Name:_____Block:_____

June 2014

2014 WNCP Math 9 Year End Review by Mathbeacon

Review Format:
Part 1: Includes 1 page review of core ideas for each chapter.
Part 2: Includes 6 practice tests varying in difficulty

Topic	Page Number	Questions I need to review.
Rational Numbers and Square Roots • Review	2	
Polynomials • Review	3	
Linear Equations • Review	4	
Linear Relations • Review	5	
Powers and Exponents • Review	6	
Similarity and Transformations • Review	7	
Measurement • Review	8	
Circle Geometry • Review	9	
Probability and Statistics • Review	10	

Directions:

1. Complete each exam, one at a time. Mark and correct each exam.
2. Each exam is harder than the one before.
3. This assignment must be handed in at the final exam.

Sample Exams	Page Number	Score	Questions I need to review
Oak Bay Sample Final Exam • Level 1.1	11-13	/30	
Oak Bay Sample Final Exam • Level 1.2	14-16	/30	
Oak Bay Sample Final Exam • Level 1.3	17-19	/30	
Oak Bay Sample Final Exam • Level 1.4	20-22	/30	
Oak Bay Sample Final Exam • Level 1.5	23-25	/30	
Oak Bay Sample Final Exam • Level 1.6	26-28	/30	

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1. Rational Numbers and Square Roots

Intended Learning Outcomes:

A3 demonstrate an understanding of rational numbers by:− comparing and ordering rational numbers− solving problems that involve arithmetic operations on rational numbers
A4 explain and apply the order of operations, including exponents, with and without technology
A5 determine the square root of positive rational numbers that are perfect squares
A6 determine an approximate square root of positive rational numbers that are non-perfect squares

1. Which of the following are not rational numbers?

$3.1,\ -3.225,\ \pi,\ -\frac{2}{3},\ \frac{1.2}{7.9}$

$7.23452,\ \sqrt{9},\ -\sqrt{16},\ \sqrt{2}$

$0.333\ldots,\ -1.2525\ldots,\ -0.00034$

Remember: 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.)

2. (t/f) Converting rational numbers to the same form, (all fractions or all decimals), is often a good when you are trying to compare them.

3. Order the following rational numbers from least to greatest:

$4, -3.6, -\frac{7}{2}, -\frac{24}{7}, -1$

_____<_____<_____<_____< +4

4. t/f A common denominator is required to add or subtract fractions.

5. Evaluate:

A) $\frac{2}{5}+\frac{1}{5}=$ B) $\frac{5}{6}-\frac{4}{6}=$

C) $\frac{1}{3}+\frac{1}{2}=$ D) $2\frac{1}{3}-1\frac{1}{2}=$

6. (t/f) A common denominator is required to multiply or divide fractions.

7. (t/f) To multiply fractions, multiply the numerator and multiply the denominator

8. Evaluate:

A) $\frac{4}{1}\times\frac{1}{2}=$ B) $\frac{7}{1}\times\frac{1}{3}=$

C) $\frac{6}{5}\times\frac{10}{3}=$ D) $2\frac{6}{5}\times\frac{3}{4}=$

9. (t/f) When multiplying or dividing, you need to convert mixed numbers, $\left(2\frac{1}{3}\right)$ to improper fractions first.

10. Evaluate:

A) $\frac{4}{1}\div\frac{1}{2}=$ B) $\frac{1}{2}\div 2=$

C) $2\frac{6}{5}\div\frac{4}{3}=$

11. (t/f) Following BEDMAS is only needed some of the times.

Evaluate:

A) $\frac{20}{40}-\frac{21}{40}\times\frac{80}{7}=$ B) $\left(\frac{5}{3}\right)^2-\frac{12}{9}=$

12. (t/f) A number is a perfect square it is made by multiplying the same number by itself.

13. Circle any the numbers that are perfect squares:
1,2,3,4,5,6,7,8,9.

14. List the first 12 perfect squares.

_____, _____, _____, _____

_____, _____, _____, _____

_____, _____, _____, _____

15. Evaluate the following:

$\sqrt{25}=$ $\sqrt{36}=$ $\sqrt{\frac{25}{36}}=$

$\sqrt{9}=$ $\sqrt{0.09}=$ $\sqrt{0.16}=$

16. Approximate each square root to the nearest tenth.

$\sqrt{26}=$ $\sqrt{35}=$ $\sqrt{30.3}=$

17. The following formula converts degrees Fahrenheit,(F) to degrees Celsius,(C):

$C=\frac{5}{9}(F-32)$. Convert 59 degrees Fahrenheit to degrees Celsius.

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2. Polynomials

Intended Learning Outcomes:

B5 demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2)
B6 model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2)
B7 model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically

18. Given the following sequence of numbers, determine the 100th term and write an expression to represent any term

A. 2,3,4,5,… _____(100th term),

B. Expression: y=_____

C. 2,4,6,8,… _____(100th term),

D. Expression: y=_____

E. 3,5,7,9,… _____(100th term),

F. Expression: y=_____

Match the letter to the appropriate number.

19. ___What is the 3 called in $3x^4+5$

20. ___What is the x called in $3x^4+5$

21. ___What is the 5 called in $3x^4+5$

22. ___What is $3x^4$ called in $3x^4+5$

23. ___$3x^2$, $4y^2$-7y and 2x(x+2) all have the same?

24. ___$2y$ is an example.

25. ___$3x^4+5$ is an example.

26. ___$x+y+z$ is an example

27. ___$3x^4+5$ & $x+y+z$ are examples.

A. Variable: An unknown quantity represented by a letter.

B. Term: A product of letters and/or numbers including single variables or constants.

C. Binomial: An expression with two terms

D. Monomial: An expression with one term

E. Constant: A number on its own that does not change

F. Trinomial: An expression with three terms

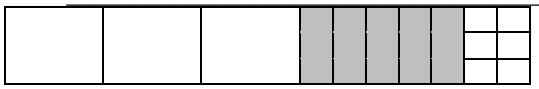
G. Polynomial: An expression made up of any number of terms.

H. Coefficient: A number in front of a variable that does not change

I. Degree: The highest sum of the exponents in a single term

28. Write a polynomial expression and simplify each polynomial.

Expression: _____+_____=_____



+

29. Simplify $\left(-8x^2+7x+9\right)-\left(6x^2-5x+2\right)$

30. Which of the following can be represented by the same set of algebra tiles?

$7x-4+3x^2$
$-7x+4+3x^2$
$3x^2+4-7x$
$3x^2-7x+4$

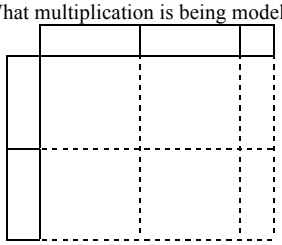
True or false.

31. (t/f) $3x+4x^2=7x^3$

32. (t/f) $3x-8x-2x^2+4x^2=-5x+2x^2$

33. (t/f) Like terms have the same variable and the same exponents.

34. What multiplication is being modeled?



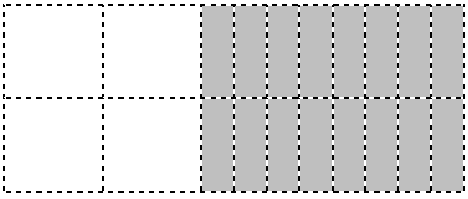
_____X_____=

35. Expand:

A) $3\left(2x+3\right)=$

B) $-2x\left(-4x+2-11z\right)=$

36. Use the tiles to simplify $\frac{4x^2-16x}{2x}=$



37. Simplify: $\frac{5x^2+10xy-25x}{5x}$

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3. Linear Equations

Intended Learning Outcomes:

B3 model and solve problems using linear equations of the form:

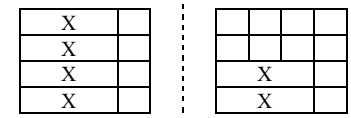
$ax = b$, $\frac{x}{a} = b$, $ax + b = c$, $\frac{x}{a} + b = c$, $a(x + b) = c$, $ax + b = cx + d$, $a(bx + c) = d(ex + f)$ $\frac{a}{x} = b$,

B4 explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context.

Write an equation and solve it by rearranging the algebra tiles.

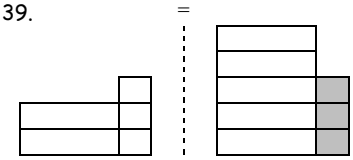
Let [+x] , [-x] , [+] , [-]

38.



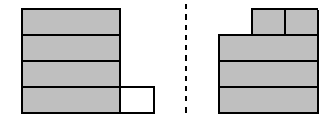
Solve for x.

39.

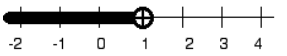
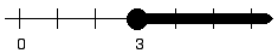


Solve for x.

40.



Solve for x.

Given: 5m+7=2m-3 Are you allowed to: **41.** (Y/N) Add 10 to both sides? **42.** (Y/N) Minus 3 from both sides? **43.** (Y/N) Divide both sides by 5? **44.** (Y/N) Add 5m to both sides? **45.** (y/n) Are any of the above helpful to solving the equation?	**46.** Solve. 4m+3=31	**47.** Solve. 4(m+3)=40	**48.** Solve. 6m+3=2m+15
49. Solve. $\frac{2}{5}m - 5 = 3$	**50.** (T/F) To eliminate fractions, multiply both sides by the lowest common denominator. **51.** Solve $\frac{m}{3} + \frac{2m}{5} - \frac{1}{2} = 2$	**52.** Write an inequality to represent each of the following:    	**53.** (t/f) When an inequality is multiplied or divided by a negative number, the direction of the inequality changes. **54.** Solve: $5m - 10 > +20$ **55.** Solve: $-5m - 3 \leq 7$

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4. Linear Relations

Intended Learning Outcomes:

B1 generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.
B2 graph linear relations, analyze the graph, and interpolate or extrapolate to solve problems

Describe a written pattern in a table of values, a graph and an equation.

Study the Pattern

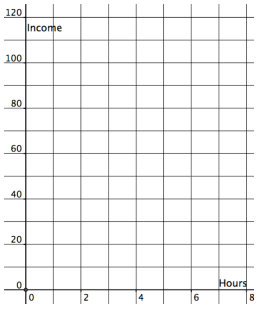
Jason cuts lawns as his summer job. He charges a travelling fee of $10 plus $20/hour for his time.

56. Fill out the table of values.

Let x= Hours & y= Income

x	y
1	
2	
3	
4	
5	
6	

57. Plot as many points as will fit.



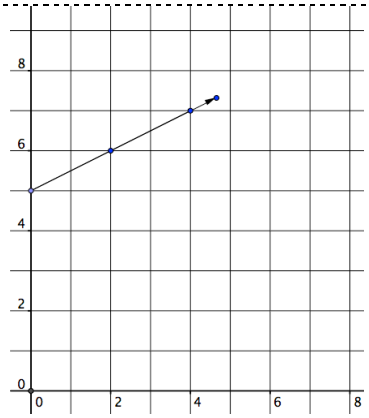
Answer the questions.

58. Rate of change: How is the y changing?

59. Write an equation to represent this pattern.

Y=_____

How can you ensure that your equation is correct



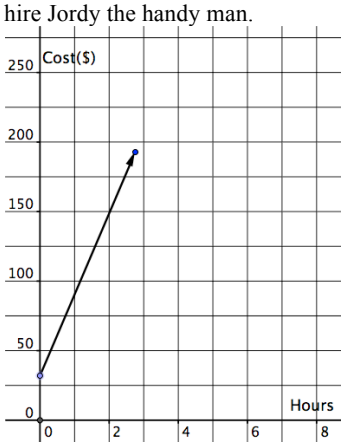
Answer each question and state whether you are interpolating or extrapolating.

60. Estimate y if x=1

61. Predict y if x=8.

62. Predict x if y=3.

The graph represents how much it costs to hire Jordy the handy man.



63. Interpolate: Estimate how much it will cost to hire Jordy for 1.5 hours.

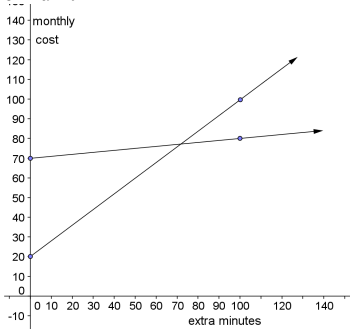
64. Extrapolate: Estimate how much it will cost to hire Jordy for 4 hours?

Tok Alut, is trying to decide between two phone plans. His options include:

Chatzilla Economy Plan: $20/ month and $0.80 for every minute above 300 minutes.

Chatzilla Premium Plan: $70/ month and $0.10 for every minute above 300 minutes.*

Label each linear relation economy or premium.



65. If he thinks he will use 110 extra minutes per month, which phone plan should he choose and approximately how much will he save?

66. Tok has budgeted $80 per month for his phone. Which option should he choose and why?

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5. Powers and Exponents

Intended Learning Outcomes:

A1 demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by; representing repeated multiplication using powers. using patterns to show that a power with an exponent of zero is equal to one, solving problems involving powers.
A2 demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.

67. What is the difference between 2^3 & 3^2 ?

68. Which of the following are equal:
a) -3^2, b) (-3^2), c)$-(3)^2$, d)$(-3)^2$ Explain your reasoning.

69. Does $2^2 + 2^3 = 2^2 \times 2^3$? Explain.

Read each explanation. Answer each written question. Complete the Exponent Law equation

70. Explanation:
Simplify: $5^2x5^3=$

$=(5x5)(5x5x5)$
$=5x5x5x5x5$
$=5^5$

71. Explanation:
Simplify: $\frac{5^4}{5^3} =$

$= \frac{5\times5\times5\times5}{5\times5\times5}$

$= \frac{\cancel{5\times5\times5}\times5}{\cancel{5\times5\times5}} = 5^1$

72. Explanation:
Simplify: $(5^2)^3=$
$=(5^2)(5^2)(5^2)$
$=(5x5)(5x5)(5x5)$
$=5x5x5x5x5x5$
$=5^6$

73. When powers are multiplied, what do you do with the exponents?

75. When powers are divided, what do you do with the exponents?

77. When powers are raised to an exponent, what do you do with the exponents?

74. $m^x \times m^y = m^{\_\_\_?}$

76. $m^x \div m^y = m^{\_\_\_?}$

78. $\left(m^x\right)^y = m^{\_\_\_?}$

Read each explanation. Complete the Exponent Law equation.

79. Explanation:
Simplify: $(2x5)^3=$

$=(2x5)(2x5)(2x5)$
$=2x5x2x5x2x5$
$=2x2x2x5x5x5$
$=2^3x5^3$

$\left(mn\right)^x = m^{\_\_\_?}n^{\_\_\_?}$

80. Explanation:
Simplify: $=\left(\frac{5}{2}\right)^3 =$

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

$\left(\frac{m}{n}\right)^x = \frac{m^{\_\_\_?}}{n^{\_\_\_?}}$

81. Explanation:
Simplify: $2^0 =$

$2^0 = 2^{3-3} = \frac{2^3}{2^3} = \frac{\cancel{2\times2\times2}}{\cancel{2\times2\times2}} = 1$

$m^0 = \_\_\_?$

Simplify and evaluate where appropriate:

82. $\frac{2^{50}\times2}{2^{20}} \times \frac{2^{20}\times2^3}{2^{50}} =$

83. $\frac{2^4\times2^5\left(2^5\right)^{11}}{2^3\left(2^{10}\right)^6} =$

84. $5\left(2-7\right)-\left(10-3\times3\right)^3$

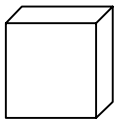
6. Measurement

Intended Learning Outcomes:

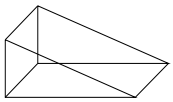
C2 determine the surface area of composite 3-D objects to solve problems

Rectangle A= lw	Triangle A = bh/2 or A = ½bh	Circle A = πr^2, C = $2\pi r$
Rectangular Prism SA = 2 (wh + lw + lh)	Cylinder SA = $2\pi r^2 + 2\pi rh$	Right Triangular Prism SA = bh + ws + wh + wb

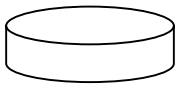
85. Label the rectangular prism with a length of 5cm, a width of 2cm and a height of 4 cm, draw its net, and calculate the surface area.



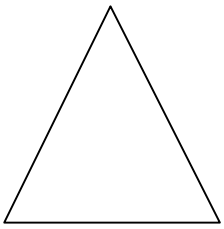
86. Label the right triangular prism with a base of 10cm, a width of 5cm and a height of 8cm, draw its net and calculate the surface area.



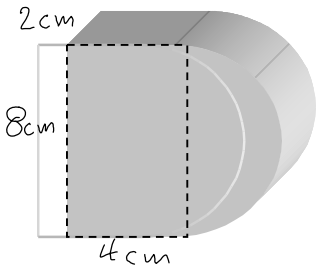
87. Label the cylinder with a radius of 12cm and a height of 10cm, draw its net and calculate the surface area.



88. Determine the area of the isosceles triangle with side lengths 8mm, 10mm, 10mm.



89. Determine the total surface area of the composite shape. Use $\pi = 3.14$.



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7. Similarity and Transformations

Intended Learning Outcomes:

C3 Demonstrate an understanding of similarity of polygons.
C4 Draw and interpret scale diagrams of 2-D shapes.
C5 Demonstrate an understanding of line and rotation symmetry.

Fill in the missing angles and side lengths.

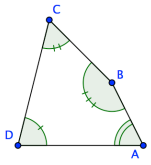
90. Determine the missing angle.

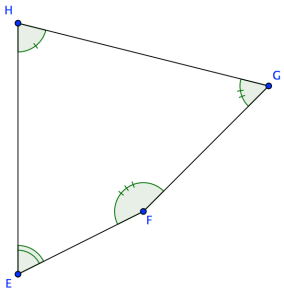
∠A=∠_____

∠B=∠_____

∠C=∠_____

∠D=∠_____



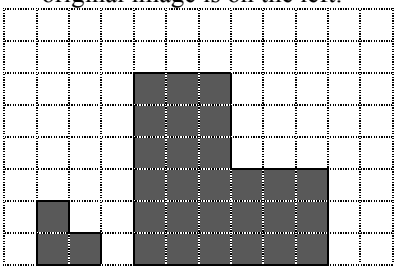


91. Complete the proportion.

$$\frac{?}{AB} = \frac{?}{AD}$$

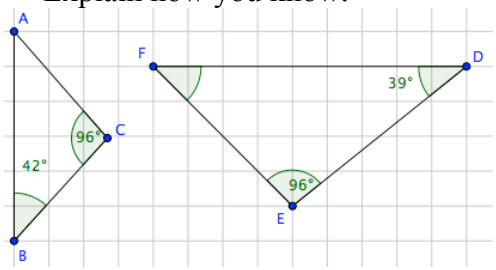
$$\frac{?}{BC} = \frac{?}{DC}$$

92. Determine the scale factor for each scale drawing. The original image is on the left.



93. A drawing of a bedbug is 2.2cm long. The actual size is 0.95cm. Determine the scale factor.

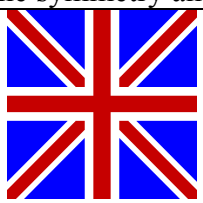
94. Are these two triangles similar? Explain how you know.



Explain how you can find the scale factor for any two objects.

Line symmetry and Rotational Symmetry

95.



A) State the number of lines of symmetry.

B) Determine the order of rotation symmetry.

C) Determine the angle of rotation symmetry.

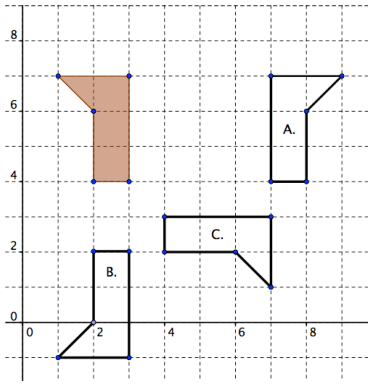
96.

A) State the number of lines of symmetry.

B) Determine the order of rotation symmetry.

C) Determine the angle of rotation symmetry.

97. Describe the location of each line of symmetry to make each polygon a reflection of the shaded polygon.



A) B) C)

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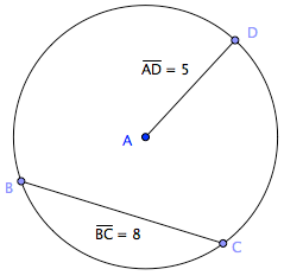
8.Circle Geometry

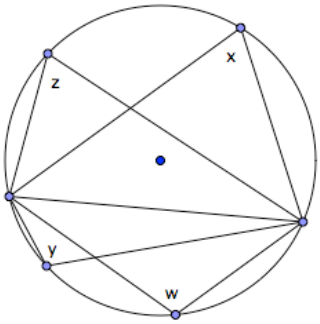
Intended Learning Outcomes:

C1: Solve problems and justify the solution strategy using circle properties, including: The perpendicular from the centre of a circle to a chord bisects the chord. The measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc. The inscribed angles subtended by the same arc are congruent. A tangent to a circle is perpendicular to the radius at the point of tangency

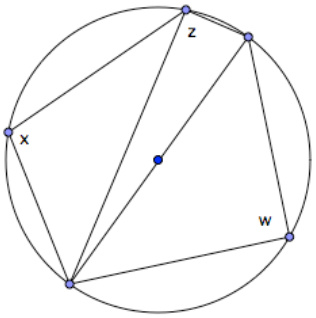
98. Determine the shortest distance between the centre of the circle and the chord BC.



99. Which angles are equal?



100. Which angle(s) measure 90˚?

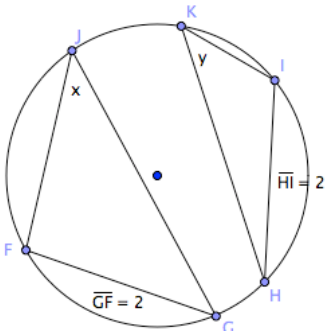


101. What do you know about a **chord** if it is perpendicular to the radius?

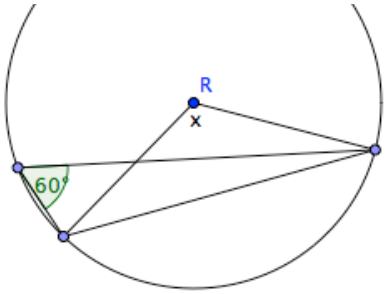
102. What do you know about inscribed angles from the same chord?

103. What do you know about inscribed angles from the diameter?

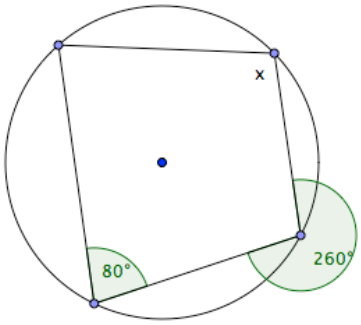
104. Why are angles x and y equal?



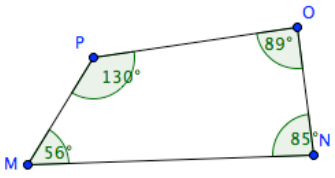
105. Why does angle x equal 120?



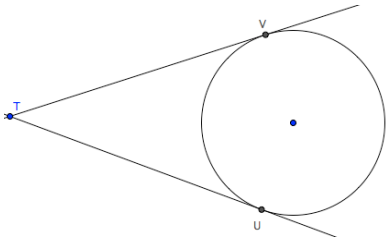
106. Why does angle x = 100?



107. Is MNOP an inscribed quadrilateral? Why?

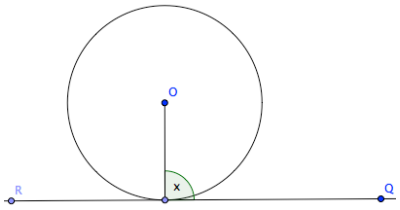


108. U and V are points of tangency.



What do you know about tangents to an external point?

109. O is the centre and line RQ is a tangent line.



What do you know about a radius meeting a tangent line?

9. Probability and Statistics

Intended Learning Outcomes:

D1 describe the effect of; Bias ,Use of language, Ethics, Cost, Time and timing, Privacy, Cultural sensitivity on the collection of data

D2 select and defend the choice of using either a population or a sample of a population to answer a question

D4select and defend the choice of using either a population or a sample of a population to answer a question

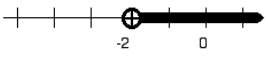
Match the definition to each word below.

110.____Bias	A. A question that influences or leads those being surveyed in a particular direction.
111. ____Biased Sample	B. The time of day, week and month can impact the results of the survey. The amount of time required to complete the survey can also impact the results.
112.____Cluster sample	C. The number of items in the sample.
113.____Convenience Sample	D. The entire set of people or things being studied or investigated.
114.____Cost	E. The cost of completing the survey cannot outweigh the benefits of obtaining the survey data.
115.____Cultural Sensitivity	F. Is the question clear? Does the question lead the participants in a particular direction?
116.____Ethics	G. Has to do with respecting a persons beliefs and traditions.
117.____Experimental probability:	H. A sample where members of the population choose to participate.
118.____Population	I. A sample where the entire population is split into subgroups and then a random sample from each subgroup is selected.
119.____Privacy	J. Are the questions socially and morally appropriate? Also, are the results from the survey being used in a responsible way?
120.____Representative sample	K. Do the survey questions respect a person's privacy?
121.____Sample	L. A sample where members from the entire population are chosen because they are easily accessible.
122.____Sample Size	M. A sample that does not accurately represent the larger population.
123.____Simple Random Sample	N. A sample where every "nth" person from a population is selected.
124.____Stratified Sample	O. A sample where every member of a sub-group of the entire population is selected.
125.____Systematic Sample	P. A sample where every member of the entire population has the same chance of being selected.
126.____Theoretical probability:	Q. A sample that accurately represents the larger population.
127.____Time and Timing	R. A part of a specific population being studied or investigated.
128.____Use of language	S. A probability obtained based on what should happen. For example, A coin is flipped 2 times. There are two sides. It should land on heads half of the time. The theoretical probability of a head is 0.5.
129.____Voluntary sample	T. A probability obtained through an experiment. For example, 7 students out of 10 say they like 2% milk. The experimental probability of this experiment is 0.7.

Name:_____Block:_____

June 2014

Oak Bay Sample Final Exam
Level 1.1.

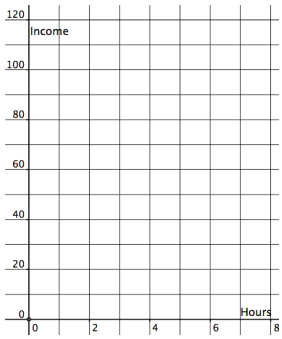
1. Evaluate: $\frac{1}{4}+\frac{1}{5}=$	2. Evaluate: $\frac{6}{5}\div\frac{3}{10}=$	3. Order the following rational numbers from least to greatest: $\frac{1}{2},\frac{1}{4},\frac{3}{8}$
4. Determine the square root of 49.	5. Simplify. $\left(4x^2+2x+6\right)-\left(3x^2+5x+1\right)$	6. Expand: $-5\left(2x-1\right)=$
7. Simplify: $\frac{10x^2+15x}{5}=$	8. A)What kind of polynomial is $3x^4+5$? B)What is the degree of the polynomial? 2,3,4 or 5	9. Solve 8m+6=15
10. Solve 8m+6=5m+15	11. Solve: $2(m-10)>30$	12. Write an inequality to represent the graph. 

Represent the following situation in a table of values, a graph and an equation. Emanuel does landscaping in the summer. He charges flat fee of $20 to cover travel time and $10/hour once he has arrived.

13. Fill out the table of values.
Let x= Hours & y= Income

x	y
1	
2	
3	
4	
5	
6	

14. Plot as many points as will fit.



Answer the questions.

15. A)Rate of change: How is the y changing?

B) Write an equation to represent this pattern.

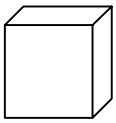
Y=_____

16. Write $2^{20} \times 2^{30} \times 2^{50}$ as a single power.

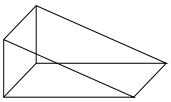
17. Evaluate: $2-5\left(2\right)^{3} =$

18. Simplify: $\dfrac{\left(m^{5}\right)^{2}}{m^{6}} =$

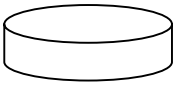
19. Label the rectangular prism with a length of 6cm, a width of 3cm and a height of 5 cm, draw its net, and calculate the surface area.



20. Label the right triangular prism with a base of 8cm, a width of 4cm and a height of 6cm, draw its net and calculate the surface area.

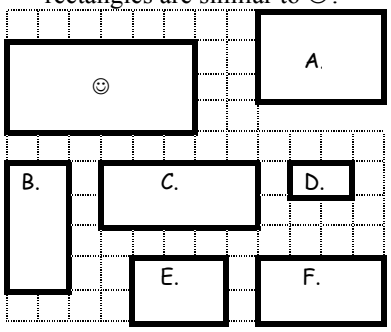


21. Label the cylinder with a radius of 8cm and a height of 4cm, draw its net and calculate the surface area. $SA = 2\pi r^2 + 2\pi rh$

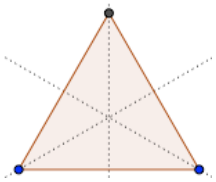


22. A grey nurse shark is 368cm long. National geographic has a photograph of the same shark and it measures 4.8cm long. Determine the scale factor to the nearest thousandth.

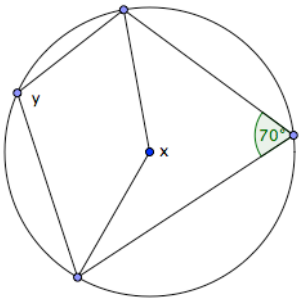
23. Which of the following rectangles are similar to ☺?



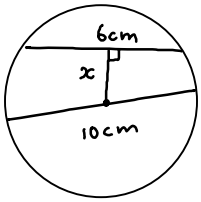
24. Determine the **order of rotation** and the **angle of rotation** for the following triangle.



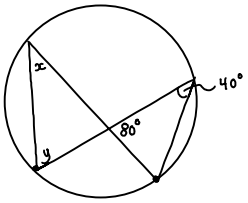
25. Find x and y.



26. Determine the length of x.



27. Find x and y.



28. Future Shop wants to know what high school students think of their reputation. Would you recommend that they survey the population or a sample of the population? Explain.

29. A marketing company calls the first name at the top of each page of the Vancouver white pages to determine what people in Vancouver thought about hosting the Olympics. Which sampling technique is this?

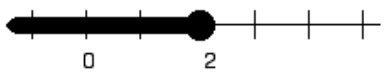
Convenience, Simple Random, Stratified, Systematic, Voluntary OR Cluster

30. The local police station is gathering data about speeding last Sunday afternoon. They recorded the speeds of 11000 drivers. 2557 drivers sped. Calculate the experimental probability to the nearest tenth of a percent.

Name:_____Block:_____

June 2014

Oak Bay Sample Final Exam
Level 1.2.

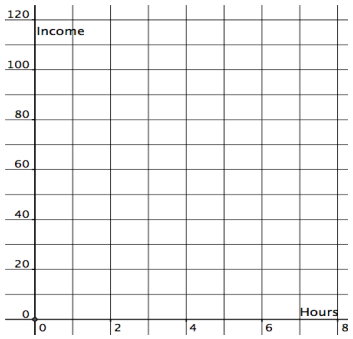
1. Evaluate: $-\frac{2}{3}-\frac{4}{7}=$	2. Evaluate: $-1\frac{3}{7}\div\frac{5}{14}=$	3. Order the following rational numbers from least to greatest: $-\frac{2}{5},-0.35,-\frac{3}{8},\frac{1}{16}$
4. Determine the square root of $\sqrt{\frac{121}{100}}$ and leave your answer as a fraction.	5. Simplify. $\left(-7x^2-5x+9\right)-\left(7x^2-3x-8\right)$	6. Expand: $-2x\left(3x-y+z\right)=$
7. Simplify: $\frac{21x^2-35x}{-7x}=$	8. A)Which number(s) is/are the coefficients of the polynomial $3x^5-x^2+2x-4$? B)What is the degree of the polynomial? 1, 2,3,4 or 5	9. Solve 7m-6=11
10. Solve 8m - 6= -5m+15	11. Solve: $-2(m+4)>10$	12. Write an inequality to represent each graph: 

Represent the following situation in a table of values, a graph and an equation. Jacob paints pictures for extra cash. He charges flat fee of $50 to cover materials and $15/hour once he has arrived.

13. Fill out the table of values.
Let x= Hours & y= Income

x	y
1	
2	
3	
4	
5	
6	

14. Plot as many points as will fit.



Answer the questions.

15. A)Rate of change: How is the y changing?

B)Write an equation to represent this pattern.

Y=_____

16. Write $2^{50} \times 2^{0} \times 2^{0}$ as a single power.

17. Evaluate: $2^2 - \left(3-5\right)^3 =$

18. Simplify: $\dfrac{-m^3\left(-m^4\right)^2}{-m^5} =$

19. Draw a rectangular prism with a rectangular prism cut through the center of it.

Correct the solution:
1st Calculate the surface area of the larger rectangular prism first.
2nd Calculate the surface area of the smaller rectangular prism and subtract it from the bigger one.
3rd Finished.

20. Draw a cylinder with a smaller cylinder cut through the middle of it.

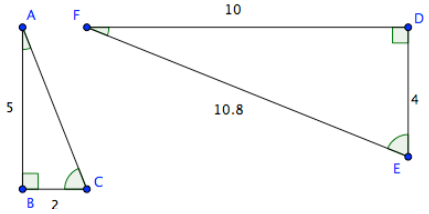
Correct the solution:
1st Calculate the surface area of the larger cylinder first.
2nd calculate the surface area of the top circles of the smaller cylinder and subtract it from the larger cylinder.
3rd Finished.

21. The two cylinders have respective radii of 5cm and 3 cm and surface areas of 200cm^2 and 100cm^2.

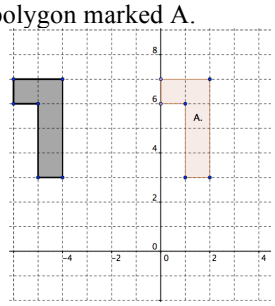
Sandy glues the two cylinders together and paints the composite shape. How much must be subtracted from 300cm^2 to determine the new surface area?

22. The greatest gap between rims in the Grand Canyon on a map is 2.9 cm. Determine the actual gap in km, if the scale factor is 1/1000000.

23. Determine the length of AC.



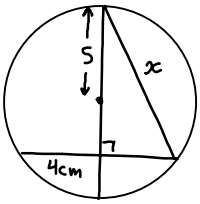
24. Describe the positions of two reflections that could transform the shaded polygon to the polygon marked A.



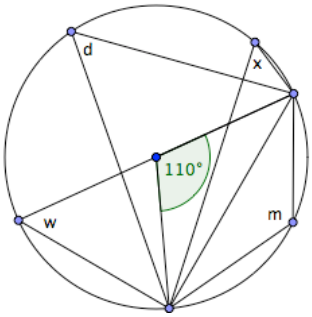
A. Reflected over x=_____

B. Reflected over x=_____

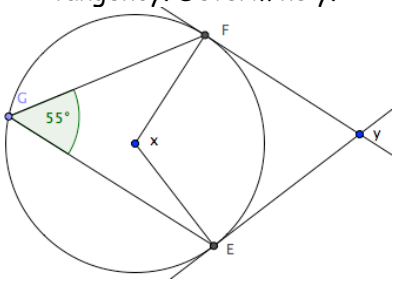
25. Find x.



26. Which angle(s) measure 55°?



27. F and E are points of tangency. Determine y.



y=

28. Save On Foods wants to know what their customers think about their points program. They give every customer a code to complete an online survey. Will the data collected be an example of the population or a sample of the population. Explain.

29. Elliott High School has 40 different sports teams. The school president wants to know what school athletes think about the team coverage on the website. Which sampling technique would you recommend, simple random or stratified? Explain

30. The probability that a carton of juice is under filled is 1.5%. The school purchased 1200 juice boxes for the school vending machines. Predict how many juice boxes will be under filled?

Name:_____Block:_____

June 2014

Oak Bay Sample Final Exam
Level 1.3.

1. If an odd number of negative numbers are multiplied, together will their product be positive?	2. Evaluate. $61.75 \div 1.9 + 345.6$	3. -3 - 7 is equivalent to which of the following: • -3 + (-7) • 3 + (-7) • -7 - 3 • -7 + 3
4. Evaluate $\sqrt{\frac{121}{256}}$	5. Simplify. $2m^2 - 9m^2 + 7nm - 5m^2 - 4mn$	6. Divide: $\left(-35y^2 - 21y + 14y\right) \div \left(-7y\right)$
7. Which of the following is equivalent to $4x - 5x^2 + 3$: A. $5x^2 - 4x + 3$ B. $-5x^2 + 4x + 3$ C. $-5x^2 + 4x - 3$	8. The area of a rectangle is $24w^2$ and has a width of 8w. Write an expression to represent the length.	9. Solve $5m - 15 = 40$
10. Solve 2(m+1)+4m=4(m-2)+6.	11. Which of the following is 4 one of the solutions to: A. $x > 4$ B. $x \geq 4$ C. $x \neq 100$ D. $x < 4$	12. An author received $6000 dollars in advance plus $3 for every sale of his new book. How many books must be sold for the author to make a total of $9600?

13. Ranteetha is paid $16/h working for Neater House Maids.
Complete the table of values.

Hours	Income
5	
6	
7	
8	

14. How much more money does she make by working 8 hours rather than 6 hours?

15. Write an equation to relate her income and the number of hours she works.

16. Express (-9)(-9)(-9)(-9) as power.

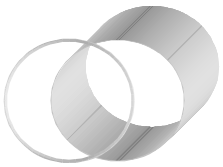
17. Simplify: $\left(\frac{m^2}{n^3}\right)^3 =$

18. Evaluate $(-1)^{401}(-1)^{5000} =$

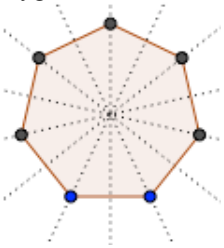
19. Determine the number of faces:

20. Determine the surface area of an isosceles triangular prism with the following dimensions; base 12cm, height 8 cm and width 3 cm.

21. Determine the outside surface area of the cylinder (not the inside), with radius 6 cm, height 5 cm without a lid or a bottom.



22. Given: A seven-sided polygon.



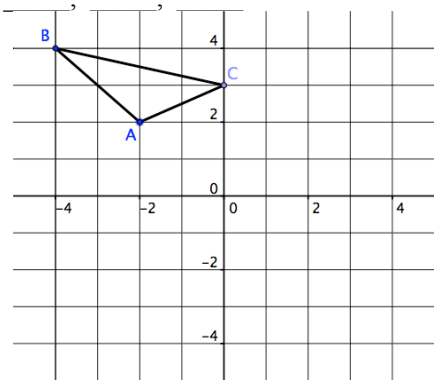
A. Order of rotation:

B. Angle of rotation:

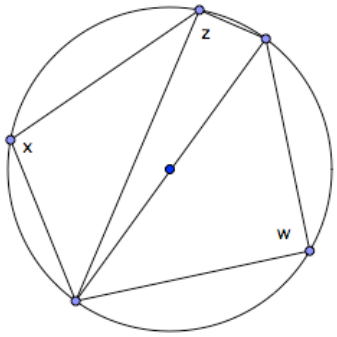
23. Bella wants to estimate the height of her office building on a sunny day. She will use her shadow and the shadow of her office building to estimate the building's height. Bella is 1.4m tall and her shadow is 2m long. Determine the height of the building if the buildings shadow is 24m long.

24. Record the **final coordinates** after
- Reflect object over the y-axis.
- Reflection the new object over the x-axis

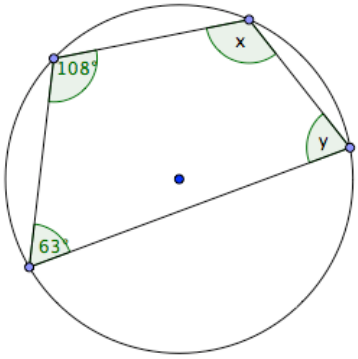
_____, _____, _____



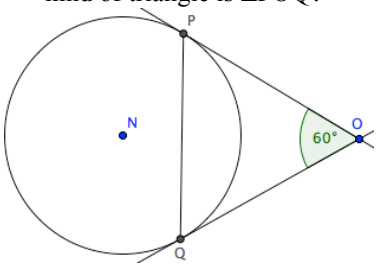
25. Which angle(s) measure 90°?



26. Determine the measure of angles x and y.



27. P and Q are points of tangency. What kind of triangle is ΔPOQ?



28. Shelly walked up to a sales booth at a mall and was asked to fill out a survey. The sales person told her it would only take 20 minutes to fill out. Describe any factors that may impact data collection.

29. Explain how you could use a voluntary sample strategy to determine how many students are coming to the Friday night basketball game.

30. An unbiased coin is flipped ten times and lands on heads seven out of ten times. What is the chance that the next flip will be a head?

Name:_____Block:_____

June 2014

Oak Bay Sample Final Exam
Level 1.4.

1. (T/F) Adding a large positive number to a negative number is always positive.	2. Arrange from smallest to biggest. $2, -8\frac{2}{3}, -\frac{87}{10}, -8.5$	3. Name three integers with square roots that are between 7 and 8.
4. Draw a square with an area of $20m^2$. What is the length of each side to 1 decimal?	5. Simplify. $\left(x^2+3x+1\right)-\left(-2x^2-3x\right)$	6. Expand: $7x\left(5x+\frac{4y}{7}-3\right)$
7. Which of the following are equivalent to $-5\left(x-2\right)$? A. $-5x+10$ B. $-5x-2$ C. $-5x-10$ D. $-3\left(x-2\right)-2\left(x-2\right)$ E. $3\left(-x+2\right)+2\left(-x+2\right)$	8. Peeyurp works for a clay excavation company. She charges \$70 for each visit plus \$65/hr. Write an expression to represent the possible cost of hiring Peeyurp for one visit.	9. Solve $-2(m-5)=25$
10. Solve for m. $2\left(m+n\right)=a$	11. Solve $-3x-4<29$	12. Write an inequality to represent the following graph: 

Name:_____Block:_____

June 2014

13. Study the pattern and state the rate of change

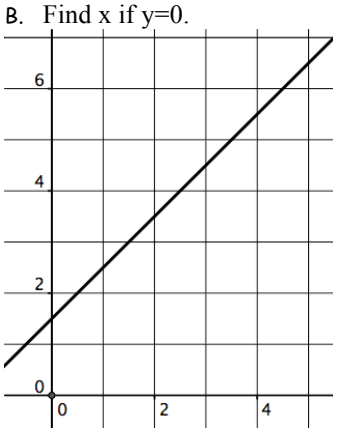
x	y
1	11
2	15
3	19
4	23
5	

Rate of change:

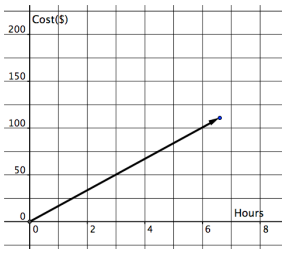
14.

A. Find y if x=3.

B. Find x if y=0.



15. The graph represents how much it costs to hire Marty to cut your grass.



A. Interpolate: Estimate how much does it cost to hire Marty for 3.5 hours?

B. Extrapolate: Estimate how much it will cost to hire Marty for 8 hours.

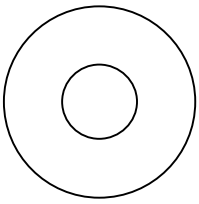
16. Explain the difference between 2^6 and 6^2.

17. Simplify: $-\left(-7m^4\right)\left(-3m^2\right) =$

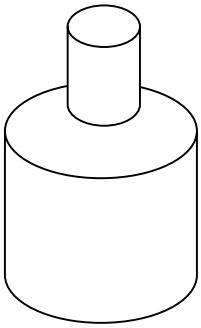
18. Simplify: $\frac{m^{50}m^{30}}{n^{40}} \times n^{20}m^{40} =$

19. Determine the side length of a square with an area of 61cm^2 to the nearest tenth.

20. Determine the area of a circle with radius 20m after a circle with radius 10m has been cut out.

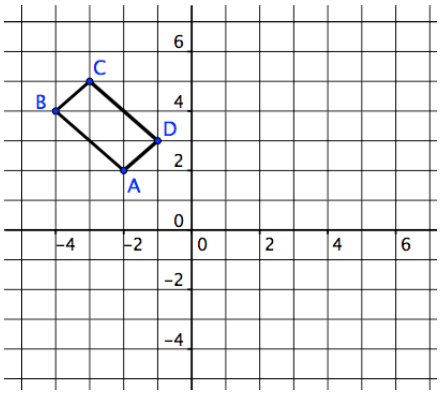


21. How many surfaces does this composite shape have.



22. Rita is building a new roof on her home. She wants an A-frame roof that is in a ratio of 7 vertical feet to 12 horizontal feet. She knows the width of her home is 30feet wide. Determine how tall her roof is.

23. Record the coordinates of the polygon after it is reflected in the line x=1.



_____, _____, _____, _____

24. Describe the transformations that occurred to create:

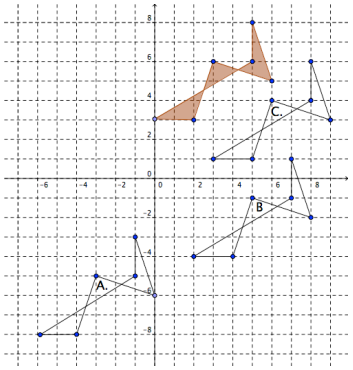
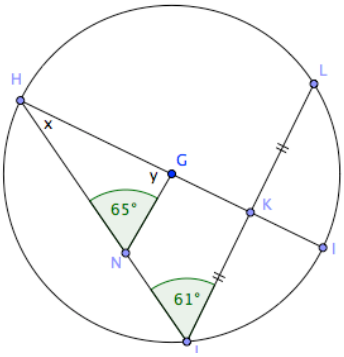
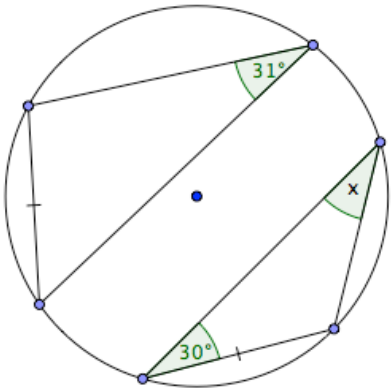


Image A:

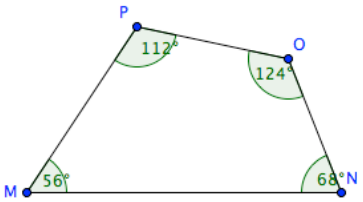
25. Determine the measure of angles x and y.



26. Determine the measure of angles x.



27. Could MNOP be an inscribed quadrilateral? Why?



28. Explain how the premier could use a convenience sample strategy to determine what Nurses think of his new health care bill.

29. Elliott High School has 40 different sports teams. The school president wants to know what school athletes think about the team coverage on the website. Which sampling technique would you recommend, simple random or stratified? Explain

30. A survey was conducted and found that 60% of boys watch at least one basketball game on TV each year. If 300 boys were selected at random, predict how many would watch at least one basketball game?

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June 2014

Oak Bay Sample Final Exam
Level 1.5.

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

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

4. Determine $\sqrt{\frac{100}{9}}$ and leave your answer as a fraction.

5. Simplify. $\left(-2x^2+7\right)+\left[-9x-\left(5x^2-1\right)\right]$

6. Expand: $-5(2x-1) =$

7. Write a polynomial expression that has the same degree as $-5x^2+x$ with coefficients 7 and -2 and constant 5

8. Write an expression to represent the perimeter if the perimeter of a complete circle is $2\pi r$.

Perimeter=

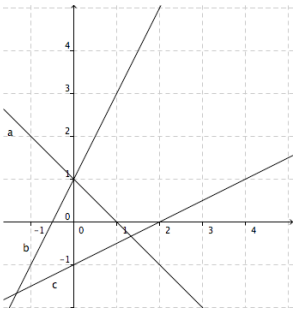
9. Solve $-\frac{2m}{3}-5=25$

10. Do not solve $\frac{m}{3}+\frac{2m}{5}=2$. Explain what you could do to eliminate the fractions.

11. Solve $-\frac{2x}{5}-3<x+7$

12. A square sheet of paper is folded in half to form a rectangle. The perimeter of the rectangle is 60 cm. Determine the dimension of the square if the length of the rectangle is twice as long as the width?

13.



i. ____ $y = \frac{1}{2}x - 1$

ii. ____ $y = 2x + 1$

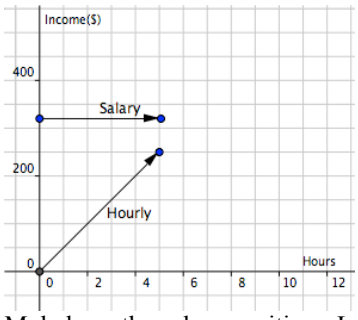
iii. ____ $y = -x + 1$

14. Complete the following table of values: $y = 2x + 5$

x	y
-1	
0	
1	

A. What is the rate of change?

15. Mel is trying to decide between a salary job and a hourly job. The graph below represents the two income streams.



Mel chose the salary position. In the first month she average 9 hours a day. Did she make a good decision? Explain.

16. Simplify: $\left(2m^{10}n\right)^3 =$

17. Evaluate: $2^2 + 2^2 =$

18. Simplify: $5 - 3\left(3 - 2^2\right)^{51} =$

19. Determine the area of a right triangle with a hypotenuse of length 10cm and one side of length 6cm.

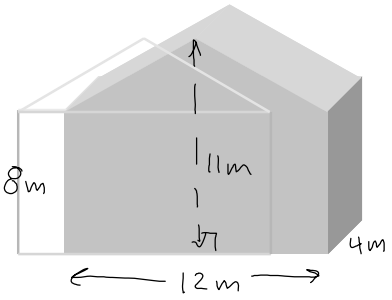
20. How many of each basic shape make up the composite shape?

_____Rectangular prism(s)

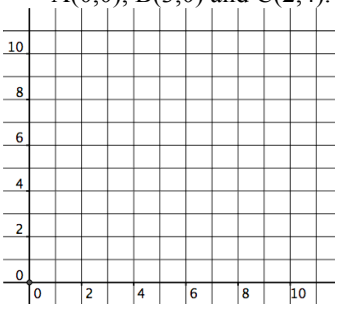
_____Right triangular prism(s)

_____Cylinder(s)

21. Calculate the total surface area excluding the base.



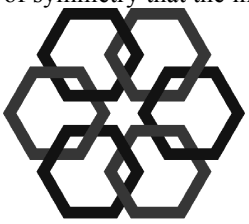
22. Draw ΔABC with vertices A(0,0), B(3,0) and C(2,4).



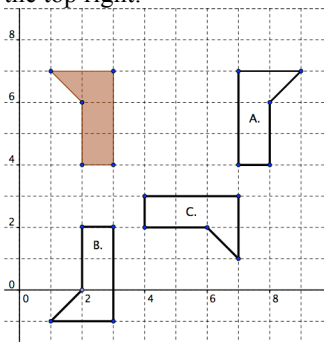
State the new coordinates if the triangle is enlarged by a scale factor of 3.

_____, _____, _____

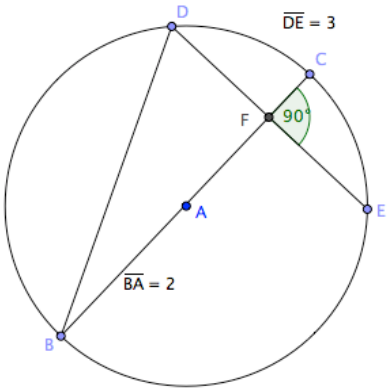
23. Determine the number of lines of symmetry that the image has.



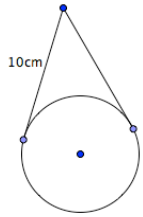
24. Describe the location of vertical line of symmetry between the shaded object and the image in the top right.



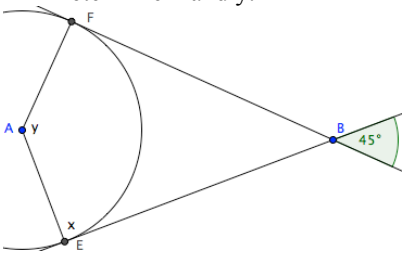
25. Determine the length of BD.



26. Determine the distance between the point and the top of the circle with radius 4cm.



27. E and F are points of tangency. Determine x and y.



28. A high school football team wants to know how many people in a 5 km radius of the school will be coming to their home football games. They decide to mail every house in a 5 km radius of their school. Describe any factors that may impact the collection of data.

29. Lucas manipulated a coin so that it lands heads 800 out of 1000 times. If the coin is flipped 30 times, how many heads should occur?

30. Jordan surveyed 5 senior citizens at Tim Hortons. He went home and told his parents that he thinks 80% of people in their town do not have jobs. According to his survey, how many people would not be working if the population of their town was 40000.

Do you think it is accurate? Explain.

Name:_____Block:_____

June 2014

Oak Bay Sample Final Exam
Level 1.6.

1. -3 - 7 is equivalent to which of the following:
   - -3 + (-7)
   - 3 + (-7)
   - -7 - 3
   - -7 + 3

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

3. If $A > B$ then which of the following is true:
   - $-A > -B$
   - $-A = -B$
   - $-A < -B$

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

5. Simplify.
   $\left(-7x^2 - 5x + 9\right) - \left(7x^2 - 3x - 8\right)$

6. Expand: $-2x\left(3x - y + z\right) =$

7. If $15x + 30y + 12z$ is equivalent to $15x + 30y + 4n$ what is the relation between n and z?

8. A rectangular prism has the following dimensions; $w = x + 1$, $l = 3$, $h = 2x$. Determine an expression for the total surface area of the rectangular prism.

9. Solve $m - \frac{m}{2} = \frac{1}{3}m + 4$

10. Solve for m. $\frac{c}{m} = \frac{ad}{b}$.

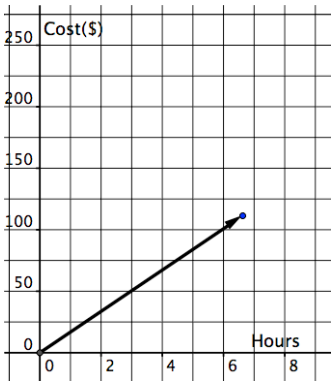
11. Write an inequality for all the numbers bigger than or equal to negative 4 and less than 11.

12. Sargent has up to 50 metres of fencing material available to build a fence. He wants his fence to be 4 metres longer than it is wide. Define a variable, write and solve an inequality to represent the possible side lengths.

13. Morland created the following number pattern: 17,26,35,…
What are the next two terms?

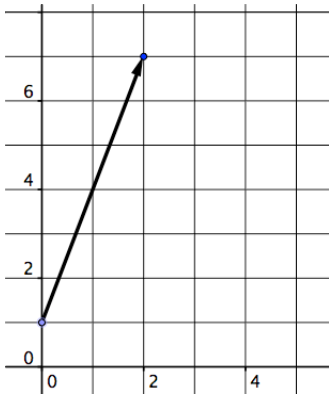
Write an equation to represent this pattern.

14. The graph represents how much it costs to hire Marty to do your gardening.



Mrs. Layseebuckets says she will pay him $150/week to do her gardening. Estimate how many hours of work is this for Marty?

15.



A. Complete the table of values.

x	y
0	
1	
2	
3	

B. Write an equation to represent the table of values?

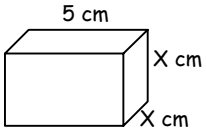
16. Evaluate: $m^0 =$

17. A population of bacteria doubles in size every day. If the bacteria began with a population of two bacteria how large would the population be after 20 days?

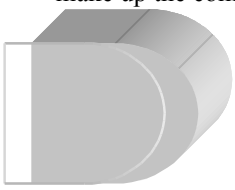
18. Simplify:

$$-\frac{15m^7}{12m^4} \times \frac{-8m^8m^4}{10m^3} =$$

19. Determine an expression to represent the surface area of the rectangular prism.



20. How many of each basic shape make up the composite shape.

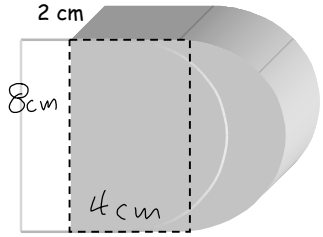


_____Rectangle(s)

_____Right triangle(s)

_____Circle(s)

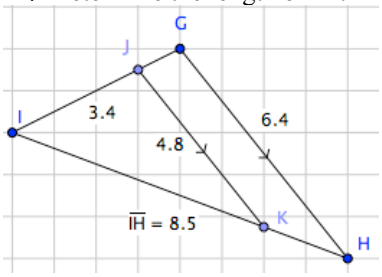
21. If he paints every surface, determine the total surface area to be covered.



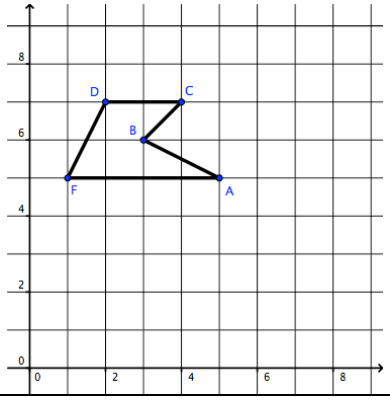
Name:_____Block:_____

June 2014

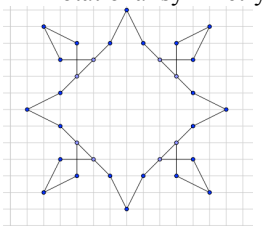
22. Determine the length of IK.



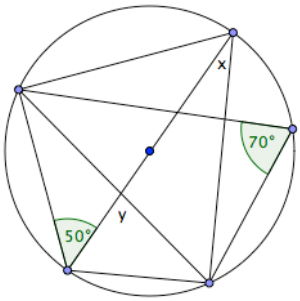
23. Complete the rotations. Rotate the image ABCDF 180° clockwise about vertex C.



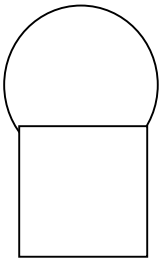
24. Determine the order of rotational symmetry.



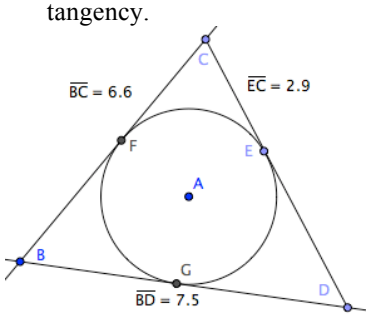
25. Find x and y.



26. Billy the sneaky ice cream scooper is trying to make people think they are getting more ice cream than they really are. He makes his scoops with a radius of 5 cm and rests it on top of a cup that is 8 cm wide and 10 cm tall. How far from the bottom of the cup is the bottom of the scoop?



27. Determine the length of ED, given E,F&G are all points of tangency.



28. If you are the marketer, what are the advantages of using a sample population rather than the entire population?

29. 6-sided die is weighted so that it lands on the number 3 40% of the time. If the die is rolled 250 times, predict how many 3s should occur?

30. Describe how data can be misinterpreted or misused to make false or inaccurate predictions.

Math 9 Review. Answer Key

Rational Numbers and Square Roots

1. $\pi, \sqrt{2}$

2. T

3. $-3.6 < -\frac{7}{2} < -\frac{24}{7} < -1 < 4$

4. T

5. $\frac{3}{5}, \frac{1}{6}, \frac{5}{6}, \frac{5}{6}$

6. F

7. T

8. $2, \frac{7}{3}, 4, \frac{12}{5}$

9. T

10. $8, \frac{1}{4}, \frac{12}{5}$

11. F, $-\frac{11}{2}, \frac{13}{9}$

12. T

13. 1,4,9

14. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

15. $5, 6, \frac{5}{6}, 3, 0.3, 0.4$

16. 5.1, 5.9, 5.5

17. 15°C

Polynomials

18. 101, t+1; 200, 2t; 201, 2t+1

19. H

20. A

21. E

22. B

23. I

24. D

25. C

26. F

27. G

28. $\left(3x^2 - 5x + 6\right) + \left(x + 3\right) = 3x^2 - 4x + 9$

29. $-14x^2 + 12x + 7$

30. All but the first.

31. F

32. T

33. T

34. $\left(2x\right)\left(2x + 1\right) = 4x^2 + 2x$

35. $6x + 9,\ 8x^2 - 4x + 22xz$

36. 2x-8

37. x+2y-5

Linear Equations

38. 4x+4=2x+10; x=3

39. 2x+3=5x-3; x=2

40. -4x+1= -3x – 2; x=3

41. Y

42. Y

43. Y

44. Y

45. N

46. 7

47. 7

48. 3

49. 20

50. F

51. $\frac{75}{22}$

52. X<1, $X \geq 3,\ X \neq -1$

53. T

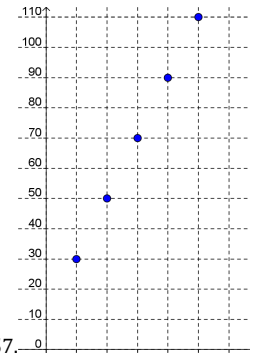
54. M>6

55. $M \geq -2$

Linear Relations

56. 30, 50, 70, 90, 110, 130

57.



58. 20

59. y=20x+10

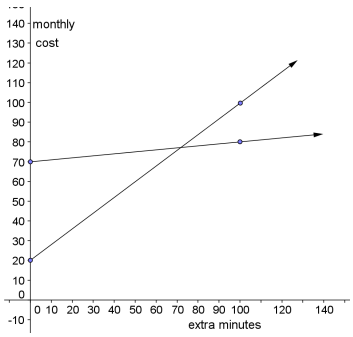
60. y=5.5, interpolating

61. y=9, extrapolating

62. x= -4, extrapolating

63. $120

64. $270



65. Premium will save him about $30.

66. Premium: about 60 extra minutes.

Powers & Exponents

67. 2^3 means $2 \times 2 \times 2 = 8$, 3^2 means $3 \times 3 = 9$

68. a, b, c

69. No. left side =12, right side = 32.

70. Answered on page.

71. Answered on page.

72. Answered on page.

73. Add them.

74. m^{x+y}

75. Subtract them.

76. m^{x-y}

77. Multiply them.

78. m^{xy}

79. $m^x n^x$

80. $\frac{m^x}{n^x}$

81. 1

82. 16

83. 2

84. -26

Measurement

85. 76cm^2

86. 234cm^2

87. 1657.9cm^2

88. 36.7cm

89. 171.4cm^2

90. $\angle A = \angle E$, $\angle B = \angle F$, $\angle C = \angle G$, $\angle D = \angle H$

91. $\frac{EF}{AB} = \frac{EH}{AD}$ and $\frac{FG}{BC} = \frac{HG}{DC}$

92. 3

93. 2.32

94. No. All three angles are not equivalent.

95. 4,4, 90°

96. 0, 3, 120°

97. A)x=5, B) y=3, C) y=x

Circle Geometry

98. 3

99. x=z & y=w

100. w=90°, z=90°

101. It is bisected.

102. Inscribed angles from same chord are equal.

103. Angle inscribed in a semicircle =90°

104. Subtended by equal length chords.

105. Central angle is twice the inscribed angle subtended by the same arc (chord).

106. Opposite angles in an inscribed quadrilateral are supplementary.

107. NO. $130+85 \neq 180$

108. UT = VT.
Tangents to external point are equal length.

109. A radius is perpendicular to a tangent line at the point of tangency.

110. A

111. M

112. O

113. L

114. E

115. G

116. J

117. T

118. D

119. K

120. Q

121. R

122. C

123. P

124. I

125. N

126. S

127. B

128. F

129. H

Sample Exam 1.1

1. $\frac{9}{20}$

2. 4

3. $\frac{1}{4}, \frac{3}{8}, \frac{1}{2}$

4. 7

5. $x^2 - 3x + 5$

6. -10x+5

7. $2x^2 + 3x$

8. Binomial, 4

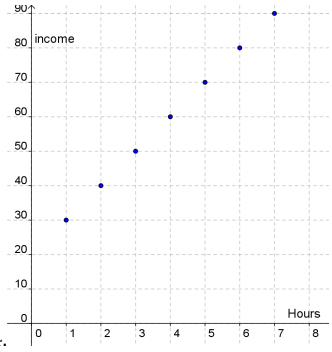
9. $\frac{9}{8}$

10. 3

11. m > 25

12. m > -2

13. 30, 40, 50, 60, 70, 80

14. 

15. 10, y=10x+20

16. 2^{100}

17. -38

18. m^4

19. 126 cm^2

20. 144 cm^2

21. 602.9 cm^2

22. 0.013

23. B,D,F

24. 3, 120°

25. x=220°, y=110°

26. x= 4cm

27. y=60°, 40°

28. Sample should be used. Too costly and impractical to use entire school for this purpose.

29. Systematic or simple random

30. 23.2%

Sample exam 1.2

1. $-1\frac{5}{21}, -1\frac{5}{21}$

2. -4

3. $-\frac{2}{5}, -\frac{3}{8}, -0.35, \frac{1}{16}$

4. $\frac{11}{10}$

5. $-14x^2 - 2x + 17$

6. $-6x^2 + 2xy - 2xz$

7. -3x+5

8. 3, -1.2; 5

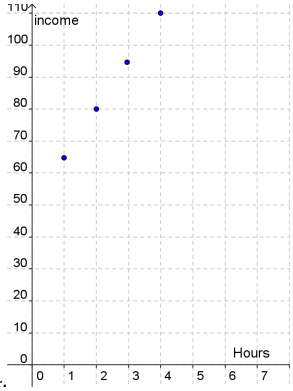
9. $\frac{17}{7}$

10. $\frac{21}{13}$

11. m< -9

12. $m \leq 2$

13. 65, 80, 95, 110, 125, 140

14. 

15. 15, y= 15h +50

16. 2^{50}

17. 12

18. m^6

19. You must subtract the two small ends of the smaller prism (the openings) and add the walls.

20. You must add the curved surface of the smaller cylinder (exposed inner surface).

21. 56.5 cm^2

22. 29 km

23.5.4
24. x= 0, x=3
25.8.9 cm
26.d,w,x
27.y=70°
28.A sample. Not everyone will participate.
29.Stratified. Ask only the athletes.
30.18 cartons

Sample exam 1.3
1.No.
2.378.1
3.-3 +(-7) and -7 - 3
4. $\frac{11}{16}$
5. $-12m^2+3mn$
6.5y+1
7.B
8.L = 3w
9.11
10.-2
11.B,C
12.1200 Books
13.80, 96,112 128
14.$32
15.I=16H
16. $\left(-9\right)^4$
17. $\frac{m^6}{n^9}$
18.-1
19.10
20.192 cm²
21.188.4cm²
22.7, 51.4°
23. 16.8 m
24.A(2, -2), B(4, -4), C(0, -3)
25.w, z
26. x=117° , y=72°
27.Equilateral
28.This is a voluntary sample.
Requires a person to take the initiative and to have 20 minutes to spare.
29.Ask students as the pass you in the hall.
Calculate the % that say yes.
30.0.5

Sample Exam 1.4
1.F
2. $-\frac{87}{10},8\frac{2}{3},-8.5,2$
3.50,51,52,...61,62,63
4.4.5m
5. $3x^2+6x+1$
6. $35x^2+4xy+21x$
7.A,D,E
8.C =70 +65h
9. $-\frac{15}{2} or -7.5$
10. $\frac{a-2n}{2}$
11.x>-11
12.>
13.4
14. y= 4.5, x= -1.5
15. $\geq \$60$, $\geq \$135$
16. $2^6=2\times2\times2\times2\times2\times2$ but
$6^2=6\times6$
17. $-21m^6$
18. $\frac{m^{120}}{n^{20}}$
19. $\geq 7.8cm$
20.942m²
21.5
22.8.75
23.(4,2), (6,4), (3,3), (5,5)
24.6 left & 11 down
25.x=29°, y=86°
26.x=31°
27.Yes opposite angles add to 180°
28.Answers will vary. He could ask the nurses he knows? Or the nurses in his city.
29.Stratified. You could sample a couple members from each team.
30.180boys

Sample Exam 1.5

1. f
2. $1\frac{2}{15}$ or $\frac{17}{15}$ higher
3. $-\frac{11}{2}$ or -5.5
4. $\frac{10}{3}$
5. $-7x^2 - 9x + 8$
6. -10x+5
7. $7x^2 - 2x + 5$ or $-2x^2 + 7x + 5$
8. $\pi r + 2r$
9. -45
10. Multiply both sides of the equation by 15
11. $x > -\frac{50}{7}$ or $x > -7\frac{1}{7}$
12. 20cm by 20cm
13. C,B,A
14. (-1,3),(0,5),(1,7) & rate 2
15. no Hourly =$425/day and Salary=$325/day
16. $8m^{30}n^3$
17. 8
18. 8
19. 24cm^2
20. 0 RP, 2 RTP, 0 C
21. 345.6m^2
22. (0,0),(9,0),(6,12)
23. 6
24. x=5
25. 3.6
26. 6.8cm
27. 135° and 90°
28. Cost of postage will make this an expensive survey. How many people would actually respond? It may be a waste of money.
29. 24 times
30. a)32000 would not be working. B) Not accurate. Only 5 people were surveyed and the survey was biased by many older retired people.

Sample Exam 1.6

1. first and third
2. $-\frac{5}{3}$
3. FFT
4. 26,27,28…34,35
5. $-14x^2 - 2x + 17$
6. $-6x^2 + 2xy - 2xz$
7. n=3z
8. $4x^2 + 22x + 6$
9. 24
10. $\frac{cb}{ad}$
11. $-4 \le x < 11$
12. $0 \le w < 10.5,\ 4 \le w < 14.5$
13. 44,53, y=9t+8
14. 9 hours
15. a)(0,1), (1,4), (2,7), (3,10), B)y=3x+1
16. 1
17. $2 \times 2^{20} = 2097152$
18. m^{12}
19. $2x^2 + 20x$
20. 6 R, 0 RT, 1C
21. 171.4cm^2
22. 6.375
23. The new coordinates are $c_1(4,7), A_1(3,9), K_1(7,9), B_1(6,7)$
24. 4
25. x=30, y=80
26. 8cm
27. 3.8
28. Efficiency, less costly and doable
29. 100 times
30. Sample is biased or too small. The sample would not represent the larger population.

