a half?



$\frac{1}{2} \div \frac{1}{4} = 2$

395. Challenge #25: Estimate and then evaluate.

$$\frac{10}{6} \times \frac{8}{5}$$

$$= \frac{80}{30} = \frac{8 \times 10}{3 \times 10} = \frac{8}{3}$$

Write down the steps to evaluate the challenge to the left.

396. Challenge #26: Estimate and then evaluate.

$$\frac{4 \times 5}{5 \times 3} \times \frac{3 \times 5}{10 \times 2}$$

$$= \frac{4}{3} \times \frac{3}{2 \times 2}$$

$$= \frac{12}{3 \times 4} = \frac{12}{12} = 1$$

Write down the steps to evaluate the challenge to the left.

397. Challenge #27: Estimate and then evaluate.

$$2\frac{1}{4} \times \frac{8}{3} =$$

$$= \frac{9}{4} \times \frac{8}{3}$$

$$= \frac{72}{12}$$

$$= 6$$

Write down the steps to evaluate the challenge to the left.

Will the following products and quotients be positive or negative? Do not evaluate.

398. $\frac{-2}{3} \times -\frac{4}{5} \times \frac{1}{-6}$

negative

399. $-\frac{5}{7} \times \frac{-1}{-4} \div \frac{-5}{8}$

Positive

400. $\left(-\frac{2}{9}\right)^3 \times \left(-\frac{4}{7} \times \frac{5}{-6}\right)^5$

Negative

401. $-\left(\frac{-2}{3}\right) \times \left(-\frac{4}{5}\right)^2 \times \frac{1}{-6}$

Negative

You decide.

402. Consider the possible strategies to the right for evaluating $\frac{24}{25} \times \frac{20}{9}$. Read David's and Bryn's strategies and decide which one you like better.

"David's strategy"

$\frac{24}{25} \times \frac{20}{9}$

$\rightarrow \frac{480}{225} \rightarrow \frac{\div 5}{\div 5}$

$\rightarrow \frac{96}{45} \frac{\div 3}{\div 3} \rightarrow \frac{32}{15}$

"Bryn's Strategy"

$\frac{24}{25} \times \frac{20}{9}$

$\rightarrow \frac{\overset{8}{\cancel{24}}}{\underset{5}{\cancel{25}}} \times \frac{\overset{4}{\cancel{20}}}{\underset{3}{\cancel{9}}}$

$\rightarrow \frac{8 \times 4}{5 \times 3} = \frac{32}{15}$

Find the product and leave your answer in lowest terms.

403. $\frac{10}{6} \times \frac{8}{5}$

Solution #1.

$\frac{10}{6} \times \frac{8}{5} = \frac{80}{30} = \frac{8}{3}$

Solution #2.

$\frac{\cancel{10}}{6} \times \frac{8}{\cancel{5}} \rightarrow \frac{2}{\cancel{6}} \times \frac{\cancel{8}}{1} \rightarrow$

$\rightarrow \frac{2}{3} \times \frac{4}{1} = \frac{8}{3}$

404. $\frac{2}{3} \times \frac{6}{8} =$

Sol #1

$\frac{2}{3} \times \frac{6}{8} = \frac{12}{24} = \frac{1}{2}$

Sol. #2

$\frac{\overset{1}{\cancel{2}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{2}{\cancel{6}}}{\underset{4}{\cancel{8}}}$

$= \frac{2}{4} = \frac{1}{2}$

405. $-\frac{12}{9} \times \frac{-6}{10} =$

$\frac{-12}{9} \times \frac{-6}{10}$

$= \frac{72}{90}$

$= \frac{36}{45}$

$= \frac{4}{5}$

406. $-\left(\frac{3}{5} \times -\frac{10}{15}\right) =$

$-\left(\frac{3}{5} \times -\frac{10}{15}\right)$

$= -\left(-\frac{30}{75}\right)$

$= \frac{30}{75}$

$= \frac{2}{5}$

407. $\frac{1}{4} \times 9 =$

Solution:

$\frac{1}{4} \times \frac{9}{1} =$

$\frac{9}{4}$

408. $-15 \times \frac{8}{5} =$

$\frac{\overset{3}{\cancel{-15}}}{1} \times \frac{8}{\underset{1}{\cancel{5}}}$

$= -3 \times 8$

$= -24$

409. $\frac{1}{4} \times 16 =$

$\frac{1}{\underset{1}{\cancel{4}}} \times \frac{\overset{4}{\cancel{16}}}{1}$

$= 4$

410. Determine a value for $(m \times n)$, if $m = -\frac{5}{12}$ and $n = 9$,

$-\frac{5}{12} \times \frac{9}{1}$

$= \frac{-45}{12} = \frac{-15}{4}$

Find the product and leave your answer in lowest terms.

411. $2\frac{1}{4} \times \frac{8}{3} =$

Solution:

$\frac{9}{4} \times \frac{8}{3} =$

$\frac{9}{4} \times \frac{8}{3} = \frac{3}{4} \times \frac{8}{1}$

$\frac{3}{4} \times \frac{8}{1} = \frac{3}{1} \times \frac{2}{1} = 6$

412. $3\frac{3}{4} \times \frac{2}{5} =$

$\frac{15}{4} \times \frac{2}{5}$

$= \frac{3}{4} \times \frac{2}{1}$

$= \frac{3}{2}$

413. $-\frac{2}{11} \times \left(-5\frac{1}{2}\right) =$

$-\frac{2}{11} \times -\frac{11}{2}$

$= +1$

Right or wrong? Fix it.

414. $4\frac{4}{3} \times 0.6 =$

Wrong 16/5

$= \frac{16}{3} \times \frac{6}{10}$

$= \frac{16}{1} \times \frac{3}{10}$

$= \frac{8}{1} \times \frac{3}{5}$

$= \frac{24}{5}$

415. $\frac{30}{12} \times \frac{6}{5} \times \frac{4}{6} =$

$= \frac{6}{3}$

$= 2$

416. $-\frac{2}{7} \times \frac{-14}{50} \times \frac{5}{-6} =$

$= -\frac{2}{30}$

$= -\frac{1}{15}$

417. $\frac{30}{-12} \times \frac{6}{55} \times -22 =$

$= 6.$

418. $\frac{20}{4} \times \frac{12}{36} \times \frac{9}{15} =$

$= \frac{5}{1} \times \frac{1}{3} \times \frac{3}{5}$

$= \frac{5 \times 3}{3 \times 5}$

$= 1.$

Right or wrong? Fix it.

419. $-\left(\frac{33}{15} \times \frac{10}{55} \times -30\right) =$

$= \frac{-33}{15} \times \frac{10}{55} \times \frac{-30}{1}$

$= \frac{-3}{15} \times \frac{10}{5} \times \frac{-30}{1}$

$= \frac{-3}{3} \times \frac{5}{5} \times \frac{-30}{1}$

$= 30$

Wrong 12

420. $\frac{60}{-40} \times -\frac{12}{72} \times \frac{-36}{-15} =$

$= -\frac{3}{2} \times -\frac{1}{6} \times \frac{12}{5}$

$= \frac{36}{60}$

$= \frac{3}{5}$

421. $-\frac{5}{36} \times \frac{3}{2} \times (-24) =$

$= -\frac{5}{3} \times \frac{3}{2} \times \frac{-24}{1}$

$= -\frac{5}{1} \times \frac{3}{2} \times -\frac{2}{1}$

$= -5 \times -1$

$= 5$

422. $\frac{2}{70} \times 14 \times \frac{50}{6} =$

$= \frac{2}{5} \times \frac{14}{1} \times \frac{50}{6}$

$= \frac{2}{1} \times \frac{50}{6}$

$= \frac{20}{6}$

$= 3\frac{2}{6}$

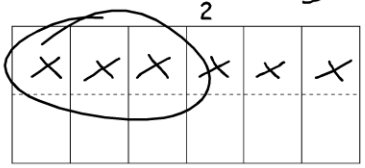
$= 3\frac{1}{3}$

or $\frac{10}{3}$

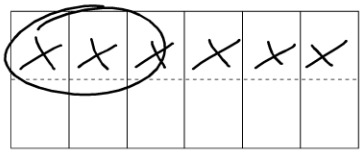
Rational Numbers: Dividing Fractions.

423. Challenge #28: Is $6 \times \frac{1}{2}$ equivalent to $6 \div 2$? Use the drawing below to support your answer.

$6 \times \frac{1}{2} = 3$



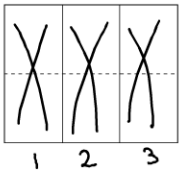
$6 \div 2 = 3$



Yes.

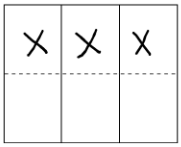
424. Challenge #29: Is $3 \div \frac{1}{2}$ equivalent to 3×2? Use the drawing below to support your answer.

$3 \div \frac{1}{2} = 6$



There are six 1/2's

$3 \times 2 = 6.$



Observation.

Dividing two fractions is the same as flipping the second fraction and then multiplying. The **reciprocal** of a rational number is the same as flipping the fraction. For instance the **reciprocal** of $\frac{7}{3}$ is $\frac{3}{7}$.

425. Create a rule: $\frac{a}{b} \div \frac{c}{d}$ is equivalent to $\frac{a}{b} \times \frac{d}{c}$.

You decide!

426. Consider the possible strategies to the right for evaluating $\frac{5}{6} \div \frac{2}{3}$. Which strategy do you like the best?

"David's strategy"

$\frac{5}{6} \div \frac{2}{3}$

$\rightarrow \frac{5}{6} \times \frac{3}{2} = \frac{15}{12} = \frac{5}{4}$

"Bryn's Strategy"

$\frac{5}{6} \div \frac{2}{3}$

$\rightarrow \frac{5}{6} \div \frac{4}{6} \rightarrow 5 \div 4 = \frac{5}{4}$

Reciprocals.

427. Determine the reciprocal of $-\frac{2}{7}$.

$-\frac{7}{2}$

428. Determine the reciprocal of $\frac{m}{n}$.

$\frac{n}{m}$

429. Is the reciprocal of $1\frac{2}{7}$, $1\frac{7}{2}$?

No.

430. Determine the reciprocal of $3\frac{1}{5}$.

$\frac{16}{5} = \frac{5}{16}$

Find the quotient.

431. $\frac{1}{4} \div \frac{5}{8} =$

Solution.

$\frac{1}{4} \div \frac{5}{8} \rightarrow$

Multiply the first fraction by the reciprocal of the second.

$\frac{1}{4} \times \frac{8}{5} = \frac{8}{20} = \frac{2}{5}$

432. $\frac{3}{4} \div \frac{5}{6} =$

$\frac{3}{4} \times \frac{6}{5} = \frac{18}{20}$

$= \frac{9}{10}$

433. $\frac{2}{3} \div 1\frac{2}{6} =$

$\frac{2}{3} \div \frac{8}{6}$

$= \frac{2}{3} \times \frac{6}{8}$

$= \frac{12}{24} = \frac{1}{2}$

434. $\frac{12}{9} \div \frac{10}{6} =$

$\frac{12}{9} \times \frac{6}{10}$

$= \frac{72}{90}$

$= \frac{4}{5}$

435. $-\frac{21}{40} \times \frac{80}{7} =$

$= -\frac{3\cancel{21}}{\cancel{40}_{1}} \times \frac{\cancel{80}^{2}}{\cancel{7}_{1}}$

$= -6$

436. $\frac{-2}{3} \times \frac{8}{-6} =$

$= -\frac{2}{3} \times -\frac{8}{6}$

$= \frac{16}{18}$

$= \frac{8}{9}$

437. $5\frac{5}{4} \div \frac{-5}{8} =$

$= \frac{25}{4} \times -\frac{8}{5}$

$= -\frac{200}{20}$

$= -10$

438. $-\frac{30}{50} \div 15 =$

$= -\frac{30}{50} \times \frac{1}{15}$

$= \frac{-2}{50} \times \frac{1}{1}$

$= -\frac{1}{25}$

439. At birth puppy is $\frac{2}{3}$ of a foot from nose to tail. Three years later the same puppy is $4\frac{2}{3}$ feet from nose to tail. How many times longer is at after three years of life?

$4\frac{2}{3} \div \frac{2}{3}$

$= \frac{14}{3} \times \frac{3}{2}$

$= \frac{14}{\cancel{7}} \times \frac{\cancel{3}}{2}$

$= \frac{14}{2} = 7$ times

440. Weh Tueold was 180cm tall when he was a young man. Due to poor posture, he is now $\frac{4}{5}$ of his younger height. How tall is he now?

$180\text{cm} \times \frac{4}{5}$

$= \frac{\overset{36}{\cancel{180}}}{1} \times \frac{4}{\cancel{5}_{1}}$

$= 36 \times 4$

$= 144\text{cm}$

Order of Operations with Fractions Math 8 Review

441. Challenge #30: The following formula converts degrees Celsius to degrees Fahrenheit: $F = \frac{9}{5}C + 32$. Convert $6\frac{2}{3}$ degrees Celsius to degrees Fahrenheit.

Write down the steps to evaluate the challenge to the left.

$$F = \frac{9}{5}\left(6\frac{2}{3}\right) + 32$$
$$= \frac{9}{5}\left(\frac{20}{3}\right) + 32$$
$$= \left(\frac{\cancel{9}^{3}}{\cancel{5}_{1}} \times \frac{\cancel{20}^{4}}{\cancel{3}_{1}}\right) + 32$$
$$\Rightarrow F = (12) + 32 = 44$$

442. Challenge #31: The following formula converts degrees Fahrenheit to degrees Celsius: $C = \frac{5}{9}(F - 32)$. Convert 59 degrees Fahrenheit to degrees Celsius.

Write down the steps to evaluate the challenge to the left.

$$C = \frac{5}{9}(59 - 32)$$
$$= \frac{5}{9}(27)$$
$$= \frac{5}{\cancel{9}_{1}} \times \frac{\cancel{27}^{3}}{1}$$
$$= 15^{\circ}C$$

Reduce any of the following. Do not evaluate.

443. True or false.

$$\frac{2}{5} + \frac{5}{3} = \frac{2}{\cancel{5}} + \frac{\cancel{5}}{3}$$
$$= \frac{2}{1} + \frac{1}{3}$$

False

444. True or false.

$$\frac{2}{5} \times \frac{5}{3} = \frac{2}{\cancel{5}} \times \frac{\cancel{5}}{3}$$
$$= \frac{2}{1} \times \frac{1}{3}$$

True

445. Reduce as much as possible without evaluating. Do not evaluate.

$$\frac{1}{15} + \frac{15}{4} \times \frac{28}{9}$$
$$\frac{1}{15} + \frac{5}{1} \times \frac{7}{3}$$

446. Reduce as much as possible without evaluating. Do not evaluate.

$$\frac{12}{18} + \frac{35}{21} + \frac{20}{30}$$
$$= \frac{\cancel{12}^{2}}{\cancel{18}_{3}} + \frac{\cancel{35}^{5}}{\cancel{21}_{3}} + \frac{\cancel{20}^{2}}{\cancel{30}_{3}}$$
$$= \frac{2}{3} + \frac{5}{3} + \frac{2}{3}$$

What is the first step in each of the following? Do not evaluate.

447. $\frac{2}{3}+\frac{5}{6}\times\frac{4}{9}$

Multiply

448. $\frac{2}{3}\div\left(\frac{5}{6}-\frac{4}{9}\right)$

Subtract

449. $\frac{2}{3}-\left(\frac{1}{2}\right)^2\times\frac{3}{2}$

Exponents

450. $\frac{2}{3}\div 1\frac{4}{9}$

Mixed number to improper fraction

451. $\frac{2}{3}\div\frac{1}{7}$

Flip & multiple

Evaluate and leave your answer in lowest terms.

452. $-2+\frac{10}{14}\times\frac{8}{5}=$

$=-2+\frac{\cancel{10}^{5}}{\cancel{14}_{7}}\times\frac{8}{\cancel{5}_{1}}$

$=-2+\frac{8}{7}$

$=\frac{-2\times 7}{1\times 7}+\frac{8}{7}$

$=-\frac{14}{7}+\frac{8}{7}$

$=-\frac{6}{7}$

453. $\frac{20}{40}-\frac{21}{40}\times\frac{80}{7}=$

$=\frac{20}{40}-\frac{\cancel{21}^{3}}{\cancel{40}_{1}}\times\frac{\cancel{80}^{2}}{\cancel{7}_{1}}$

$=\frac{1}{2}-3\times 2$

$=\frac{1}{2}-6$

$=\frac{1}{2}-\frac{12}{2}$

$=-\frac{11}{2}$

454. $\frac{-2}{5}\left(\frac{1}{2}-\frac{6}{8}\right)=$

$=-\frac{2}{5}\left(\frac{1}{2}-\frac{6}{8}\right)$

$=-\frac{2}{5}\left(\frac{4}{8}-\frac{6}{8}\right)$

$=-\frac{2}{5}\left(-\frac{2}{8}\right)$

$=\frac{4}{40}$

$=\frac{1}{10}$

455. $\left(\frac{1}{3}-\frac{6}{9}\right)\frac{3}{5}=$ Will the answer be positive or negative? How do you know? Do not evaluate.

Negative, $\frac{6}{9}$ is greater than $\frac{1}{3}$.

In your own words explain step by step how you would do question 452 above.

(Scientists have found that students who learn how to explain what they are doing are more successful than those who just memorize the procedures.)

Evaluate and leave your answer in lowest terms.

Right or wrong? Fix it.

456. $\frac{10}{12} + \left(\frac{3}{2}\right)^2 =$

Incorrect $\frac{37}{12}$

$= \frac{5}{6} + \frac{6}{4}$

$= \frac{20}{24} + \frac{36}{24}$

$= \frac{56}{24}$

$= \frac{28}{12} = \frac{7}{3}$ ✓

457. $-3 + \frac{10}{6} \times \frac{8}{12} =$

$= -3 + \frac{5}{\cancel{6}_3} \times \frac{\cancel{8}^2}{\cancel{12}_3}$

$= -3 + \frac{5}{3} \times \frac{2}{3}$

$= \frac{-3}{1} + \frac{10}{9}$

$= \frac{-3 \times 9}{1 \times 9} + \frac{10}{9}$

$= \frac{-27}{9} + \frac{10}{9}$

$= -\frac{17}{9}$

458. $\left(-\frac{2}{3} + \frac{1}{2}\right)^2 =$

$= \left(-\frac{2 \times 2}{3 \times 2} + \frac{1 \times 3}{2 \times 3}\right)^2$

$= \left(-\frac{4}{6} + \frac{3}{6}\right)^2$

$= \left(-\frac{1}{6}\right)^2$

$= -\frac{1}{6} \times -\frac{1}{6}$

$= \frac{1}{36}$

459. $\left(\frac{-5}{6} + 2\right)^2 =$

Will the answer be positive or negative? Do not evaluate. How do you know?

Positive, because the exponent will get rid of the negative even if there is a neg inside the brackets.

460. The difference of seven halves and six quarters is multiplied by negative two fifths. Find this rational number.

$\left(\frac{7}{2} - \frac{6}{4}\right)\left(-\frac{2}{5}\right)$

$= \left(\frac{7 \times 2}{2 \times 2} - \frac{6}{4}\right)\left(-\frac{2}{5}\right)$

$= \left(\frac{14}{4} - \frac{6}{4}\right)\left(-\frac{2}{5}\right)$

$= \left(\frac{8}{4}\right)\left(-\frac{2}{5}\right) = -\frac{16}{20}$

$= -\frac{4}{5}$

461. How much bigger is one and one third all squared than twelve twentieths?

$\left(1\frac{1}{3}\right)^2 \div \frac{12}{20}$

$= \left(\frac{4}{3}\right)^2 \div \frac{3}{5}$

$= \left(\frac{4}{3}\right)\left(\frac{4}{3}\right) \times \frac{5}{3}$

$= \frac{16}{9} \times \frac{5}{3}$

$= \frac{80}{27}$

462. Jovan makes two and a half times more than Erin does. Erin makes half as much as Matty. If Matty makes $1250 per week, who makes more money Jovan or Matty and by how much?

M = $1250

Erin: $1250 \div 2 = 625$

Jovan: $625 \times 2\frac{1}{2} = 625 \times \frac{5}{2}$

$= \frac{3125}{2} = 1562\frac{1}{2}$

$1526\frac{1}{2} - 1250 = 312.50$

Jovan by $312.50

Simplify. These are tough. You can do it. Use the answer key for hints IF needed.

463. $\frac{mn}{m} \div \frac{mn}{n} =$

$= \frac{\cancel{m}\cancel{n}}{\cancel{m}} \times \frac{\cancel{n}}{m\cancel{n}}$

$= \frac{n}{m}$

464. $\frac{nm}{mn} \div \frac{mn}{nm} =$

$= \frac{\cancel{nm}\cancel{n}}{\cancel{nm}\cancel{n}} \times \frac{\cancel{nm}\cancel{n}}{n\cancel{m}\cancel{n}}$

$= 1.$

465. $\frac{mn}{mm} \div \frac{n}{m} =$

$= \frac{\cancel{m}\cancel{n}\cancel{m}}{\cancel{m}\cancel{m}\cancel{n}} \times \frac{\cancel{m}}{\cancel{n}}$

$= 1.$

466. $\frac{mn}{mn} \div \frac{mnn}{nmn} =$

$= \frac{\cancel{n}}{\cancel{n}\cancel{m}} \times \frac{\cancel{n}\cancel{m}\cancel{n}}{\cancel{n}\cancel{m}\cancel{n}}$

$= 1.$

Rational numbers and Irrational numbers.

Up to this point we have been studying and working with rational numbers. Each of the following numbers are rational numbers.

5	-2.4	$\frac{2}{9}$	$\frac{51}{100}$	$\frac{15}{90}$
Equivalent forms 5 or 5.000…	Equivalent forms -2.4 or -2.4000…	Equivalent forms 0.222	Equivalent forms 0.51 or 0.51000…	Equivalent forms 0.1666…

Study the above rational numbers. What makes a number rational?

467. True of false. True	If a number can be written in fraction form where the numerator and denominator are both integers and the denominator does not equal zero then, it is a rational number.
468. True of false. True	If a number's decimal stops, (3.4 or -7), then it is a rational number.
469. True of false. True	If a number's decimal repeats (0.333… or -1.0222…), then it is a rational number.

The following numbers are irrational numbers.

$\sqrt{2}$ = 1.41421 35623 73095 04880 16887 24209 69807 85696 71875 37694 80731 76679....

$\sqrt{3}$ = 1.73205 08075 68877 29352 74463 41505 87236 69428 05253 81038 06280 5580...

π=3. 1415926535 8979323846 2643383279 5028841971 6939937510 5820974944 5923078164 …

What makes a number rational?

470. A number is irrational if its decimal never stops or never repeats.

471. Square roots of integers that are not perfect squares are always irrational *numbers.*

472. Which of the following numbers are irrational? $\sqrt{0}$ $\sqrt{1}$ $\sqrt{2}$ $\sqrt{3}$ $\sqrt{4}$ $\sqrt{5}$ $\sqrt{6}$ $\sqrt{7}$ $\sqrt{8}$ $\sqrt{9}$

$\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{6}, \sqrt{7}, \sqrt{8}$

Pi: The most famous irrational number.

π = 3. 1415926535 8979323846 2643383279 5028841971 6939937510 5820974944 5923078164
0628620899 8628034825 3421170679 8214808651 3282306647 0938446095 5058223172 5359408128 4811174502 8410270193
8521105559 6446229489 5493038196 4428810975 6659334461 2847564823 3786783165 2712019091 4564856692 3460348610
4543266482 1339360726 0249141273 7245870066 0631558817 4881520920 9628292540 9171536436 7892590360 0113305305
4882046652 1384146951 9415116094 3305727036 5759591953 0921861173 8193261179 3105118548 0744623799 6274956735
1885752724 8912279381 8301194912 9833673362 4406566430 8602139494 6395224737 1907021798 6094370277 0539217176
2931767523 8467481846 7669405132 0005681271 4526356082 7785771342 7577896091 7363717872 1468440901 2249534301
4654958537 1050792279 6892589235 4201995611 2129021960 8640344181 5981362977 4771309960 5187072113 4999999837
2978049951 0597317328 1609631859 5024459455 3469083026 4252230825 3344685035 2619311881 7101000313 7838752886
5875332083 8142061717 7669147303 5982534904 2875546873 1159562863 8823537875 9375195778 1857780532 1712268066

Pi has been calculated to over 1,241,100,000,000 decimal digits. If the digits above were continued here, this guidebook would need to be 70 kilometers thick. The paper required to produce this guidebook would cost more than 6.2 million dollars plus tax at Office depot in 2009 dollars.

473. True or false. The square root of each number is an irrational number.

False. $\sqrt{9} = 3$

474. Draw a square with an area of 9cm^2. What is the length of each side?

3

3

475. Draw a square with an area of 16cm^2. What is the length of each side?

4.

476. Draw a square with an area of 25cm^2. What is the length of each side?

5

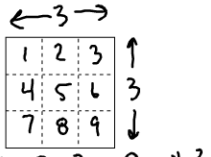
477. The area of a square is always a perfect square number. 1,4,9,16...are all perfect square numbers. How can you determine if a number is a perfect square or not?

The product of 2 equal numbers.

478. The side length of a square is always the square root of the area of a square. Explain what a square root is.

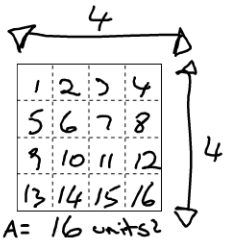
The quotient of a number and itself.

Determine the area of each square.



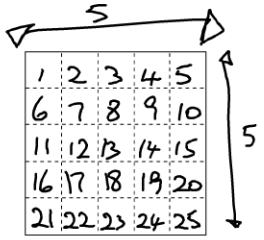
479. A= $3 \times 3 = 9$ units^2

Determine the square root of each area.



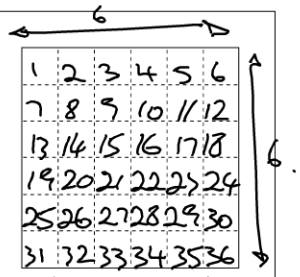
480. A= 16 units^2

Determine the square root of each area.



481. A= 25 units^2

Determine the square root of each area.

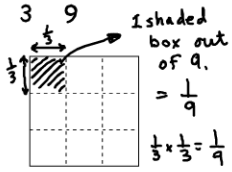


482. A= 36 units^2

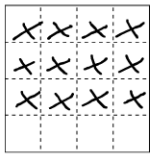
Determine the square root of each area.

Use the squares below to explain the following:

483. Show that $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$.



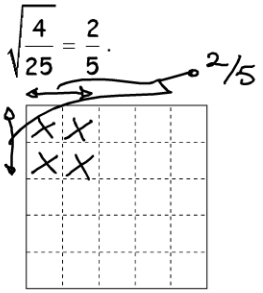
484. Show that $\left(\frac{3}{4}\right)^2 = \frac{9}{16}$.



$\frac{12}{16}$ eq $= \frac{3}{4}$; $\therefore (3/4)^2 = \frac{9}{16}$

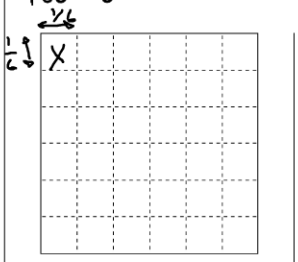
$\frac{3}{4}$ of 12 = 9

485. Show that $\sqrt{\frac{4}{25}} = \frac{2}{5}$.



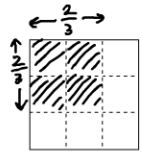
or $\frac{\sqrt{4}}{\sqrt{25}} = \frac{2}{5}$

486. Show that $\sqrt{\frac{1}{36}} = \frac{1}{6}$.



Use the square below to find each square root.

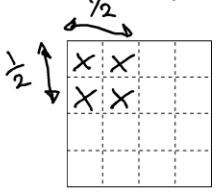
487. Evaluate. $\sqrt{\frac{4}{9}}$



$\therefore \sqrt{\frac{4}{9}} = \frac{2}{3}$

or $\frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

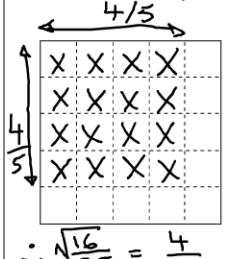
488. Evaluate. $\sqrt{\frac{4}{16}}$



$\therefore \sqrt{\frac{4}{16}} = \frac{1}{2}$

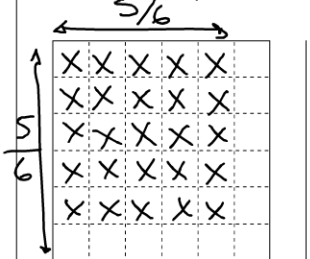
or $\sqrt{4}/\sqrt{16} = \frac{2}{4} = 1/2$

489. Evaluate. $\sqrt{\frac{16}{25}}$



$\therefore \sqrt{\frac{16}{25}} = \frac{4}{5}$

490. Evaluate. $\sqrt{\frac{25}{36}}$



$\therefore \frac{\sqrt{25}}{\sqrt{36}} = \frac{5}{6}$

491. List the first 20 non-zero perfect squares.

1	4	9	16	25	36	49	64	81	100
121	144	169	196	225	256	289	324	361	400

Determine the square of each number.

492. $\frac{7}{10} = \frac{7^2}{10^2} = \frac{9}{100}$

493. $1.1 = 1.21$

494. $\frac{13}{8} = \frac{169}{64}$

495. $1.5 \quad 2.25$

496. $\frac{17}{18} = \frac{289}{324}$

Determine the value of each square root.

497. $\sqrt{0.09}$ $\sqrt{\frac{9}{100}} = \frac{3}{10} = 0.3$ OR $\sqrt{9} = 3$ check $3 \times 3 = 9$ ✓ $\sqrt{0.09} = 0.3$ check $0.3 \times 0.3 = 0.09$ ✓ $= 0.3$ ✓

498. $\sqrt{0.25} = \frac{\sqrt{25}}{\sqrt{100}} = \frac{5}{10} = 0.5$

499. $\sqrt{0.81} = \frac{\sqrt{81}}{\sqrt{100}} = \frac{9}{10} = 0.9$

500. $\sqrt{1.44} = \frac{\sqrt{144}}{100} = \frac{12}{10} = 1.2$

501. $\sqrt{\frac{9}{121}} = \frac{\sqrt{9}}{\sqrt{121}} = \frac{3}{11}$

502. $\sqrt{\frac{49}{36}} = \frac{\sqrt{49}}{\sqrt{36}} = \frac{7}{6}$

503. $\sqrt{\frac{1}{400}} = \frac{\sqrt{1}}{\sqrt{400}} = \frac{1}{20}$

504. $\sqrt{\frac{100}{9}} = \frac{\sqrt{100}}{\sqrt{9}} = \frac{10}{3}$

Right or wrong? Fix it.

505. $\sqrt{\frac{361}{100}} = \frac{18}{10} = \frac{9}{5}$

Wrong. $\frac{19}{10}$

Right or wrong? Fix it.

506. $\sqrt{\frac{289}{100}} = \frac{17}{50}$

Wrong $\frac{17}{10}$

Right or wrong? Fix it.

507. $\sqrt{2.25} = 1.25$

Wrong 2.5

Right or wrong? Fix it.

508. $\sqrt{2.56} = 1.4$

Wrong 1.6

Circle the rational numbers that are perfect squares. Show how you know.

509. (144), 14.4, (1.44)

$12 \times 12 = 144$, $1.2 \times 1.2 = 1.44$, 12×1.2

510. 8.1, (0.81)

$8.1 = 9 \times 0.9$

$0.81 = 0.9 \times 0.9$

511. 1000, (100), 10

$1000 = 100 \times 10$

$100 = 10 \times 10$

$10 = 10 \times 1$

512. (0.25), (0.49), 0.9

$0.25 = 0.5 \times 0.5$

$0.49 = 0.7 \times 0.7$

$0.9 = 0.3 \times 3$

513. $\frac{49}{88}$, $\frac{400}{9}$

$\frac{49}{88} = \frac{7 \times 7}{8 \times 11}$

$\frac{400}{9} = \frac{20 \times 20}{3 \times 3}$

514. $\frac{4}{121}$, $\frac{1}{91}$

$\frac{2 \times 2}{11 \times 11} = \frac{4}{121}$

515. 2.5, 1.69

$1.69 = 13 \times 1.3$

$2.5 = 5 \times 0.5$

516. 0.144, 0.0001

$0.144 = 0.12 \times 1.2$

$0.0001 = 0.01 \times 0.01$

517. **Match the letters to the square roots below.** (It is easiest to start with the number and find the letter.)

N	T		C	N		E		H	E		M		A	T		N
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

$$\frac{e}{\sqrt{50}}, \frac{n}{\sqrt{0.80}}, \frac{c}{\sqrt{13}}, \frac{h}{\sqrt{90}}, \frac{a}{\sqrt{240}}, \frac{n}{\sqrt{18}}, \frac{t}{\sqrt{270}}, \frac{m}{\sqrt{168}}, \frac{e}{\sqrt{110}}, \frac{n}{\sqrt{343}}, \frac{t}{\sqrt{2}}$$

518. List the first 20 non-zero perfect squares.

1	4	9	16	25	36	49	64	81	100
121	144	169	196	225	256	289	324	361	400

519. **Since the square root of 25 is 5 and the square root of 36 is 6 what do you think the square root of 30 might be?**

5.3 → 5.5 approx.

520. Challenge #32: Estimate $\sqrt{6.5}$ to 1 decimal.

$\sqrt{4} = 2$

$\sqrt{9} = 3$

$\therefore$ 2.4 → 2.6 approx.

Write down the steps to complete the challenge to the left.

521. Challenge #33: Estimate $\sqrt{0.45}$ to 2 decimals.

$\sqrt{1} = 1$

$\sqrt{0.01} = 0.1$

$\sqrt{0.36} = 0.6$

$\sqrt{0.49} = 0.7$

$\therefore$ 0.6 → 0.7 approx.

Write down the steps to complete the challenge to the left.

Name two perfect squares that sandwich each rational number. Use these numbers to help you approximate each square root to 1 decimal place.

522. 6.5

① Perfect squares 4, 6.5, 9
2 3

② $\sqrt{6.5}$ must be between 2 & 3

③ Since 6.5 is in the middle of 4 & 5, the $\sqrt{6.5}$ must be near the middle of 2 & 3

④ $\sqrt{6.5} \doteq 2.5$

523. 20

① Perfect Squares 16, 20, 25
4, 5

② $\sqrt{20}$ between 4 & 5

③ 20 is in the middle, $\sqrt{20}$ must be too.

④ $\sqrt{20} \cong 4.4 \rightarrow 4.6$

524. 60

$60 \rightarrow 49$ & 64
7 8

$\sqrt{60}$ is closer to $\sqrt{64}$

$\therefore \sqrt{60} \cong 7.6 \rightarrow 7.8$

525. 88

$88 \rightarrow 81$ & 100
9 & 10

$\sqrt{88}$ is closer to $\sqrt{81}$

$\therefore \sqrt{88} \cong 9.3 \rightarrow 9.5$

526. 0.45

① Perfect squares: 0.36, 0.45, 0.49

Square roots: $0.6 < \sqrt{0.45} < 0.7$

② The Average of 0.36 & 0.49 is 0.425

③ Since $0.45 > 0.425$, $\sqrt{0.45}$ must be bigger that 0.65.

④ $\therefore \sqrt{0.45} \doteq 0.67$ is a good guess

527. 1.18

528. 0.27

529. 0.62

530. Name three integers with square roots are between 5 and 6.

$5^2 = 25$

$6^2 = 36$

$\therefore > 25$ and < 36

531. Name three rational numbers with square roots between 2 and 2.5.

$2^2 = 4$; $2.5^2 = 6.25$

$\therefore 4.1 \rightarrow 6.2$

532. Name a rational number with square roots between 1.25 and 1.4.

$1.25^2 = 1.5625$

$1.4^2 = 1.96$

$\therefore 1.5625 \rightarrow 1.96$

e.g. 1.58 ; $\sqrt{1.58} = 1.256$

533. Draw a square with an area of $0.64m^2$. What is the length of each side?

0.8m

534. Draw a square with an area of $51m^2$. What is the length of each side to 1 decimal place?

$\sqrt{49} = 7$

$\sqrt{64} = 8$

$\sqrt{51} \cong 7.1m$

535. Draw a square with an area of $20m^2$. What is the length of each side to 1 decimal?

$\sqrt{16} = 4$

$\sqrt{25} = 5$

$\sqrt{20} = 4.5m$

Review Check List

I don't know how to study for math tests

In general, "A" students are not smarter than "C" students, they just study smarter! ○ Make sure you know how to do all the questions on the quizzes and practice tests. ○ "A" students ask for more help before tests than "C-" students do!	Studying is about finding out what you don't know and doing something about it. ○ Redo every question that is on your tough questions list.	Studying math is not rereading your notes! It is redoing and mastering each type of question prior to the test. ○ Go through each page of the guidebook and redo one question from each section.

Definitions:		Pg #	Face it ☺☹*
Go to page 3 and write down any definitions that you are unsure of.	Define each word and be able to show your understanding with examples.	3	

Learning Target	Examples	Pg #	Face it ☺☹
• Solve a given problem involving operations on rational numbers in fraction form and decimal form	**Jayme has been hired to put in all the baseboards in work in a 6-unit apartment complex. Each unit requires 48.6 meters of baseboards. If each unit is identical, how many meters of baseboards does he need to buy?**	22	
• Order a given set of rational numbers, in fraction and decimal form, by placing them on a number line (e.g., -0.666..., 0.5, - 5/8)	**Place the following rational numbers on the number line.** $\frac{4}{5}, -\frac{2}{3}, -\frac{81}{10}, 4\frac{2}{7}$, -0.7,-8.4, 0.85, 4.34	29	
• Identify a rational number that is between two given rational numbers	**List three rational numbers between each pair.** $-\frac{4}{6}$ *and* -0.25	30	
• Solve a given problem by applying the order of operations without the use of technology	**Evaluate** $\left(\frac{3}{2}\right)^2 + \frac{10}{12} =$	42	
• Identify the error in applying the order of operations in a given incorrect solution	See page 18 and 42.		
• **Determine whether or not a given rational number is a square number and explain the reasoning**	**Circle the rational numbers that are perfect squares. Show how you know. 144, 14.4,1.44.**	46	
• **Determine the square root of a given positive rational number that is a perfect square**	**Determine the value of each square root.** $\sqrt{\frac{1}{100}}$	45	
• **Identify the error made in a given calculation of a square root (e.g., Is 3.2 the square root of 6.4?)**	**Right or wrong? Fix it.** $\frac{9}{25} = \frac{81}{100} = \sqrt{\frac{324}{100}}$	45	
• **Determine a positive rational number given the square root of that positive rational number**	**Determine the square of each number. 7/10, 1.1,...**	46	
• **Estimate the square root of a given rational number that is not a perfect square, using the roots of perfect squares as benchmarks**	Estimate $\sqrt{0.45}$ to 2 decimals.	47	
• Identify a number with a square root that is between two given numbers	**Name three integers with square roots are between 5 and 6.**	47	

*Face it. When you have mastered the content draw a ☺ OR if you are unsure, draw a ☹ and ask for help.

Score _____/26
Face it! ☺ or ☹

Practice Test

- Write this test and do not look at the answers until you have completed the entire test.
- Mark the test and decide whether or not you are happy with the result. FACE IT!
- Successful students will go back in the guidebook and review any questions they got wrong on this test.

Correct any errors in the following written expansions.

1.	536.01	Five hundred ~~and~~ thirty-six and one hundreds.
2.	56 000.4	Fifty-six thousand and four tenths.

3. Circle all that apply:
-1.7 is a:
- Rational,
- Real,
- Natural,
- Irrational,
- Integer.

4. Round 7.447 to the nearest tenth.

7.4

5. -3 - 7 is equivalent to which of the following:
- -3 + (-7)
- 3 + (-7)
- -7 - 3
- -7 + 3

6. If an odd number of negative numbers are multiplied, together will their product be positive?

No. $(-1)(-1)(-1) = -1$

7. (T/F) Adding a large positive number to a negative number is always positive.

False. $-500+499 = -1$

8. Evaluate.
$12 - 10(85 - 86)^4 =$

$12 - 10(-1)^4$
$= 12 - 10(1)$
$= 12 - 10 = 2$

9. Evaluate.
$3 \times 2 - 5(4 - 3 \times 2)^3 + 1$

$= 6 - 5(4-6)^3 + 1$
$= 6 - 5(-2)^3 + 1$
$= 6 - 5(-8) + 1$
$= 6 + 40 + 1$
$= 47$

10. Evaluate.
$61.75 \div 1.9 + 345.6$

$19\overline{)617.5}$ → 32.5
57
47
38
95
95
0

345.6 + 32.5 = 378.1

11. Which number is larger?
$-\frac{6}{25}$ or $-\frac{28}{100}$

$-\frac{6\times4}{25\times4} = \frac{-24}{100}$

$\therefore -\frac{6}{25}$ is larger

12. Convert $\frac{3}{7}$ to a decimal to the nearest hundredth.

$7\overline{)3.00}$ → 0.428
28
20
14
60
56

$\therefore$ 0.428 → 0.43

13. Arrange from smallest to biggest.
$2, -8\frac{2}{3}, -\frac{87}{10}, -8.5$

$-8\frac{2}{3} = -8.666$
$-\frac{87}{10} = -8.7$

$\therefore -\frac{87}{10}, -8\frac{2}{3}, -8.5, 2$

14. True or false. If two opposite numbers are both decreased by the same positive value, their sums will be opposites.

False. $-10 - 4 = -14$
$+10 - 4 = 6$

15. List 3 rational numbers between $-2\frac{7}{8}$ and -2.7.

$-2\frac{7}{8} = -2.875$

> -2.875

< -2.7

16. Jayda is sitting in her tree fort $2\frac{1}{5}$ meters above the ground. Billinter is sitting in his tree fort $3\frac{1}{3}$ m above the ground. How much higher in the air is Billinter?

$3\frac{1}{3} - 2\frac{1}{5}$ i.e. $1\frac{2}{15}$ m higher

$= \frac{10}{3} - \frac{11}{5}$

$= \frac{10\times5}{3\times5} - \frac{11\times3}{5\times3}$

$= \frac{50}{15} - \frac{33}{15} = \frac{17}{15}$

17. The following formula converts degrees Fahrenheit to degrees Celsius: $C = \frac{5}{9}(F - 32)$. Convert 59 degrees Fahrenheit to degrees Celsius.

$C = \frac{5}{9}(59-32)$

$= \frac{5}{9}(27)$

$= \frac{5}{9} \times \frac{27}{1}$

$= \frac{5}{\cancel{9}_1} \times \frac{\cancel{27}^3}{1}$

$C = 15$

18. Evaluate $-3 \times \frac{-25}{27} \times \frac{21}{-35}$

$= \frac{\cancel{-3}^1}{1} \times \frac{\cancel{-25}^5}{\cancel{27}^9} \times \frac{21}{\cancel{-35}_7}$

$= -\frac{1}{1} \times \frac{-5}{\cancel{9}_3} \times \frac{-\cancel{21}^3}{\cancel{7}_1}$

$= -\frac{5}{3}$

Correct the error.

19. The reciprocal of $1\frac{11}{12}$ if

$1\frac{12}{11}$

$1\frac{11}{12} = \frac{23}{12}$

Reciprocal $= \frac{12}{23}$

20. Evaluate. $2\frac{3}{5} \div \frac{7}{10}$

$= \frac{13}{5} \times \frac{10}{7}$

$= \frac{13}{\cancel{5}_1} \times \frac{\cancel{10}^2}{7}$

$= \frac{26}{7}$

21. How much bigger is one and one third all squared than twelve twentieths?

$\left(1\frac{1}{3}\right)^2 \div \frac{12}{20}$

$= \left(\frac{4}{3}\right)\left(\frac{4}{3}\right) \times \frac{20}{12}$

$= \frac{16}{9} \times \frac{5}{3}$

$= 80/27$

22. Evaluate $\sqrt{\frac{121}{256}}$

$= \frac{\sqrt{121}}{\sqrt{256}} = \frac{11}{16}$

Right or wrong? Fix it.

23. $\sqrt{2.25} = 1.25$

wrong

$\sqrt{2.25} = \sqrt{2\frac{1}{4}} = \sqrt{\frac{9}{4}}$

$= \frac{\sqrt{9}}{\sqrt{4}} = \frac{3}{2} = 1.5$

24. Name three integers with square roots are between 7 and 8.

$7^2 = 49$

$8^2 = 64$

$\therefore$ 50, 51, 59, 60 & more.

25. Name a rational number with a square root between 1.11 and 1.22.

$(1.12)^2 = 1.25$

$(1.21)^2 = 1.46$

$1.25 \rightarrow 1.46$

26. Draw a square with an area of $20m^2$. What is the length of each side to 1 decimal?

$\sqrt{20}$; $\sqrt{25} = 5$; $\sqrt{16} = 4$

$\therefore$ 4.5 or 4.4

This test must be marked and corrected prior to the test day.

Answer Key

1. All the numbers that be placed on a number line.
2. Numbers that can be written as a fraction where both the numbers are integers and the denominator is not zero.
3. Positive and negative whole numbers and zero.
4. Positive numbers without decimals and zero.
5. Positive numbers without decimals not including zero.
6. Numbers where the decimals do not repeat or stop.

For each of the numbers below check all the boxes that describe the number:

	8	-100	$4.\overline{31}$	$2/3$	0	π	-1.7	$5\frac{1}{4}$
7. Real numbers	yes	yes	yes	yes	yes		yes	yes
8. Rational numbers	yes	yes	yes	yes	yes		yes	yes
9. Integers	yes	yes			yes			
10. Natural numbers	yes							
11. Whole numbers	yes				yes			
12. Irrational numbers						yes		

13. False	14. True	15. True	16. False	17. False
18. True	19. Irrational π , $\sqrt{2}$ Natural: 12 Whole : Nat + 0 Integers: Whole + -5 Rational: Int + $\frac{1}{2}$ + 1.8 Real: Rat + Irrat..	20. Convenience, security, record keeping	21. Thirty-seven	22. Better accuracy. Less chance that someone could add an extra zero and make \$109→\$1090.

23. Thirty-seven
24. Four hundred five thousand
25. Six and three hundredths
26. Fifty-six thousand, eight hundred and twelve thousandths
27. Four hundred thirty-six (remove the and)
28. Thirty-seven thousand two (The hyphen is needed)
29. Five hundred thousand eleven (correct)
30. Six hundred ten million five (remove the and)
31. Two thousand four hundred fifty-three
32. Fifty-one and nine hundredths (add the th in hundreds)
33. Two hundred seventy-one (remove the "and" and add a hyphen)
34. Seventeen thousand three hundred (the hyphen is not needed)
35. Nine hundred thousand seven hundred four
36. Eighty million six thousand one
37. Seventy-two billion
38. Sixteen and one hundred two thousandths
39. Fifty-nine thousandths
40. One and twenty-two ten thousandths
41. Five hundred and five thousandths

42. 5.2	43. 5.25	44. 5.250	45. 2.5	46. 7.4
47. 2.1	48. 8.06	49. 2.30	50. 3.0	51. 4.96
52. 2.8	53. 8.4	54. 0.5	55. 3.0	56. 0.96
57. 7	58. -3	59. 7	60. -3	61. -7
62. 2-(-5) & 2+(+5)	63. 2+(-5) &-5 + 2	64. -2+(-5) & -5-2		
65. 13	66. 5	67. -5	68. -5	69. -13

70. -3	71. -25	72. 19	73. -9	74. -24
75. -2	76. -19	77. 27	78. 6	79. 2
80. -23	81. -2	82. +1	83. -1	84. -53
85. -6	86. 12	87. -9	88. 18	89. 65
90. -19	91. 1	92. -4	93. -13	94. correct: -3
95. correct: 11	96. incorrect→-27	97. Perfect squares→1,4,9,16,25,36,49,64,81,100,121,144		
98. 10	99. -10	100. -10	101. 10	102. -14
103. 24	104. -24	105. 55	106. -46	107. -11
108. -1	109. -11	110. -5	111. 45	112. -25
113. -36	114. -60	115. 1	116. -1	117. 1
118. -1	119. 1	120. -1	121. Y	122. N
123. Y	124. Y	125. N	126. T	127. T
128. T	129. F -2+1=-1	130. F -2+(-3)=-5	131. T	132. F -2-(-5)=3
133. F 100+(-101)=-1		134. Negative	135. Positive	136. Negative
137. Positive	138. Positive	139. Negative	140. 6	141. 10
142. -12	143. -6	144. 10	145. 4	146. -8
147. 10	148. -20	149. Brackets, exponents, division, multiplication, addition & subtraction.	150. -7	151. 93
152. Bemdas	Bemdsa, Bedmsa	153. -7	154. 93	155. 14
156. 13	157. 30	158. 8	159. 34	160. 17
161. 12	162. 40	163. -6	164. -5	165. 22
166. 4	167. -34	168. -27	169. 8	170. 81
171. 9,-9,-9,9 -3^2 means -(3x3)=-9. It is easily confused with $(-3)^2=(-3x-3)^2=9$				
172. 9	173. 9	174. -1	175. 1	176. 1
177. 1	178. -1	179. 1	180. -4	181. 16
182. -2	183. -3	184. -3	185. -17	186. 7
187. 2		188. 13	189. 8	190. -5
191. -12	192. 5	193. 13	194. 5	195. 0
196. 47	197. -398	198. 5	199. incorrect→-78	200. Incorrect→-75
201. +1	202. 75.45	203. 79.43	204. 15.912	205. 38.4
	206. 75.45	207. 79.43	208. 6.35	209. 162.23
210. 20.98	211. 137.63	212. 156.39	213. Incorrect→1.45	214. 121.7
215. 144.2	216. 133.91	217. 15.912	218. 2901.36	219. 4820.148
220. 5623.2876	221. 104.04	222. -95.34	223. 861.98	224. -32.48

225. 39	226. 240.8	227. 3.4	228. -66.8	229. Negative
230. positive	231. 38.4	232. 8.1	233. 55.6	234. incorrect→25.5
235. 291.6m	236. 78.81→79boards	237. 3.3	238. F	239. A
240. B	241. D	242. E	243. k	244. H
245. I	246. J	247. N	248. $\frac{1}{2}, \frac{2}{4}, \frac{4}{8}...$	249. 2/5
250.	251.	252.	253.	
		254. 3/5	255. 2/5	256. 3/10
257. -3/5	258. 3 1/6	259. 5 5/9	260. -9 1/24	261. -6/25
262. 7/4	263. 7/3	264. -7/2	265. A whole number plus a fraction	266. A fraction where the top is bigger than the bottom.

267. $2\frac{1}{4}$	268. -17/5			
	269. 2 1/4	270. 3 4/5	271. -3 2/7	272. 8.5
273. -5 7/10	274. -4 3/7	275. 9 1/5	276. -34/11	
277. 17/5	278. -6/5	279. 13/3	280. -17/6	281. 16/7
282. 9/8	283. -22/5	284. 4/3	285. 0.19, 0.7, .2, 0.35, 0.12	286. 0.125
	287. 0.60	288. 1.17	289. 0.88	290. 1.80
291. 0.22	292. 0.25	293. 0.63	294. 2.25	295. 2.75
296. 0.78	297. 0.80	298. 0.80	299. 0.60	300. 0.24
301. 0.14	302. 0.60	303. Repeating decimal.	304. 0.111… & 0.1212…	
	305. 1/2	306. 3/5	307. 23/100	308. 1/4
309. 13/20	310. 5/9	311. 7/9	312. 23/99	313. 25/99
314. 65/99	315. 7/20	316. 1/3	317. 1/4	318. 23/99
319. 12/25	320. 2/9	321. incorrect→1/8	322. 4/33	323. incorrect→9/20
324. 5/11				

325. ASTONISH	326. $-\frac{25}{99}, \frac{1}{4}, -0.24, 0.1$	327. Answers will vary. -0.65, -0.4, -0.26	328. -4&1/2	329. 8.9
330. -18.2	331. 3/9	332. -4.8	333. -9.3	334. -19
335. 3/9	336. -8/25	337. 5.33333…	338. -0.33	339. -1.45555…
340. $-\frac{25}{99}, \frac{1}{4}, -0.24, 0.1$	341. $-\frac{87}{10}, -8\frac{2}{3}, -8.5, 2$	342. $2\frac{1}{3}, 2\frac{5}{9}, 2\frac{9}{14}, 2\frac{5}{7}$	343. ELATIONS	344. TRUE
345. -8	346. -7/11	347. 2.777…	348. T	349. F (10+5=15) AND (-10+5=-5)
350. F (10>8) BUT (-10<-8)	351. –A<-B	352. Answers will vary. -0.65, -0.4, -0.26	353. Answers will vary. $-\frac{5}{16}, -\frac{4}{16}, -\frac{3}{16}, \frac{2}{16}$	354. 2 15/16 too big, Any number between 2.7 7 2.875
355. 9/32	356. 3/16	357. 11/32	358. 5/6	359. 5/6
360. 1/6	361. 4/5			
362. 11/10	363. 41/10	364. 4/5	365. -2/5	366. -7/5
367. 1/5	368. 11/10	369. -11/20	370. -7/12	371. -1/15

372. a, b,d	373. acd &be	374. NO	375. Personal preference. Wonda is more efficient.	
376. 9/10	377. 7/10	378. 1/2	379. Common denominators	
	380. -23/10	381. 51/10 or 5.1	382. 9/4	383. -17/4
384. 41/10	385. -79/20 or -3.95	386. 5/12	387. incorrect→-37/5	388. 1 &2/15 m
389. 4&13/16				390. 2
391. 1/6	392. 1/2	393. 6	394. 2	395. 8/3
396. 1	397. 6	398. neg	399. neg	400. neg
401. neg	402.		403. 8/3	404. 1/2
405. 4/5	406. 2/5	407. 9/4	408. -24	409. 4
410. -15/4	411. 6	412. 3/2	413. 1	414. incorrect 16/5 or 3.2
415. 2	416. -1/15	417. 6	418. 1	419. Incorrect→12
420. 3/5	421. 5	422. 10/3		
		423. yes	424. yes	425. $\frac{a}{b} \times \frac{d}{c}$
426. Personal preference	427. -7/2	428. n/m	429. no	430. 5/16

			431. 2/5	432. 9/10
433. 1/2	434. 4/5	435. -6	436. 8/9	437. -10
438. -1/25	439. 7	440. 144cm	441. 44	442. 15
443. false	444. true	445. $\frac{1}{15}+\frac{5}{1}+\frac{7}{3}$	446. $\frac{2}{3}+\frac{5}{3}+\frac{2}{3}$	447. Multiply
448. Subtract	449. Exponents	450. Mixed number to improper fraction.	451. Flip and multiply	452. -6/7
453. -11/2	454. 1/10	455. negative	456. incorrect→37/12	457. -17/9
458. 1/36	459. Positive	460. -4/5	461. 53/45	462. Jovan makes $362.50 more than Matty.
463. mn	464. 1/n	465. 1	466. n	467. t
468. t	469. t	470. stops, repeats	471. irrational	472. $\sqrt{2},\sqrt{3},\sqrt{5},\sqrt{6},\sqrt{7},\sqrt{8}$
473. F i.e. $\sqrt{9}=4$	474. 3	475. 4	476. 5	477. The product of two equal numbers.
478. The quotient of a number and itself.	479. 9,3	480. 16,4	481. 25,5	482. 36,6
483.	484.	485.	486.	487. 2/3
488. 1/2	489. 4/5	490. 5/6	491. 1,4,9,16,25,36,49,64,81,100,121,144,169, 196,225,256,289,324,361,400	
492. 49/100	493. 1.21	494. 169/64	495. 2.25	496. 289/324
497. 0.3	498. 0.5	499. 0.9	500. 1.2	501. 3/11
502. 7/6	503. 1/20	504. 10/3	505. 19/10	506. 17/10
507. 2.5	508. 1.6	509. 144,1.44	510. 0.81	511. 100
512. 0.25, 0.49	513. 400/9	514. 2/11,4/121	515. 1.69	516. 0.0001
517. Enchantment	518. See #489	519. 5.3-5.5 aprox	520. 2.4-2.6 aprox	521. 0.65-0.67 aprox
522. 2.4-2.6 aprox	523. 4.4-4.6 aprox	524. 7.6-7.8 aprox	525. 9.3-9.5 aprox	526. 0.66-0.68 aprox
527. 1.07-1.09 aprox	528. 0.51-0.53 aprox	529. 0.77-0.79 aprox	530. 26-35 aprox	531. 4.1-6.2 aprox
532. 1.11-1.19 aprox	533. 0.8	534. 7.1 aprox	535. 4.5 aprox	

Answers to practice test.

DO NOT LOOK AT THE ANSWERS UNTIL YOU HAVE COMPLETED THE TEST!

1. Five hundred thirty-six and one hundredths		2. Fifty-six thousand and four tenths	3. Rational and real	
4. 7.4	5. -3 +(-7) & -7-3	6. F(-1)(-1)(-1)=-1	7. F (-500+499=-1	8. 2
9. 47	10. 670.6	11. -6/25	12. 0.43	13. $-\frac{87}{10},-8\frac{2}{3},-8.5,2$
14. F(-10-4=-14 & 10-4=6)	15. Answers will vary: -2.8,-2.75, -2.74	16. 1&2/15 m higher	17. 15° C	18. -5/3
19. 12/23 is the reciprocal of 1&11/12	20. 26/7	21. 53/45	22. 11/16	23. 1.5
24. Answers will vary: 50,60,63	25. Answer will vary: 1.3 (1.23-1.49)	26. Answers will vary: 4.5 or 4.4 (4.6 is too big		

Your test must be marked prior to the test.