

# Rational Numbers and Square Roots

Calculators may not be used on quizzes or 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	

Find detailed homework solutions at [www.mathbeacon.ca/guidebooks/#math9](http://www.mathbeacon.ca/guidebooks/#math9)

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

---

---

---

## Numeracy, Including Rational numbers and Square roots

Objective	No	Daily Topic	Key Idea
The first 18 pages are review and have been added to ensure a smooth transition into the WNCNCP Math 9 curriculum.	1.	1-8: Numbers Systems, Write numbers	Place the numbers 2, 3.5, $\pi$ , 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.	9-14: Integers $\rightarrow$ 4 operations	Evaluate. $-5 - 1 + (-2) - 5 =$ Evaluate. $-(-1)(-1)(-1)(-1) =$ Evaluate. $-70 \div 5 =$
	3.	15-18: Integers $\rightarrow$ BEDMAS	Evaluate. $5 - 3(4 - 3 \times 2)^2 =$
N3 demonstrate an understanding of rational numbers by -comparing and ordering rational numbers -solving problems that involve arithmetic operations on rational numbers	4.	<ul style="list-style-type: none"> <li>19-22: Decimals <math>\rightarrow</math> 4 operations</li> <li>Solve a given problem involving operations on rational numbers in fraction form and decimal form</li> </ul>	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. <ul style="list-style-type: none"> <li>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)</li> <li>Identify a rational number that is between two given rational numbers</li> </ul>	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 <ul style="list-style-type: none"> <li>Solve a given problem involving operations on rational numbers in fraction form and decimal form</li> </ul>	Evaluate: $-\frac{4}{3} + \frac{3}{4} =$ & Evaluate: $3 - \frac{3}{4} =$
8.	35-39: Multiplying Fractions <ul style="list-style-type: none"> <li>Solve a given problem involving operations on rational numbers in fraction form and decimal form</li> </ul>	Evaluate. $2\frac{1}{4} \times \frac{8}{3} =$ & Evaluate. $\frac{1}{4} \div \frac{5}{8} =$	
N4 explain and apply the order of operations, including exponents, with and without technology	9.	40-42: Bedmas with fractions <ul style="list-style-type: none"> <li>Solve a given problem by applying the order of operations without the use of technology</li> <li>Solve a given problem by applying the order of operations with the use of technology (This will be covered in later chapters)</li> <li>Identify the error in applying the order of operations in a given incorrect solution</li> </ul>	Evaluate. $\frac{20}{40} - \frac{21}{40} \times \frac{80}{7} =$ Evaluate. $\square \frac{5}{\square} - \frac{12}{\square} =$ $\square \frac{\square}{3} - \frac{\square}{20} =$
N5 determine the square root of positive rational numbers that are perfect squares	10.	43-46: Rational Square roots <ul style="list-style-type: none"> <li>Determine whether or not a given rational number is a square number and explain the reasoning</li> <li>Determine the square root of a given positive rational number that is a perfect square</li> <li>Identify the error made in a given calculation of a square root (e.g., Is 3.2 the square root of 6.4?)</li> <li>Determine a positive rational number given the square root of that positive rational number</li> </ul>	Evaluate. $\sqrt{25}$ $\sqrt{36}$
N6 determine an approximate square root of positive rational numbers that are non-perfect squares	11.	47-49: Irrational Square roots <ul style="list-style-type: none"> <li>Estimate the square root of a given rational number that is not a perfect square, using the roots of perfect squares as benchmarks</li> <li>Determine an approximate square root of a given rational number that is not a perfect square using technology (e.g., calculator, computer) (later)</li> <li>Explain why the square root of a given rational number as shown on a calculator may be an approximation (later)</li> <li>Identify a number with a square root that is between two given numbers</li> </ul>	Approximate $\sqrt{40}, \sqrt{0.34}$
	12.	50: Chapter Review and Practice Test <ul style="list-style-type: none"> <li>Help students develop sound study habits.</li> <li>Many students will graduate high school saying they do not know how to study for math tests.</li> </ul>	
	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 that can be written as a ratio of two integers. (The denominator cannot be zero.)	
Irrational numbers	A number whose decimal does not stop or repeat. A number than cannot 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

(It may be helpful to complete pages 4 & 5 later in the chapter.)

	Definition	Example
1. Real numbers		
2. Rational numbers		
3. Integers		
4. Whole numbers		
5. Natural numbers		
6. Irrational numbers		

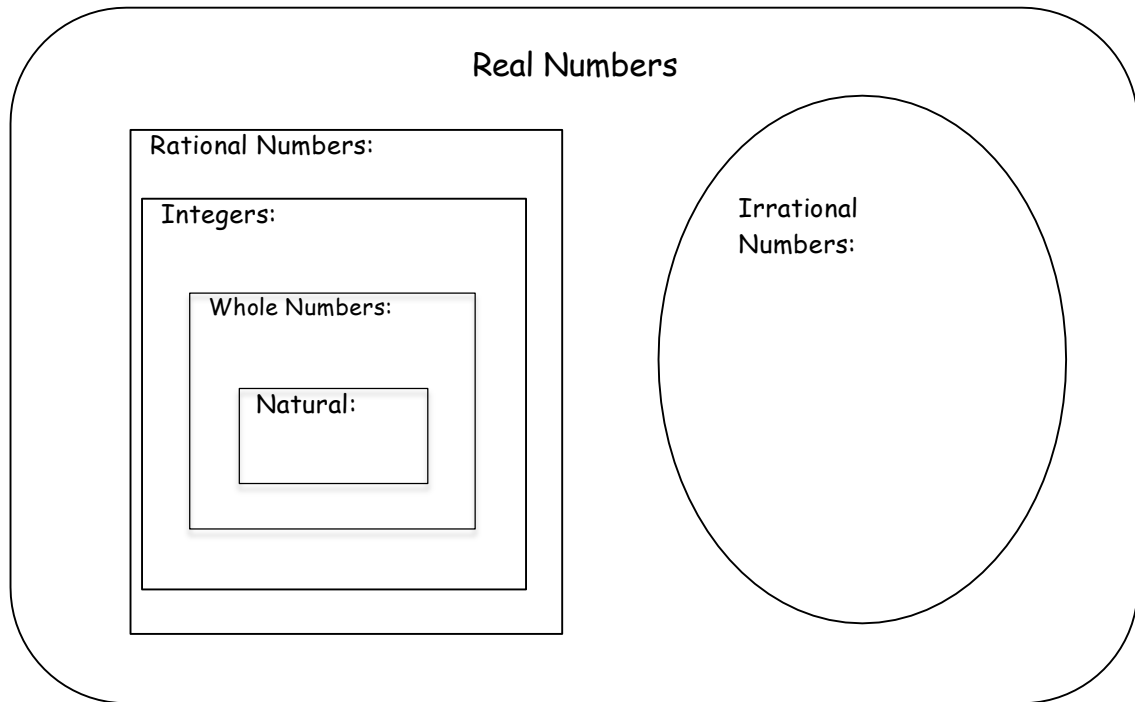
For each of the numbers below check all the boxes that describe the number:

	8	-100	4.31	$\frac{2}{3}$	0	$\pi$	-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 or False? A real number is always a whole number.
14. True or False? A natural number is always a rational number.
15. True or False? An integer is always a rational number.
16. True or False? A real number is always an integer. An
17. True or False? integer is always a natural number.
18. True or False? An irrational number is always a real number.

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

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



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?

---



---

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?

---



---

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

23. 37	Thirty seven
24. 405 000	Four hundred and five thousand
25. 6.03	Six point zero three
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
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 hundreds
33. 271	Two hundred and seventy one
34. 17 300	Seven-teen thousand three hundred

Write the following in words(spelling counts).

35. 900 704	
36. 80 006 001	
37. 72 000 000 000	
38. 16.102	
39. 0.059	
40. 1.0022	
41. 500.005	

## 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.

<p>42. Round 5.2498 to the nearest tenth.</p> <p>Solution:</p> <ul style="list-style-type: none"> <li>❖❖ The 2 is in the tenths place. Is the answer 5.2 or 5.3?</li> <li>❖❖ If the number to the right of 2 is a five or more round up. Otherwise round down.</li> <li>❖❖ Another way to think about it is, 24 is closer to 20 than it is to 30.</li> <li>❖❖ The answer is 5.2</li> </ul>	
<p>43. Round 5.2498 to the nearest hundredth.</p> <p style="text-align: right; margin-top: 20px;">Solution: 5.25</p>	<p>44. Round 5.2498 to the nearest thousandth.</p> <p style="text-align: right; margin-top: 20px;">Solution: 5.250</p>

Round each number to the designated place value.

<p>45. Round 2.467 to the nearest tenth.</p>	<p>46. Round 7.447 to the nearest tenth.</p>	<p>47. Round 2.057 to the nearest tenth.</p>	<p>48. Round 8.057 to the nearest hundredth.</p>
<p>49. Round 2.297 to the nearest hundredth.</p>	<p>50. Round 2.952 to the nearest tenth.</p>	<p>51. Round 4.956 to the nearest hundredth.</p>	<p>52. Round 2.84 to the nearest tenth.</p>
<p>53. Round 8.427 to the nearest tenth.</p>	<p>54. Round 0.457 to the nearest tenth.</p>	<p>55. Round 3.049 to the nearest tenth.</p>	<p>56. Round 0.957 to the nearest hundredth.</p>



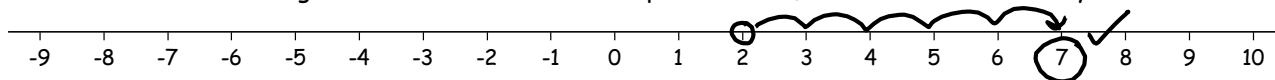
## Integers and Operations Math 8 Review

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

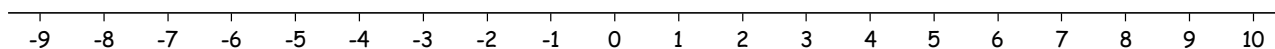
List as many situations as you can where people do not like negative numbers.

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

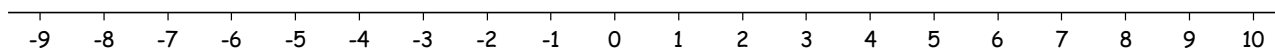
57. Evaluate  $2 + 5$  using the number line. Start at positive two, use arrows and circle your answer.



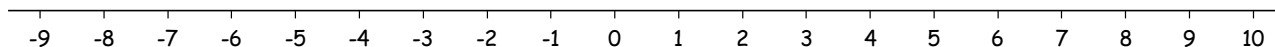
58. Evaluate  $2 - 5$  using the number line.



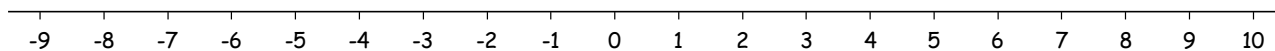
59. Evaluate  $2 - (-5)$  using the number line.



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



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



### Observations:

<p>62. <math>2 + 5</math> is equivalent to which of the following:</p> <ul style="list-style-type: none"> <li>• <math>2 - 5</math></li> <li>• <math>2 - (-5)</math></li> <li>• <math>-2 - 5</math></li> <li>• <math>2 + (+5)</math></li> </ul>	<p>63. <math>2 - 5</math> is equivalent to which of the following:</p> <ul style="list-style-type: none"> <li>• <math>2 + 5</math></li> <li>• <math>2 + (-5)</math></li> <li>• <math>-2 + 5</math></li> <li>• <math>-5 + 2</math></li> </ul>	<p>64. <math>-2 - 5</math> is equivalent to which of the following:</p> <ul style="list-style-type: none"> <li>• <math>-2 + (-5)</math></li> <li>• <math>2 + (-5)</math></li> <li>• <math>-5 - 2</math></li> <li>• <math>-5 + 2</math></li> </ul>
--	--	---

## 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.  $4 + 9 =$

66.  $-4 + 9 =$

67.  $4 - 9 =$

68.  $4 + (-9) =$

69.  $-4 - 9 =$

70.  $-12 + 9 =$

71.  $-8 - 17 =$

72.  $13 - (-6) =$

73.  $-8 + (-1) =$

74.  $-5 - 19 =$

75.  $13 - 15 =$

76.  $-4 - 15 =$

77.  $4 - (-23) =$

78.  $15 + (-9) =$

79.  $-7 - (-9) =$

**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?

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?

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.

83. Sandeesa bought six one-dollar raffle tickets and won five dollars. Use an integer to represent her total winnings.

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?

What does evaluate mean? \_\_\_\_\_

Evaluate.

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

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

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

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

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

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

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

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

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

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

94.  $6 - 2 + -4 + (-5) - (-2) =$   
 $= 4 + 9 + 2$   
 $= 15$

95.  $12 - (-8) - 4 + (-5) =$   
 $= 12 + 8 - 4 - 5$   
 $= 12 + 4 - 5$   
 $= 16 - 5$   
 $= 11$

96.  $-15 - 3 - 2 + (-3) - 4 =$   
 $= -18 - 1 - 4$   
 $= -19 - 4$   
 $= -23$

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	<b>1</b>											
2		<b>4</b>										
3			<b>9</b>									
4				<b>16</b>								
5					<b>25</b>							
6						<b>36</b>						
7							<b>49</b>					
8								<b>64</b>				
9									<b>81</b>			
10										<b>100</b>		
11											<b>121</b>	
12												<b>144</b>

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. $2(-7) =$

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

Evaluate.

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

Answer the following with a yes or a no.

121.If two negative numbers are multiplied together will their product be positive?	
122.If three negative numbers are multiplied together will their product be positive?	
123.If four negative numbers are multiplied together will their product be positive?	
124.If an even number of negative numbers are multiplied together will their product be positive?	
125.If an odd number of negative numbers are multiplied, together will their product be positive?	

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.	127. (T/F) The sum of positive numbers is always positive.	128. (T/F) The quotient of a negative number and a positive number is always negative.	129. (T/F) The sum of a negative number and a positive number is always positive.
130. (T/F) The sum of two negative numbers is always positive.	131. (T/F) The product of negative numbers is always positive.	132. (T/F) Subtracting a negative number from a negative number is always negative.	133. (T/F) Adding a large positive number to a negative number is always positive.

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

134. $(-31)(-14)(-91) =$ <i>Negative ✓</i>	135. $(-12)(-51)(-19)(-1) =$	136. $-(-101)(-1)(-1)(-199) =$
137. $(-11)(-2)(-12)(2)(-31) =$	138. $(-1)(11)(-1)(51)(-1)(-2) =$	139. $(-5)(-92)(-1)(-19)(-2) =$

Find the product.

140. $2 \times 3 \times 1 =$	141. $-2 \times 5 \times (-1) =$	142. $-4 \times (-3) \times (-1) =$
143. $-1 \times (-2) \times 3 \times (-1) =$	144. $1 \times (-2) \times 5 \times (-1) =$	145. $-1 \times (-1) \times (-1) \times (-4) =$
146. $(-1)(-2)(-1)(2)(-1)(-2) =$	147. $(-1)(1)(-1)(5)(-1)(-2) =$	148. $(-5)(-2)(-1)(-1)(-2) =$

## 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?

150. Challenge #2:

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

151. Challenge #3:

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

# 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
<b>Step 1</b>	<b>B</b>	Brackets.	<b>B</b>			
<b>Step 2</b>	<b>E</b>	Exponents.	<b>E</b>			
<b>Step 3</b>	<b>D or M</b>	Division or Multiplication. Do whatever operation comes first working left to right.	<b>D</b> <b>M</b>			
<b>Step 4</b>	<b>A or S</b>	Addition or Subtraction. Do whatever operation comes first working left to right.	<b>A</b> <b>S</b>			

Possible solution strategy:

<p>153. Evaluate. <math>5 - 3(4 - 3 \times 2)</math></p> <p>Brackets first. Multiply before subtracting.</p> $5 - 3(4 - 6)^2$ <p>Subtract inside the brackets only.</p> $5 - 3(-2)^2$ <p>Exponents.</p> $5 - 3 \times 4$ <p>Multiply.</p> $5 - 12$ <p>Subtract.</p> $-7$	<p>154. Evaluate. <math>3 + 5((5 - 3) \times 3^2)</math></p> <p>Complete the brackets inside the brackets first.</p> $3 + 5 \underset{\leq}{(2)} \times \underset{f}{3^2}$ <p>Exponents.</p> $3 + 5 \underset{\leq}{(2)} \times \underset{f}{9}$ <p>Multiply inside the brackets.</p> $3 + 5(18)$ <p>Multiply</p> $3 + 90$ <p>Add.</p> $93$
--	---

Evaluate.

155. $20 - 3 \times 2 =$	156. $20 - (5 + 2) =$	157. $20 + 2(20 - 15) =$	158. $20 \times 2 \div 5 =$
159. $(20 - 3) \times 2 =$	160. $20 - (5 - 2) =$	161. $20 + 2(2 - 3 \times 2) =$	162. $20 \times (4 \div 2) =$



Evaluate.

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

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

$$165. 12 - 2(10 - 15) =$$

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

$$167. \frac{-20 + (-3)}{2} \times f \leq$$

$$168. \frac{-20 - 5 - (-2)}{5} \leq f$$

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

$$170. 1 - 20 \times (-8 \div 2) =$$

Just to make sure  $5^2$  means  $(5 \times 5)$  and equals 25.  $5^2$  does not equal  $(5 \times 2)$ .

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

$$3^2 =$$

$$-3^2 =$$

$$-1 \times 3^2 =$$

$$(-3)^2 =$$

Which question above are people most likely to make a silly mistake on?

Evaluate.

$$172. (5 - 2)^2 =$$

$$173. (-5 + 2)^2 =$$

$$174. (5 - 6)^3 =$$

$$175. (85 - 86)^4 =$$

$$176. (235 - 236)^6 =$$

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

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

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

$$180. 5 - (5 - 2)^2 =$$

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

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

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

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

$$185. -2(-5 + 2)^2 + 1 =$$

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

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

Evaluate.

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

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

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

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

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

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

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

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

Evaluate.

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

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

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

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.  $5 - 2 \times 10 - (-4 + 3) \times 2^2$   
 $= 3 [ -(-1) \times 2 ]^2 \times 10$   
 $= 3 [ 4 ] \times 10$   
 $= 120$

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

## Rational Numbers: Decimals and the Four Operations

---

202. **Challenge #5:** Estimate and then evaluate.

$$82.34 - 6.89 =$$

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

---

---

---

---

---

---

203. **Challenge #6:** Estimate and then evaluate.

$$72.84 + 6.59 =$$

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

---

---

---

---

---

---

204. **Challenge #7:** Estimate and then evaluate.

$$2.34 \times 6.8 =$$

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

---

---

---

---

---

---

---

205. **Challenge #8:** Estimate and then evaluate.

$$234 \div 6.1 =$$
 Round your answer to the nearest tenth.

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

---

---

---

---

---

---

---

## Decimals and Operations Math 8 Review

Estimate and then evaluate.

206. $82.34 - 6.89 =$	207. $72.84 + 6.59 =$	208. $72.94 - 66.59 =$	209. $112.04 + 50.19 =$
Solution:	Solution:		
$\begin{array}{r} 82.34 \\ -6.89 \\ \hline 75.45 \end{array}$	$\begin{array}{r} 72.84 \\ +6.59 \\ \hline 79.43 \end{array}$		
210. $67.84 - 46.86 =$	211. $61.34 + 76.29 =$	212. $102.04 + 54.35 =$	Right or wrong? Fix it. 213. $62.74 - 61.29 =$ $\begin{array}{r} 62.74 \\ -61.29 \\ \hline 1.55 \end{array}$

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

Estimate and then determine the product.

217.  $2.34 \times 6.8 =$

$$\begin{array}{r} 234 \\ \times 68 \\ \hline 1872 \\ 14040 \\ \hline 15912 \end{array}$$

3 decimal

218.  $62.8 \times 46.2 =$

219.  $72.9 \times 66.12 =$

220.  $112.04 \times 50.19 =$

221.  $15.3 \times 6.8 =$

15.912

222.  $-22.7 \times 4.2 =$

223.  $-32.9(-26.2) =$

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

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

225.  $234 \div 6 =$

$$6 \overline{)234}$$

226.  $1204 \div 5 =$

227.  $24 \div 7 =$

228.  $-534 \div 8 =$

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.

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

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

231.  $234 \div 6.1 =$

Handwritten long division for  $234 \div 6.1$ . The student moves the decimal to get  $2340.00 \div 61$ . The quotient is  $38.36$ . A note says  $38.36 \rightarrow 38.4$ . The final answer written is  $38.4$ .

232.  $34 \div 4.2 =$

233.  $434 \div 7.8 =$

Fix the mistake.

Handwritten long division for  $74 \div 2.9$ . The student moves the decimal to get  $7400 \div 29$ . The quotient is  $255.17$ . The student has written  $255.1$  and  $17.c$ .

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

236. Use the previous question as a base for this question. Jayme can only find baseboards in 3.7 metre lengths. How many baseboards does he need to buy?

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

OMIT THIS QUESTION

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

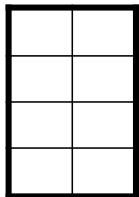
MATCH		MATCH	
238. $\_\_\_x + y$	A. Close to -30.	243. $\_\_\_x \div z$	H. In between -5 and -6.
239. $\_\_\_x \times y$	B. Close to -20	244. $\_\_\_z + x$	I. In between -6 and -7
240. $\_\_\_z \times y$	C. Close to -16	245. $\_\_\_x \times z$	J. In between 0 and 1
241. $\_\_\_x - y$	D. A little more than negative 13.	246. $\_\_\_z \div y$	K. In between 1 and 2.
242. $\_\_\_x \div y$	E. A little more than negative half.	247. $\_\_\_y - z$	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:

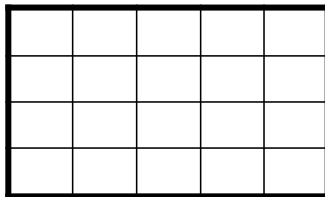
What fraction of the box has apples in it?



List as many correct fractions as you can?

249. Challenge #10:

What fraction of the box has apples in it?

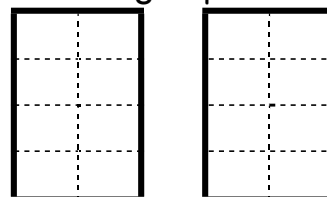


List your answer in lowest terms.

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

$$\frac{1}{3} \text{ is equivalent to } \frac{2}{6}.$$

252. Draw a picture to show that

$$\frac{3}{5} \text{ is equivalent to } \frac{6}{10}.$$

253. Draw a picture to show that

$$\frac{2}{3} \text{ is equivalent to } \frac{6}{9}.$$

## 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.  $\frac{14}{35} =$

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

257. Reduce.  $\frac{24}{40} =$

258. Reduce.

$$3\frac{2}{12} =$$

259. Reduce.

$$5\frac{15}{27} =$$

260. Reduce.

$$-9\frac{2}{48} =$$

261. Which number is larger?

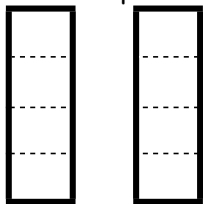
$$-\frac{6}{25} \text{ or } -\frac{28}{100}$$

Mixed and Improper Fractions

262. Challenge #12:

Shade the boxes below to

represent  $1\frac{3}{4}$ .



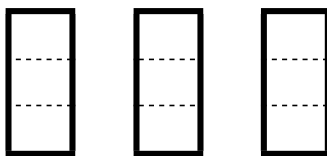
How many quarters did you shade?

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

263. Challenge #13:

Shade the boxes below to

represent  $2\frac{1}{3}$ .



How many thirds did you shade?

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

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.

265. What is a mixed number?

266. What is an improper fraction?

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

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

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.  $\frac{19}{5}$

274.  $-\frac{31}{7}$

271.  $-\frac{23}{7}$

275.  $\frac{46}{5}$

272.  $\frac{17}{2}$

273.  $-\frac{57}{10}$

276. Which number is larger?

$-\frac{34}{11}$  or  $-3\frac{2}{11}$

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.  $-1\frac{1}{5}$

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

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

283.  $-4\frac{2}{5}$

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

284. Which number is smaller?

$1\frac{2}{3}$  or  $\frac{4}{3}$

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



## Converting between fractions and decimals

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

---

$\frac{19}{100}$	$\frac{7}{10}$	$\frac{1}{5}$	$\frac{7}{20}$	$\frac{3}{25}$
------------------	----------------	---------------	----------------	----------------

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

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

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

Solution:  
Divide 5 into 3.

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

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

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

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

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

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

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

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

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

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

---

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

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

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

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

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

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

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

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

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

---

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

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

305.0.5 Solution: $0.5 = \frac{5}{10}$	306.0.6	307.0.23	308.0.25
309.0.65	310.0.555...	311.0.777...	312.0.2323...
313.0.2525...	314.0.6565...	315.0.35	316.0.333...
317.0.250	318.0.2929...	319.0.48	320.0.222...
Right or Wrong? Fix it. 321.0.125 $= \frac{125}{100}$ $= \frac{25}{20}$ $= \frac{5}{4} \checkmark$	Right or Wrong? Fix it. 322.0.1212... $= \frac{12}{99}$ $= \frac{4}{33} \checkmark$	Right or Wrong? Fix it. 323.0.45 $= \frac{45}{100}$ $= \frac{9}{25} \checkmark$	Right or Wrong? Fix it. 324.0.4545... $= \frac{4545}{9999}$ $= \frac{1515}{3333}$ $= \frac{505}{1111} \div \frac{101}{101} = \frac{5}{11} \checkmark$

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.)

---



---



---



---



---



---



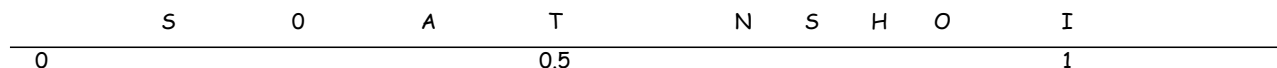
---



---

## 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



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

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

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

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

---

---

---

---

---

---

---

---

327. **Challenge #21:** Find three rational

numbers between  $-\frac{4}{6}$  and  $-0.25$ .

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 $\frac{3}{9}$
--------------------------------	----------------------	-----------------------	-------------------------------------

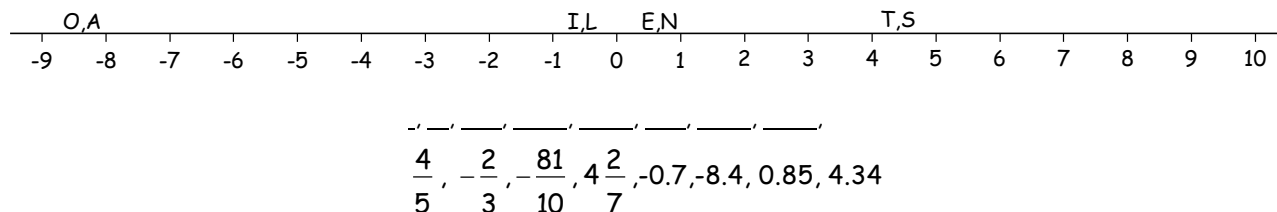
Which rational number in each pair is bigger? Circle your answer.

336. $-\frac{8}{25}$ or $-0.33$	337. $5.\overline{3}$ or $5.333$	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 $-0.24, -0.25, -0.2525..., 0.1$ $\leftarrow -\frac{1}{4} \quad 0 \quad 1$ $-\frac{25}{99}, -\frac{1}{4}, -0.24, 0.1$	341. $2, -8\frac{2}{3}, -\frac{87}{10}, -8.5$	342. $2\frac{5}{7}, 2\frac{9}{14}, 2\frac{5}{9}, 2\frac{1}{3}$
--	---	--

343. Match the letters with the best number below.



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

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

345. What is the opposite of 8?

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

347. What is the opposite of  $-2.7$ ?

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.

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

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

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

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

List three rational numbers between each pair.

352.  $-\frac{4}{6}$  and  $-0.25$   
*A possible solution.*  
 $-0.\overline{66}, -0.6, -0.5, -0.3, -0.25$   
 $-\frac{4}{6}, \underline{\quad}, \underline{\quad}, \underline{\quad}, -\frac{1}{4}$

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

Right or wrong? Fix it.

354.  $2.7$  and  $2\frac{7}{8}$   
 $2.8, 2\frac{13}{16}, 2\frac{15}{16}$

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.

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

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.

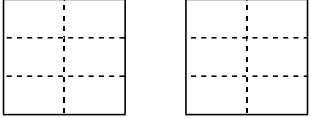
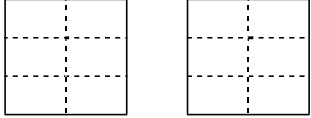
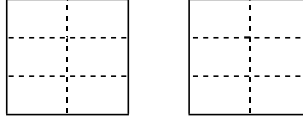
$$\frac{1}{8} < \frac{\text{help}}{16} < \frac{1}{4}$$

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

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

## Operations and Fractions Math 8 Review

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

		
358. $\frac{1}{6} + \frac{4}{6} =$	359. $\frac{1}{2} + \frac{1}{3} =$	360. $\frac{2}{3} - \frac{1}{2} =$

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

361. Challenge #22: Estimate and then

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

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

---

---

---

---

362. Challenge #23: Estimate and then

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

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

---

---

---

---

---

---

363. Challenge #24: Estimate and then

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

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.
	$\frac{7 \times 7}{2 \times 7} + \frac{6 \times 2}{7 \times 2}$ $= \frac{49}{14} + \frac{12}{14}$	$\frac{7 \times 7}{2 \times 7} - \frac{6 \times 2}{7 \times 2}$ $= \frac{49}{14} - \frac{12}{14}$	$\frac{7 \times 6}{2 \times 7}$	$\frac{7}{2} \times \frac{7}{6}$
Step 3	Add numerators.	Subtract numerators.	Reduce numerator and denominator.	Reduce numerator and denominator.
	$\frac{61}{14}$	$\frac{37}{14}$	$\frac{\cancel{7} \times 6}{2 \times \cancel{7}} = \frac{6}{2} = 3$	$\frac{49}{12}$

Evaluate and leave your answer in lowest terms.

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

Solution:

Since there is already a common denominator:

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

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

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

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

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

Solution:

Create a common denominator.

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

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

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

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

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

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

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



373. Which of the following are equivalent?

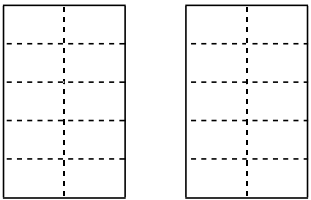
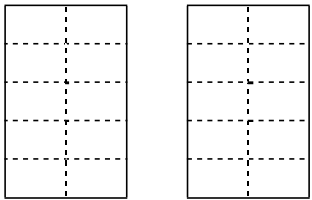
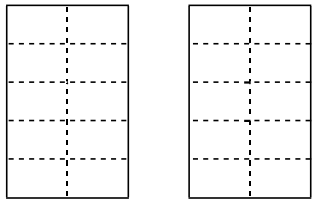
a)  $\frac{2}{-9} + \frac{1}{9}$ ,    b)  $\frac{-2}{9} + \frac{1}{-9}$ ,    c)  $\frac{-2}{9} - \frac{1}{-9}$ ,    d)  $\frac{-2}{9} + \frac{-1}{-9}$ ,    e)  $\frac{-2}{9} - \frac{1}{9}$

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

*You decide!*

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

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

 <p>376. <math>\frac{7}{10} + \frac{2}{10} =</math></p>	 <p>377. <math>\frac{1}{5} + \frac{1}{2} =</math></p>	 <p>378. <math>\frac{4}{5} - \frac{3}{10} =</math></p> <p>379. What must you make sure you have before adding or subtracting fractions?</p>
--	--	--

Keep it simple!

Always move the negative signs to the numerator.

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

Evaluate.

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

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

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

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

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

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

41/10

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

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

Right or wrong? Fix it.

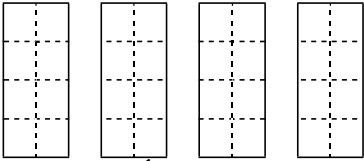
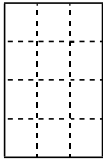
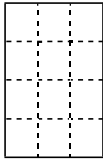
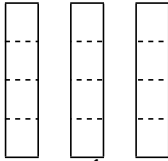
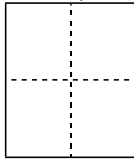
$$\begin{aligned} 387. \frac{8}{-1} - \frac{-3}{5} &= \\ &= \frac{8}{-1} - \frac{-3}{5} \\ &= \frac{40}{-5} - \frac{-3}{5} \\ &= \frac{40}{-5} + \frac{3}{5} \\ &= \frac{43}{-5} \checkmark \end{aligned}$$

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?

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?

# Multiplying and Dividing Fractions

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

<p>390. One half of 4.</p>  <p style="text-align: center;"><math>\frac{1}{2} \times 4 =</math></p>	<p>391. One half of one third.</p>  <p style="text-align: center;"><math>\frac{1}{2} \times \frac{1}{3} =</math></p>	<p>392. Two thirds of three fourths.</p>  <p style="text-align: center;"><math>\frac{2}{3} \times \frac{3}{4} =</math></p>	<p>393. How many times does a half divide into three?</p>  <p style="text-align: center;"><math>3 \div \frac{1}{2} =</math></p>	<p>394. How many times does a quarter divide into a half?</p>  <p style="text-align: center;"><math>\frac{1}{2} \div \frac{1}{4} =</math></p>
---	---	---	--	--

395. Challenge #25: Estimate and then evaluate.

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

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

---

---

---

---

---

396. Challenge #26: Estimate and then evaluate.

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

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

---

---

---

---

---

---

---

397. Challenge #27: Estimate and then evaluate.

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

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.

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

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

400.  $\square 2^3 - \square 4 \times \square - 5^5 \times \square$   
 $\square 7 \quad 9 \square \quad -6 \square$

401.  $\square -2 \square 4^2 \square 1$   
 $\square \times \square 3 \square - \square$   
 $\square 5 \square -6 \square$

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"

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

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

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

"Bryn's Strategy"

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

$$\rightarrow \frac{8}{5} \times \frac{4}{3}$$

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

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.

$$\frac{10}{6} \times \frac{8}{5} \rightarrow \frac{2}{3} \times \frac{8}{3} \rightarrow$$

$$\rightarrow \frac{2 \times 8}{3 \times 3} = \frac{16}{9}$$

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

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

406.  $-\frac{3}{5} \times -\frac{10}{15} =$

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

Solution:

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

$$\frac{9}{4}$$

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

409.  $1 \times 16 =$

410. Determine a value for  $(m \times n)$ , if

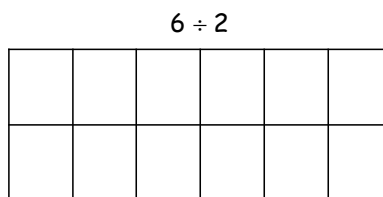
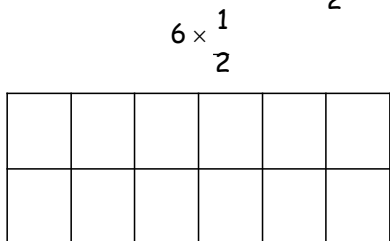
$$m = -\frac{5}{12} \text{ and } n = 9,$$

Find the product and leave your answer in lowest terms.

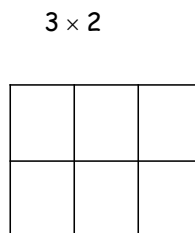
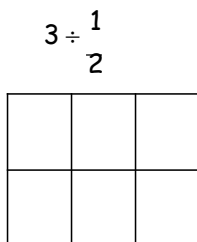
<p>411. <math>2\frac{1}{4} \times \frac{8}{3} =</math></p> <p>Solution:</p> $\frac{2}{4} \times \frac{8}{3} =$ $\frac{\cancel{2}}{\cancel{4}} \times \frac{8}{3} = \frac{3}{\cancel{3}} \times \frac{8}{1}$ $\frac{4}{1} \times \frac{8}{1} = \frac{32}{1} = 32$	<p>412. <math>3\frac{3}{4} \times \frac{2}{5} =</math></p>	<p>413. <math>-\frac{2}{11} \times \frac{51}{2} =</math></p>	<p>Right or wrong? Fix it.</p> <p>414. <math>4\frac{4}{3} \times 0.6 =</math></p> $= \frac{16}{3} \times \frac{6}{10}$ $= \frac{16}{1} \times \frac{3}{10}$ $= \frac{8}{1} \times \frac{3}{5}$ $= \frac{24}{5}$
<p>415. <math>\frac{30}{12} \times \frac{6}{5} \times \frac{4}{6} =</math></p>	<p>416. <math>-\frac{2}{7} \times \frac{-14}{50} \times \frac{5}{-6} =</math></p>	<p>417. <math>\frac{30}{-12} \times \frac{6}{55} \times -22 =</math></p>	<p>418. <math>\frac{20}{4} \times \frac{12}{36} \times \frac{9}{15} =</math></p>
<p>Right or wrong? Fix it.</p> <p>419. <math>-\frac{33}{15} \times \frac{10}{5} \times -30 =</math></p> $= \frac{-33}{15} \times \frac{10}{5} \times \frac{-30}{1}$ $= \frac{-3}{15} \times \frac{10}{5} \times \frac{-30}{1}$ $= \frac{-3}{3} \times \frac{5}{5} \times \frac{-30}{1}$ $= 30$	<p>420. <math>\frac{60}{-40} \times -\frac{12}{72} \times \frac{-36}{-15} =</math></p>	<p>421. <math>-\frac{5}{36} \times \frac{3}{2} \times (-24) =</math></p>	<p>422. <math>\frac{2}{70} \times 14 \times \frac{50}{6} =</math></p>

## 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.



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



### 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 \_\_\_\_\_  $\times$  \_\_\_\_\_.

You decide!

<p>426. Consider the possible strategies to the right for evaluating <math>\frac{5}{6} \div \frac{2}{3}</math>. Which strategy do you like the best?</p>	<p>"David's strategy"</p> $\frac{5}{6} \div \frac{2}{3}$ $\rightarrow \frac{5}{6} \times \frac{3}{2} = \frac{15}{12} = \frac{5}{4}$	<p>"Bryn's Strategy"</p> $\frac{5}{6} \div \frac{2}{3}$ $\rightarrow \frac{5}{6} \div \frac{4}{6} \rightarrow 5 \div 4 = \frac{5}{4}$
--	---	---

## Reciprocals.

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

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

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

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

Find the quotient and leave your answer in lowest terms.

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

Solution.

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

Multiply the first fraction by the reciprocal of the second.

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

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

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

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

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

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

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

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

439. At birth a 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 it after three years of life?

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?

## 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.

---

---

---

---

---

---

---

---

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.

---

---

---

---

---

---

---

---

Reduce any of the following. Do not evaluate.

443. True or false.

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

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

444. True or false.

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

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

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

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

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

$$\frac{12}{18} + \frac{35}{21} + \frac{20}{30}$$



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

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

$$448. \frac{2}{4} + \frac{5}{6} - \frac{5}{9}$$

$$449. \frac{2}{3} \times \frac{1}{2} - \frac{1}{2}$$

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

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

Evaluate and leave your answer in lowest terms.

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

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

$$454. \frac{-2}{5} - \frac{1}{2} - \frac{6}{8} =$$

$$455. \frac{1}{3} - \frac{6}{9} - \frac{3}{5} =$$

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

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.

$$456. \frac{10}{12} + \frac{3}{4} =$$

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

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

$$= \frac{56}{24}$$

$$= \frac{28}{12} = \frac{7}{3} \checkmark$$

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

$$458. \frac{2}{3} + \frac{1}{2} =$$

$$459. \frac{-5}{6} + 2 =$$

Will

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

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

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

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?

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

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

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

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

$$466. \frac{mn}{mm} \div \frac{mnn}{nmm} =$$

## 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.

$\frac{5}{5}$	$-\frac{24}{10}$	$\frac{2}{9}$	$\frac{51}{100}$	$\frac{15}{90}$
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 or false.	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 or false.	If a number's decimal stops, (3.4 or -7), then it is a rational number.
469. True or false.	If a number's decimal repeats (0.333... or -1.0222...), then it is a rational number.

The following numbers are irrational numbers.

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

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

$\pi = 3.1415926535\ 8979323846\ 2643383279\ 5028841971\ 6939937510\ 5820974944\ 5923078164\dots$

What makes a number rational?

<p>470. A number is irrational if its decimal never _____ or never _____.</p> <p>471. Square roots of integers that are not perfect squares are always _____ numbers.</p> <p>472. Which of the following numbers are irrational? <math>\sqrt{0}</math> <math>\sqrt{1}</math> <math>\sqrt{2}</math> <math>\sqrt{3}</math> <math>\sqrt{4}</math> <math>\sqrt{5}</math> <math>\sqrt{6}</math> <math>\sqrt{7}</math> <math>\sqrt{8}</math> <math>\sqrt{9}</math></p>
--

Pi: The most famous irrational number.

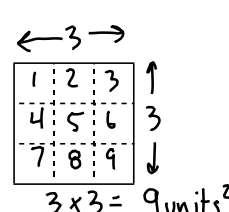
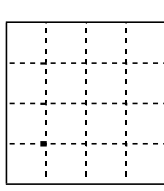
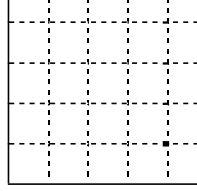
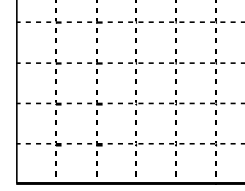
$\pi = 3.1415926535 8979323846 2643383279 5028841971 6939937510 5820974944 5923078164$   
 0628620899 8628034825 3421170679 8214808651 3282306647 0938446095 5058223172 5359408128 4811174502 8410270193  
 8521105559 6446229489 5493038196 4428810975 6659334461 2847564823 3786783165 2712019091 4564856692 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.

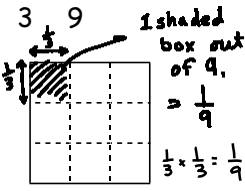
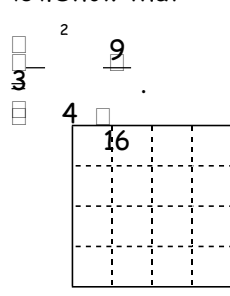
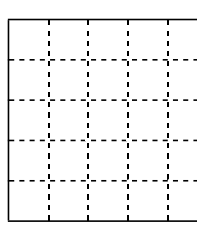
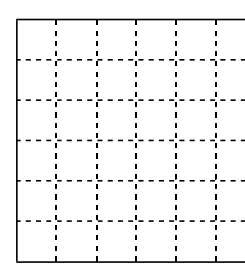
473. True or false. The square root of each number is an irrational number.

<p>474. Draw a square with an area of <math>9\text{cm}^2</math>. What is the length of each side?</p>	<p>475. Draw a square with an area of <math>16\text{cm}^2</math>. What is the length of each side?</p>	<p>476. Draw a square with an area of <math>25\text{cm}^2</math>. What is the length of each side?</p>
<p>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?</p> <p>478. The side length of a square is always the square root of the area of a square. Explain what a square root is.</p>		

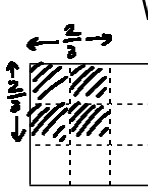
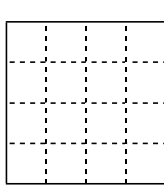
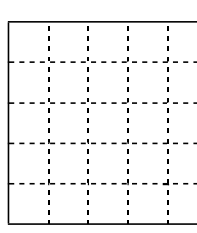
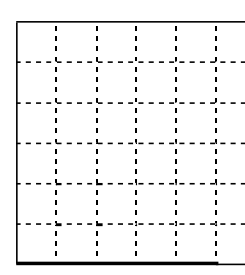
Determine the area of each square.

<p>479. A=</p> <p>Determine the square root of each area.</p>  <p><math>3 \times 3 = 9 \text{ units}^2</math></p>	<p>480. A=</p> <p>Determine the square root of each area.</p> 	<p>481. A=</p> <p>Determine the square root of each area.</p> 	<p>482. A=</p> <p>Determine the square root of each area.</p> 
--	---	--	---

Use the squares below to explain the following:

<p>483. Show that</p> $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$  <p>1 shaded box out of 9.  <math>\frac{1}{9}</math>  <math>\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}</math></p>	<p>484. Show that</p>  <p>9 16</p>	<p>485. Show that</p> $\sqrt{\frac{4}{25}} = \frac{2}{5}$ 	<p>486. Show that</p> $\sqrt{\frac{1}{36}} = \frac{1}{6}$ 
--	--	---	--

Use the square below to find each square root.

<p>487. Evaluate. <math>\sqrt{\frac{4}{9}}</math></p>  <p><math>\therefore \sqrt{\frac{4}{9}} = \frac{2}{3}</math>      or <math>\frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}</math></p>	<p>488. Evaluate. <math>\sqrt{\frac{4}{16}}</math></p> 	<p>489. Evaluate. <math>\sqrt{\frac{16}{25}}</math></p> 	<p>490. Evaluate. <math>\sqrt{\frac{25}{36}}</math></p> 
--	--	--	---

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

1	4	9							

Determine the square of each number.

492.  $\frac{7}{10}$

493. 1.1

494.  $\frac{13}{8}$

495. 1.5

496.  $\frac{17}{18}$

Determine the value of each square root.

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

498.  $\sqrt{0.25}$

499.  $\sqrt{0.81}$

500.  $\sqrt{1.44}$

501.  $\sqrt{\frac{9}{121}}$

502.  $\sqrt{\frac{49}{36}}$

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

504.  $\sqrt{\frac{100}{9}}$

Right or wrong? Fix it.

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

Right or wrong? Fix it.

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

Right or wrong? Fix it.

507.  $\sqrt{2.25} = 1.25$

Right or wrong? Fix it.

508.  $\sqrt{2.56} = 1.4$

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

509. 144, 14.4, 1.44  
 $12 \times 12 = 144$   
 $12 \times 1.2 = 14.4$   
 $1.2 \times 1.2 = 1.44$   
144 + 1.44

510. 8.1, 0.81

511. 1000, 100, 10

512. 0.25, 0.49, 0.9

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

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

515. 2.5, 1.69

516. 0.144, 0.0001

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		

$$\sqrt{50}, \sqrt{0.80}, \sqrt{13}, \sqrt{90}, \sqrt{240}, \sqrt{18}, \sqrt{270}, \sqrt{168}, \sqrt{110}, \sqrt{343}, \sqrt{2}$$

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


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?

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

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

---



---



---



---



---



---

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

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.

<p>522.6.5</p> <p>① Perfect squares 4, 6.5, 9</p> <p style="text-align: center;">2      3</p> <p>② <math>\sqrt{6.5}</math> must be between 2+3</p> <p>③ Since 6.5 is in the middle of 4+9, the <math>\sqrt{6.5}</math> must be near the middle of 2+3.</p> <p>④ <math>\sqrt{6.5} \approx 2.5</math></p>	523.20	524.60	525.88
<p>526.0.45</p> <p>① Perfect squares: 0.36, 0.49, 0.44</p> <p style="text-align: center;">Square roots: <math>0.6 &lt; \sqrt{0.45} &lt; 0.7</math></p> <p>② The Average of 0.36+0.49 is 0.425</p> <p>③ Since <math>0.45 &gt; 0.425</math>, <math>\sqrt{0.45}</math> must be bigger than 0.65.</p> <p>④ <math>\therefore \sqrt{0.45} \approx 0.67</math> is a good guess</p>	527.1.18	528.0.27	529.0.62

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

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

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

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

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

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



## Review Check List

### I don't know how to study for math tests

<p>In general, "A" students are not smarter than "C" students, they just study smarter!</p> <ul style="list-style-type: none"> <li>○ Make sure you know how to do all the questions on the quizzes and practice tests.</li> <li>○ "A" students ask for more help before tests than "C-" students do!</li> </ul>	<p>Studying is about finding out what you don't know and doing something about it.</p> <ul style="list-style-type: none"> <li>○ Redo every question that is on your tough questions list.</li> </ul>	<p>Studying math is not rereading your notes! It is redoing and mastering each type of question prior to the test.</p> <ul style="list-style-type: none"> <li>○ Go through each page of the guidebook and redo one question from each section.</li> </ul>
---	--	---

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 ☺☹☹☹
<ul style="list-style-type: none"> <li>• Solve a given problem involving operations on rational numbers in fraction form and decimal form</li> </ul>	<p>Jayne 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?</p>	22	
<ul style="list-style-type: none"> <li>• 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)</li> </ul>	<p>Place the following rational numbers on the number line.</p> $\frac{4}{5}, -\frac{2}{3}, \frac{81}{10}, 4\frac{2}{7}, -0.7, -8.4, 0.85, 4.34$	29	
<ul style="list-style-type: none"> <li>• Identify a rational number that is between two given rational numbers</li> </ul>	<p>List three rational numbers between each pair. <math>-\frac{4}{6}</math> and <math>-0.25</math></p>	30	
<ul style="list-style-type: none"> <li>• Solve a given problem by applying the order of operations without the use of technology</li> </ul>	<p>Evaluate <math>\square 3^2 + \frac{10}{\square} =</math>  <math>\square \square + \square =</math>  <math>\square \square \square 12</math></p>	42	
<ul style="list-style-type: none"> <li>• Identify the error in applying the order of operations in a given incorrect solution</li> </ul>	<p>See page 18 and 42.</p>		
<ul style="list-style-type: none"> <li>• Determine whether or not a given rational number is a square number and explain the reasoning</li> </ul>	<p>Circle the rational numbers that are perfect squares. Show how you know. 144, 14.4, 1.44.</p>	46	
<ul style="list-style-type: none"> <li>• Determine the square root of a given positive rational number that is a perfect square</li> </ul>	<p>Determine the value of each square root. <math>\sqrt{\quad}</math></p>	45	
<ul style="list-style-type: none"> <li>• Identify the error made in a given calculation of a square root (e.g., Is 3.2 the square root of 6.4?)</li> </ul>	<p>Right or wrong? Fix it. <math>\sqrt{\quad}</math></p>	45	
<ul style="list-style-type: none"> <li>• Determine a positive rational number given the square root of that positive rational number</li> </ul>	<p>Determine the square of each number. <math>7/10, 1.1, \dots</math></p>	46	
<ul style="list-style-type: none"> <li>• Estimate the square root of a given rational number that is not a perfect square, using the roots of perfect squares as benchmarks</li> </ul>	<p>Estimate <math>\sqrt{0.45}</math> to 2 decimals.</p>	47	
<ul style="list-style-type: none"> <li>• Identify a number with a square root that is between two given numbers</li> </ul>	<p>Name three integers with square roots are between 5 and 6.</p>	47	

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

## 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.

<p>1. 536.01</p> <p>2. 56 000.4</p>	<p>Five hundred and thirty-six and one hundredths.</p> <p>Fifty six thousand and four tenths.</p>	
<p>3. Circle all that apply:</p> <p>-1.7 is a:</p> <ul style="list-style-type: none"> <li>• Rational,</li> <li>• Real,</li> <li>• Natural,</li> <li>• Irrational,</li> <li>• Integer.</li> </ul> <p>6. If an odd number of negative numbers are multiplied, together will their product be positive?</p>	<p>4. Round 7.447 to the nearest tenth.</p> <p>7. (T/F) Adding a large positive number to a negative number is always positive.</p>	<p>5. <math>-3 - 7</math> is equivalent to which of the following:</p> <ul style="list-style-type: none"> <li>• <math>-3 + (-7)</math></li> <li>• <math>3 + (-7)</math></li> <li>• <math>-7 - 3</math></li> <li>• <math>-7 + 3</math></li> </ul> <p>8. Evaluate.</p> <p><math>12 - 10(85 - 86)^4 =</math></p>
<p>9. Evaluate.</p> <p><math>3 \times 2 - 5(4 - 3 \times 2)^3 + 1</math></p>	<p>10. Evaluate.</p> <p><math>61.75 \div 1.9 + 345.6</math></p>	<p>11. Which number is larger?</p> <p><math>-\frac{6}{25}</math> or <math>-\frac{28}{100}</math></p>
<p>12. Convert <math>\frac{3}{7}</math> to a decimal to the nearest hundredth.</p>	<p>13. Arrange from smallest to biggest.</p> <p><math>2, -8\frac{2}{3}, -\frac{87}{10}, -8.5</math></p>	<p>14. True or false. If two opposite numbers are both decreased by the same positive value, their sums will be opposites.</p>

15. List 3 rational numbers between  $-2\frac{7}{8}$  and  $-2.7$ .

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?

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

18. Evaluate  $-3 \times \frac{-25}{27} \times \frac{21}{-35}$

Correct the error.

20. Evaluate.  $2\frac{3}{5} \div \frac{7}{10}$

19. The reciprocal of  $1\frac{11}{12}$  is  $1\frac{12}{11}$

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

22. Evaluate  $\sqrt{\frac{121}{256}}$

Right or wrong? Fix it.

23.  $\sqrt{2.25} = 1.25$

24. Name three integers with square roots that are between 7 and 8.

25. Name a rational number with a square root between 1.11 and 1.22.

26. Draw a square with an area of  $20\text{m}^2$ . What is the length of each side to 1 decimal?

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	$\sqrt{4.31}$	$\frac{2}{3}$	0	!	-1.7	$5\frac{1}{4}$
7. Real numbers	yes	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 $\pi, \sqrt{2}$ Natural: 12 Whole: Nat & 0 Integers: Whole & -5 Rational: Int & $\frac{1}{2}$ & 1.8 Real: Rat 7 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. +2	83. -1	84. -53
85. -6	86. 12	87. -9	88. 18	89. 1
90. -19	91. 1	92. -4	93. -13	94. incorrect: -3
95. correct: 11	96. incorrect $\rightarrow \rightarrow -27$	97. Perfect squares $\rightarrow \rightarrow 1,4,9,16,25,36,49,64,81,100,121,144$		
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 $-(3 \times 3)=-9$ . It is easily confused with $(-3)^2=(-3 \times -3)=9$				
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 $\rightarrow \rightarrow -78$	200. Incorrect $\rightarrow \rightarrow -75$
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 $\rightarrow \rightarrow 1.45$	214. 121.98
215. 144.20	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 $\rightarrow \rightarrow 25.5$
235. 291.6m	236. 78.81 $\rightarrow \rightarrow 79$ boards	237. 0.7	238. F	239. A
240. B	241. D	242. E	243. k- - -	244. H
245. L	246. J	247. N	248. $\begin{matrix} 1 & 2 & 4 \\ 2 & 4 & 8 \end{matrix} \dots$	249. 2/5

250.	251.	252.	253.	
		254. $\frac{3}{5}$	255. $\frac{2}{5}$	256. $\frac{3}{10}$
257. $-\frac{3}{5}$	258. $3\frac{1}{6}$	259. $5\frac{5}{9}$	260. $-9\frac{1}{24}$	261. $-\frac{6}{25}$
262. $\frac{7}{4}$	263. $\frac{7}{3}$	264. $-\frac{7}{2}$	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. $2\frac{1}{4}$	270. $3\frac{4}{5}$	271. $-3\frac{2}{7}$	272. $8.5$ or $8\frac{1}{2}$
273. $-5\frac{7}{10}$	274. $-4\frac{3}{7}$	275. $9\frac{1}{5}$	276. $-\frac{34}{11}$	
277. $-17/5$	278. $-\frac{6}{5}$	279. $\frac{13}{3}$	280. $-\frac{17}{6}$	281. $\frac{16}{7}$
282. $\frac{9}{8}$	283. $-\frac{22}{5}$	284. $\frac{4}{3}$	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. $0.111\dots$ & $0.1212\dots$	
	305. $\frac{1}{2}$	306. $\frac{3}{5}$	307. $\frac{23}{100}$	308. $\frac{1}{4}$
309. $\frac{13}{20}$	310. $\frac{5}{9}$	311. $\frac{7}{9}$	312. $\frac{23}{99}$	313. $\frac{25}{99}$
314. $\frac{65}{99}$	315. $\frac{7}{20}$	316. $\frac{1}{3}$	317. $\frac{1}{4}$	318. $\frac{29}{99}$
319. $\frac{12}{25}$	320. $\frac{2}{9}$	321. incorrect $\rightarrow \rightarrow 1/8$	322. $\frac{4}{33}$	323. incorrect $\rightarrow \rightarrow 9/20$
324. $\frac{5}{11}$				

325. ASTONISH	326. $-\frac{25}{99}, \frac{1}{4}, 0.24, 0.1$	327. Answers will vary. $-0.65, -0.4, -0.26$	328. $-4\frac{1}{2}$	329. $8.9$
330. $-18.2$	331. $\frac{3}{9}$	332. $-4.8$	333. $-9.3$	334. $-19$
335. $\frac{3}{9}$	336. $-\frac{8}{25}$	337. $5.33333\dots$	338. $-0.33$	339. $-1.45555\dots$
340. $-\frac{25}{99}, \frac{1}{4}, 0.24, 0.1$	341. $-\frac{87}{10}, \frac{2}{3}, 8.5, 2$	342. $2\frac{1}{3}, 2\frac{5}{9}, 2\frac{9}{14}, 2\frac{5}{7}$	343. ELATIONS	344. TRUE
345. $-8$	346. $-\frac{7}{11}$	347. $2.777\dots$	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. $2\frac{15}{16}$ too big, Any number between $2.7$ & $2.875$
355. $\frac{9}{32}$	356. $\frac{3}{16}$	357. $\frac{11}{32}$	358. $\frac{5}{6}$	359. $\frac{5}{6}$
360. $\frac{1}{6}$	361. $\frac{4}{5}$			
362. $\frac{11}{10}$	363. $\frac{41}{10}$	364. $\frac{4}{5}$	365. $-\frac{2}{5}$	366. $-\frac{7}{5}$
367. $\frac{1}{5}$	368. $\frac{11}{10}$	369. $-\frac{11}{20}$	370. $-\frac{7}{12}$	371. $-\frac{1}{15}$

372. a, b, d	373. acd & be	374. NO	375. Personal preference. Wonda is more efficient.	
376. $\frac{9}{10}$	377. $\frac{7}{10}$	378. $\frac{1}{2}$	379. Common denominators	
	380. $-\frac{23}{10}$	381. $\frac{51}{10}$ or $5.1$	382. $\frac{9}{4}$	383. $-\frac{17}{4}$
384. $\frac{41}{10}$	385. $-\frac{79}{20}$ or $-3.95$	386. $\frac{5}{12}$	387. incorrect $\rightarrow \rightarrow -\frac{37}{5}$	388. $1\frac{2}{15}$ m
389. $4\frac{13}{16}$				390. $2$
391. $\frac{1}{6}$	392. $\frac{1}{2}$	393. $6$	394. $2$	395. $\frac{8}{3}$

396.1	397.6	398. neg	399. Positive	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 or 4/5	461. 53/45	462. Jovan makes \$312.50 more than Matty.
463. n/m	464. 1	465. 1	466. 1	467. †
468. †	469. †	470. stops, repeats	471. irrational	472. $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{6}, \sqrt{7}, \sqrt{8}$
473. F (i.e. $\sqrt{9} = 3$ )	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. 1.5	508. 1.6	509. 144,1.44	510. 0.81	511. 100
512. 0.25, 0.49	513. 400/9	514. 4/121	515. 1.69	516. 0.0001
517. Enchantment	518. See #491	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. 1.57-1.95 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 hundredth	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
9. 47	10. 378.1	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. $1\frac{2}{15}$ m higher	17. $15^{\circ}\text{C}$	18. $-\frac{5}{3}$
19. $\frac{12}{23}$ is the reciprocal of $1\frac{11}{12}$	20. $\frac{26}{7}$	21. $\frac{53}{45}$	22. $\frac{11}{16}$	23. 1.5
24. Answers will vary: 50,60,63	25. Answer will vary: 1.3 (1.24-1.48)	26. Answers will vary: 4.5 (4.6 is too big)		

**Your test must be marked prior to the test.**