

Dear Accelerated Math II Student:

Congratulations on being selected to be a part of the Accelerated Math II program at Wheeler High School. This is a fast-paced, college preparatory math course that includes substantial work with the skills and concepts presented in each lesson and emphasizes more complex applications and challenging exercises than might be encountered in the traditional high school course. Accelerated Math II is a course in which the concepts from the beginning lessons build upon one another and are essential to the mastery of the material that will be encountered later in the semester. Your success in this class will be the result of the consistency of your study and homework habits. Reviewing class notes each night and diligent homework efforts will greatly enhance your learning process. Your responsibility is to be the best student that you can be!

During the semester, we will be learning many new concepts in Accelerated Math II. Because of the pace and rigor of the course, there will not be a lot of time to spend reviewing topics that you were exposed to in Accelerated Math I or previous math courses. This packet represents topics that are considered to be a review of those courses. Work all of the problems neatly on separate paper, numbering your work. Write all answers on the answer sheet provided. Be sure to make a note of the problems that you have difficulty solving. **You must show your work for problems in the review packet. Do not list only an answer.**

The following internet resources may be of some assistance to you as you work through these questions. <http://themathpage.com/>; <http://www.purplemath.com/>; <http://www.sosmath.com/> . If you are interested in math tutoring this summer, please feel free to contact Lynn Barry at lynn.barry@cobbk12.org, and she can help you find a teacher to provide summer math tutoring.

The completed packet represents your first graded assignment in Accelerated Math II – it will be graded for completion and accuracy. You should also expect to be tested on the material in the packet within the first three weeks of school. The packet is due on the second day of school, **Friday August 6, 2010**, to Mrs. Buhler or to Mrs. Barry in Room 520, even if you are taking the course second semester. This deadline is firm and points will be deducted if it is late.

We look forward to working with each of you this next school year. Please feel free to contact either me (Rachel.Buhler@cobbk12.org) or Mrs. Quindslan (Rebecca.Quindslan@cobbk12.org) if you have any questions.

Sincerely,

Mrs. Buhler
Accelerated Math II teacher

Mrs. Quindslan
Accelerated Math II Teacher

Accelerated Math 2 Summer Work Packet

REVIEW OF LINEAR FUNCTIONS

A. Graph Linear Functions using slope, points, and intercepts

- The slope-intercept form of a line is $y = mx + b$, where m is the slope and b is the y-intercept.
- A line crosses the x-axis when $y = 0$ (x-intercept).
- A line crosses the y-axis when $x = 0$ (y-intercept).

Find the slope, x-intercept and y-intercept for each line and the graph each line.

1. $y = x + 2$

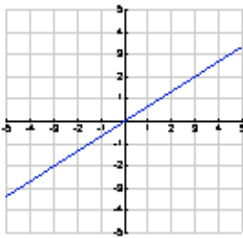
2. $x + y = 4$

3. $2x + 3y = 12$

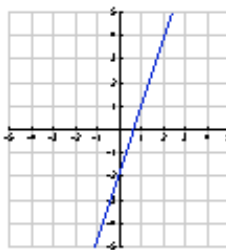
4. $3x - 2y = 0$

Write an equation for each line in slope-intercept form.

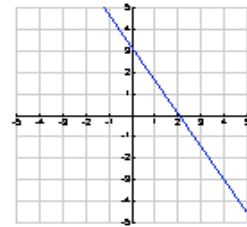
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B. Slope

- The point-slope form of a line with slope m and containing the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Write the equation of the line containing each pair of the given points.

8. $(1, 0)$ and $(-4, 2)$

9. $(5, 3)$ and $(-3, 5)$

10. $(-1, -3)$ and $(4, 4)$

C. Special Types of Lines

- Vertical lines have a slope that is undefined.
- Horizontal lines have a slope of zero.
- Parallel lines have the same slope.
- Perpendicular lines have slopes that are negative reciprocals of each other.

Write the equation of the line containing each pair of the given points and describe the slope.

11. $(2, 7)$ and $(-4, 7)$

12. $(-3, 8)$ and $(-3, -2)$

Write an equation in slope-intercept form for:

a) the line that contains the given point and is parallel to the given line

b) the line that contains the given point and is perpendicular to the given line.

13. $(3, 0)$; $y = 2x + 3$

14. $(0, 0)$; $y = x - 5$

15. $(-3, 1)$; $y = -4x + 2$

16. $(3, -1)$; $3x - 2y = -8$

NUMBER AND OPERATIONS

MA1N1. Students will represent and operate with complex numbers.

A. Simplify the following:

17. $(7 + 3i) - (4 + 9i)$

18. $\frac{5 + 3i}{4 - 8i}$

19. $i(3 - 2i)(5 + 4i)$

20. $\sqrt{-45}$

ALGEBRA

MA1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.

A. Parent Graphs – Sketch the graphs of the following functions without using a graphing calculator. You should be familiar enough with these “parent” graphs to be able to sketch them from memory. If you are unsure about how to graph the functions, make a “t”-chart of x - and y - values. Label the units on the graphs.

21. $f(x) = x$

22. $f(x) = x^2$

23. $f(x) = x^3$

24. $f(x) = \sqrt{x}$

25. $f(x) = |x|$

26. $f(x) = \frac{1}{x}$

B. Transformations of Basic Functions – Describe the transformations from the parent function, $f(x)$ to the function $g(x)$ such as vertical shifts, stretches, and shrinks, as well as reflections across the x - and y - axes) for each of the following functions.

27. $f(x) = x^3$; $g(x) = -2(x - 3)^3 + 1$

28. $f(x) = \sqrt{x}$; $g(x) = \frac{1}{3}\sqrt{x+1} - 2$

C. Even and Odd Functions – Determine if the following functions are even, odd or neither. Discuss how this impacts the symmetry of the graphs.

29. $f(x) = x^3 - 5x + 1$

30. $f(x) = x^6 - x^4 + x^2$

MA1A2. Students will simplify and operate with radical expressions, polynomials and rational expressions.

A. Add or Subtract

31. $(4b^3 - 2b) + (b^3 + 6b^2 + 3b - 7)$

32. $(12y^2 - 8y + 4) - (9y^2 + 5y + 1)$

33. $\frac{9}{x+2} + \frac{2x}{x-3}$

34. $\frac{x}{x^2 + 2x - 3} - \frac{1}{x+3}$

35. $2\sqrt{48} + 3\sqrt{12}$

B. Multiply

36. $(4x+7)(3x-7)$

37. $(x-1)(x^2-4x+6)$

38. $(3x-4y)^2$

39. $(2x-3y)^3$

40. $(4x+7y)^3$

41. $\frac{5y}{2y^2-y-1} \cdot \frac{2y^2+2y-4}{10y+20}$

42. $2\sqrt{6} \cdot 3\sqrt{10}$

C. Divide

43. $(2w^2+19w+24) \div (w+8)$

44. $\frac{x^2-25}{x+3} \div \frac{x+5}{x^2-9}$

45. $\frac{\sqrt{72}}{\sqrt{3}}$

D. Factor Polynomials

46. $t^2-4t-21$

47. $6x^2-5x-25$

48. $9b^2-36$

49. $x^3+6x^2y+2xy^2+12y^3$

MA1A3. Students will analyze quadratic functions in the forms $f(x) = ax^2 + bx + c$ and

$f(x) = a(x-h)^2 + k$.

A. Quadratic Functions

- o The *standard form* for the equation of a quadratic function is: $y = ax^2 + bx + c$
- o The *vertex form* for the equation of a quadratic function is: $y = a(x-h)^2 + k$, where (h, k) are the coordinates of the vertex and $x = h$ is the equation of the axis of symmetry.
- o The graph opens up if $a > 0$ and opens down if $a < 0$.

50. Graph $y = -2(x+4)^2 - 9$ and label the vertex and axis of symmetry.

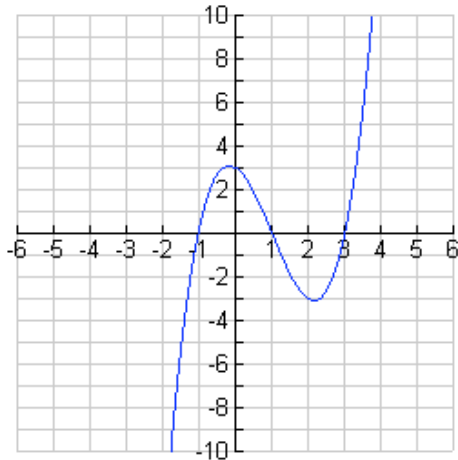
51. Write $y = 3(x-1)^2 + 5$ in standard form.

52. Write $y = x^2 - 4x + 15$ in vertex form (*hint: use the method of completing the square*) and state the vertex.

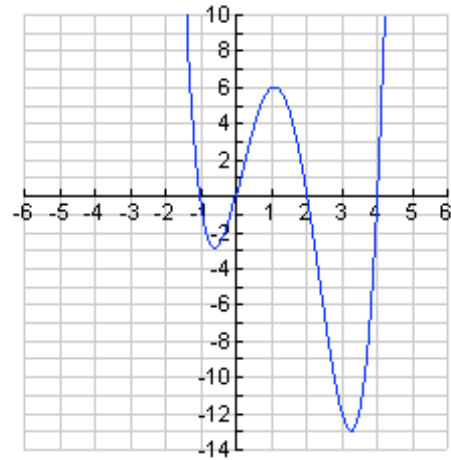
B. Characteristics of Graphs – For each of the following functions, state the:

- domain and range
- zeros
- intercepts
- intervals of increase and decrease
- relative maximum and minimum values
- end behavior
- rate of change for $-1 \leq x \leq 3$.

53.

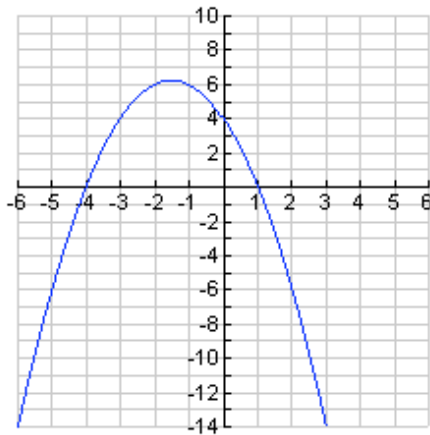


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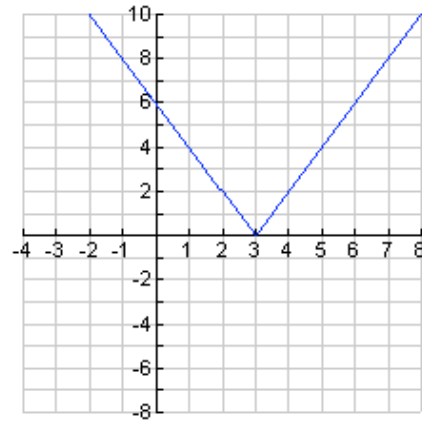


C. Writing Equations of Graphs - Write the equation for each of the following graphs:

55.



56.



D. Arithmetic Sequences and Series

- The n th term of an arithmetic sequence with first term a_1 and common difference d is given by $a_n = a_1 + (n - 1)d$
- The sum of the first n terms of an arithmetic series is $S_n = n \left(\frac{a_1 + a_n}{2} \right)$

57. For the sequence 2, 9, 16, 23,.....

- a. Write a rule for the n th term of the sequence.
- b. Find a_{19} .
- c. Find the sum of the first 30 terms of the arithmetic sequence.

MA1A4. Students will solve quadratic equations and inequalities in one variable.

A. Quadratic Formula and the Discriminant

- To solve for x in a quadratic equation use the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- The *discriminant* is given as: $\sqrt{b^2 - 4ac}$ and helps identify the nature of the solutions to a quadratic equation.
 - 1) For $\sqrt{b^2 - 4ac} > 0$, there are two real solutions.
 - 2) For $\sqrt{b^2 - 4ac} < 0$, there are two non-real (imaginary) solutions.
 - 3) For $\sqrt{b^2 - 4ac} = 0$, there is one real solution.

58. Find the discriminant for $x^2 + 7x - 13$ and determine the nature of the solutions.

B. Solve by factoring:

59. $2x^2 + 5x = 12$

60. $4x^2 + 15x \geq 25$

61. $x^3 - 19x^2 + 84x = 0$

62. $x^2 - 2x - 3 < 0$

C. Solve each of the following using the quadratic formula and then by completing the square:

63. $2x^2 + 3x + 11 = 0$.

64. $2(x - 3)^2 = -16$

D. Solve (round your solutions to the nearest hundredth)

65. $x^2 + 11 = 24$

66. $2(x + 7)^2 = 34$

67. $3\sqrt{x - 6} + 8 = 32$

MA1A5. Students will investigate step and piecewise functions, including the greatest integer and absolute value functions.

A. Evaluate piecewise functions:

68. Evaluate the function $f(x) = \begin{cases} \frac{1}{2}x - 10, & x \leq 6 \\ -x - 1, & x > 6 \end{cases}$ when a) $f(2)$ b) $f(6)$ c) $f(9)$

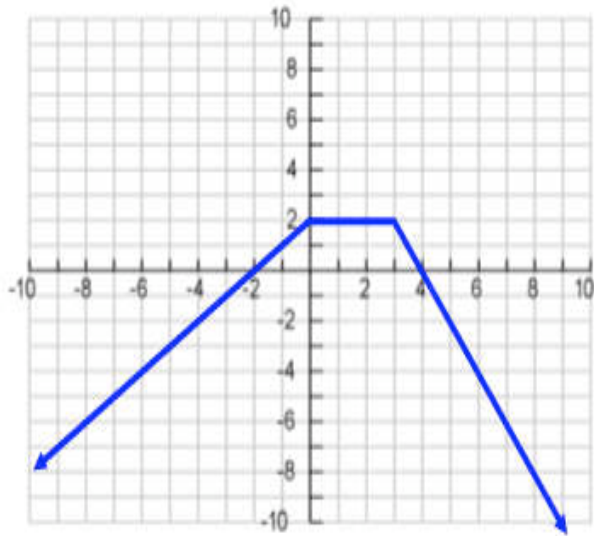
B. Characteristics of graphs: Graph the following stating the domain, range, intervals over which the function is constant, intervals of increase and decrease, and, if appropriate, give the vertex, axis of symmetry and any zeros.

69. Graph: $y = \begin{cases} 2x & \text{if } x < 0 \\ 0 & \text{if } x = 0 \\ 3 & \text{if } x > 0 \end{cases}$

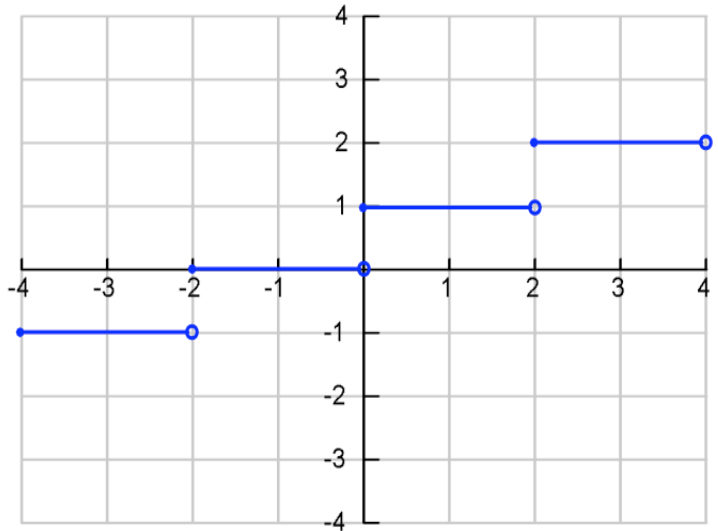
70. Graph: $f(x) = \frac{1}{2}[x]$ (hint: greatest integer function)

C. Write the equation of the graph:

71.



72.



GEOMETRY

MA1G1. Students will investigate properties of geometric figures in the coordinate plane.

A. Distance and Midpoint Formulas

- The distance between two points on a graph is given by: $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$
- The midpoint of a line segment is given by: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Find the distance between the two given points. Then find the midpoint of the segment.

73. (8, 6) and (9, 10)

74. (-8, 7) and (2, -5)

MA1G2. Students will understand and use the language of mathematical argument and justification.

Rewrite the statement in “if-then” form. Then write the converse, inverse, and contrapositive.

75. A rose is a flower.

76. All 90° angles are right angles.

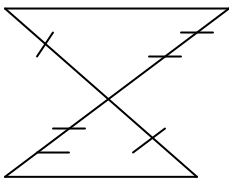
MA1G3. Students will discover, prove, and apply properties of triangles, quadrilaterals, and other polygons.

A. Congruent Triangles

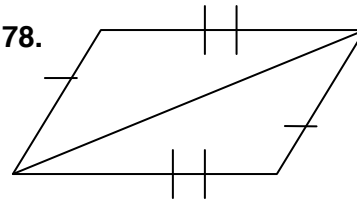
- o Triangles are congruent if:
 - a) Three sides of one triangle are congruent to three sides of another triangle.
 - b) Two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle.
 - c) The hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of another right triangle.
 - d) Two angles and the included side of one triangle are congruent to two angles and the included side of another triangle.
 - e) Two angles and a non-included side of one triangle are congruent to two angles and a non-included side of another triangle.

Determine which, if any of the following triangles are congruent. State your reason.

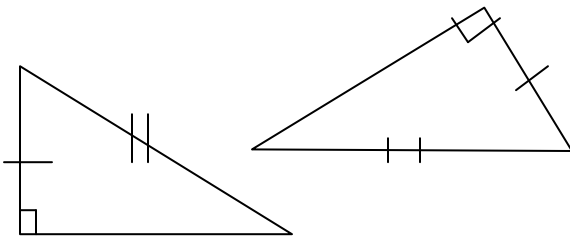
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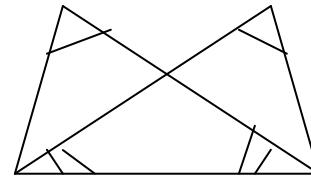
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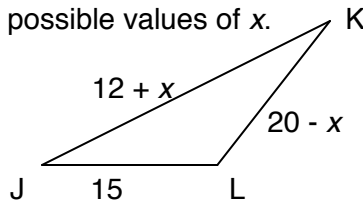


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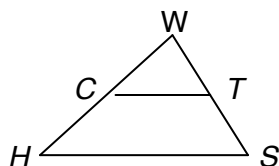


B. Properties of Triangles

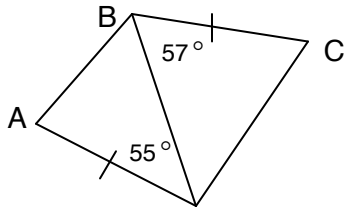
81. In $\triangle JKL$, $m\angle J < m\angle K < m\angle L$. Find all possible values of x .



82. In $\triangle WHS$, $\overline{CT} \parallel \overline{HS}$, T is the midpoint of \overline{WS} , and C is the midpoint of \overline{WH} . Solve for x if $\overline{CT} = 4x + 5$ and $\overline{HS} = 3x + 25$.

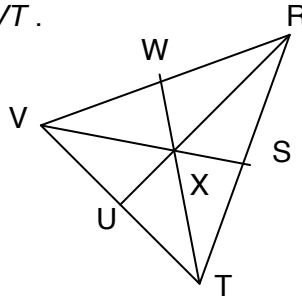


83. In the figure at the left, which of the following statements is true?



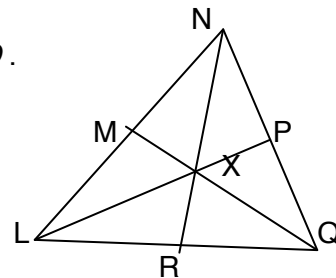
- a) $AB > CD$ b) $AB < CD$ c) $AB = CD$

84. In the diagram at the right, X is the centroid of $\triangle RVT$. If $WX = 12$, determine the length of WT and TX .



85. In the diagram at the right, X is the circumcenter of $\triangle LNQ$.

- (a) What is the measure of $\angle NMQ$?
 (b) If $LM = 17$, $LR = 2x$, and $NM = 5x - 18$, what is the length of LQ ?

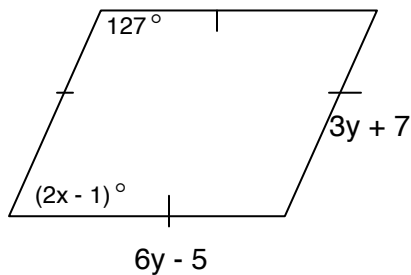


86. Which special triangle segment has as its point of concurrency the center of the inscribed circle?

C. Properties of Quadrilaterals

87. Points $C(-3, 5)$, $A(-7, 6)$, $T(-9, -2)$, and $S(-5, -3)$ are the vertices of a quadrilateral. Determine the most specific name for the quadrilateral and explain your answer.

88. (a) Solve for x and y .
 (b) What is the most specific name for this quadrilateral?



89. Complete the following chart by checking the box if the shape *always* has the given property.

Property	Parallelogram	Rectangle	Rhombus	Square	Kite	Trapezoid
Both pairs of opposite angles are \cong						
Both pairs of opposite angles are \cong						
Exactly one pair of opposite sides are \cong						
Exactly one pair of opposite angles are \cong						
Consecutive angles are supplementary						
Exactly one pair of opposite sides are parallel						
Diagonals bisect each other						
Diagonals are perpendicular to each other						

D. Properties of Polygons

- o The sum of the interior angles of a polygon is given as: $180^\circ(n - 2)$.
- o The sum of the exterior angles of **any** polygon is 360° .

90. If the sum of the interior angles of a convex polygon is 1440° , how many sides does the polygon have? Classify the polygon by the number of sides.

91. What is the measure of one interior angle of a regular nonagon?

92. How many sides does a regular polygon have if the measure of each exterior angle 12° ?

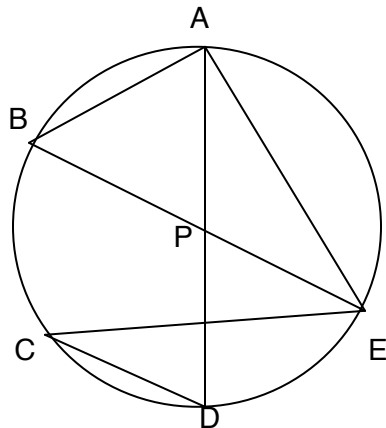
93. How many sides does a regular polygon have if the measure of one interior angle is 165° ?

MA1G4. Students will understand the properties of circles.

A. Angle, Arc, Secant, Tangent, and Chord Measures

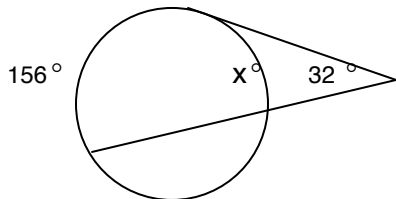
94. Find the measure of the indicated arc or angle in $\odot P$ if $m\widehat{ED} = 86^\circ$ and $m\widehat{AC} = 114^\circ$.

- (a) $m\angle DAE$
- (b) $m\angle BAE$
- (c) $m\angle BAD$
- (d) $m\angle CDA$
- (e) $m\angle AEC$
- (f) $m\widehat{CE}$
- (g) $m\widehat{EAB}$

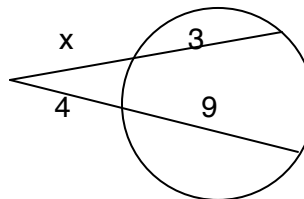


Solve the following for x .

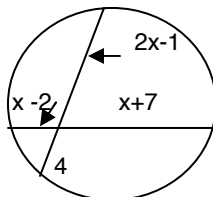
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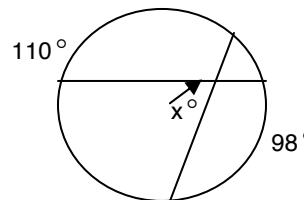
96.



97.



98.



B. Area of a Sector

99. If the arc length of one sector of a circle that was divided into 12 equal sectors is 3π , what is the radius of the circle?

100. Find the area of a sector, radius 5 cm, on an intercepted arc of 60° .

MA1G5. Students will find and compare the measures of spheres.

101. If the volume of a sphere is 288π , what is the radius and surface area of the sphere?

102. If the radius of a sphere is 12 cm and the length of the radius were halved, what would be the relationship between:

- (a) the surface area of the original sphere and the surface area of the smaller sphere?
- (b) the volume of the original sphere and the volume of the smaller sphere?

DATA ANALYSIS AND PROBABILITY

A. Permutations & Combinations

MA1D1. Students will determine the number of outcomes related to a given event.

- The number of permutations of n objects is given by: ${}_n P_n = n!$.
- The number of permutations of n objects taken r at a time is given by: ${}_n P_r = \frac{n!}{(n-r)!}$
- The number of combinations of n objects taken r at a time is given by: ${}_n C_r = \frac{n!}{(n-r)! \cdot r!}$

103. Evaluate ${}_{12}C_3$.

104. Evaluate ${}_{16}P_6$.

105. Find the number of ways you can arrange (a) all of the letters and (b) 2 of the letters of the word WILDCATS.

106. A bag contains 6 blue marbles and 10 red marbles. If you choose one marble at random, and then another marble at random, what is the probability that both marbles are blue?

107. Chelsea wants to decide on an outfit to wear to a friend's birthday party. She has narrowed down her choices to 3 shirts, 2 skirts, and 4 pairs of shoes. How many possible outfits does Chelsea have to choose from?

B. Basic Probability

MA1D2. Students will use the basic laws of probability.

- Mutually exclusive events cannot occur at the same time. We find the probability of these events by adding the individual probabilities.
- When one event's occurrence changes the occurrence of a subsequent event, the two events are said to be dependent. We find the probability of these events by multiplying the individual probabilities.
- To calculate conditional probabilities, use $P(B|A) = \frac{P(B \cap A)}{P(A)}$
- To find the expected value, or long-run average, of an event, use $\sum x \cdot p(x)$.

108. Find the probability of choosing a spade or a red card from a standard deck of 52 cards?

109. A bag contains 6 blue marbles and 10 red marbles. If you choose one marble at random, and then another marble at random, what is the probability that both marbles are blue?

110. A 1992 poll conducted by the University of Montana classified respondents by gender and political party, as shown in the table below.

	Democrat	Republican	Independent
Male	36	45	24
Female	48	33	16

Determine the probability that a randomly chosen person from this poll is a Republican given that you know the person is female.

111. AP Statistics test scores on Random Variables are described by the following probability distribution.

Score	40	50	60	70	80
P(Score)	.1	.2	.3	.3	.1

Determine the expected value of the scores.

C. Statistics & Sample Measurements

MA1D3. Students will relate samples to a population.

and

MA1D4. Students will explore variability of data by determining the mean absolute deviation (the average of the absolute values of the deviations).

- o The mode of a numbered set of data is the value that occurs most frequently.
- o The mean of a numbered set of data is the average value.
- o The median of a numbered set of data is the middle number when the data is arranged in numerical order. The median splits the data in half.
- o The lower quartile is found by finding the median of the lower half of a data set.
- o The upper quartile is found by finding the median of the upper half of a data set.
- o The interquartile range (IQR) is found by subtracting “upper quartile” – “lower quartile”
- o The range of a numbered set of data is the difference between the highest value and the lowest value.
- o The deviation from the mean is the difference of a data value and the mean of a data set.
- o The mean absolute deviation of a numbered data set is given by:

$$\frac{|x_1 - \bar{x}| + |x_2 - \bar{x}| + \dots + |x_n - \bar{x}|}{n}$$

112. Find the mean, median, mode, quartiles, IQR, range and mean absolute deviation of the data set given by:

50, 47, 48, 49, 47, 52, 50, 45, 53, 50, 53, 59

113. Which of the following sampling methods would result in a sample representative of the population? Justify your choice.

- a. Choosing all residents in a single block that has been randomly chosen.
- b. Putting one number in a hat for each participant and then drawing one number.
- c. Separating boys and girls into two groups and then choosing one from each group.
- d. Sending questionnaires and waiting for responses.

MA1D5. Students will determine an algebraic model to quantify the association between two quantitative variables.

114. Write the median-median line for the data points below:

x	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
y	53.6	56.3	58.1	59.4	60.8	62.8	65.6	66.2	66.6	66.8	67.1	68.8	70.0	71.2	72.0

115. Determine if the following data is best represented by a linear or quadratic equation.

x	2	5	7	10	12	14	18
y	21	29	35	40	37	32	23

Review of Linear Equations

A. Graph Linear Functions using slope, points, and intercepts

1. Slope _____
x-int _____
y-int _____

2. Slope _____
x-int _____
y-int _____

3. Slope _____
x-int _____
y-int _____

4. Slope _____
x-int _____
y-int _____

5.

6.

7.

B. Slope

8.

9.

10.

C. Special Types of Lines

11.

12.

13.

14.

15.

16.

Numbers and Operations

17.

18.

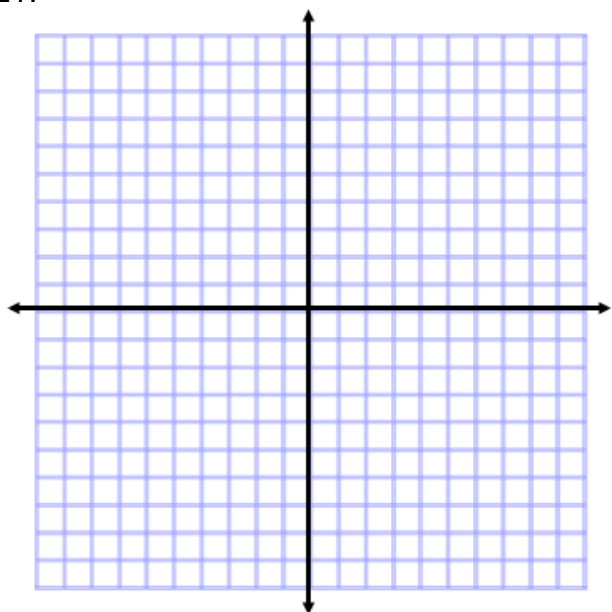
19.

20.

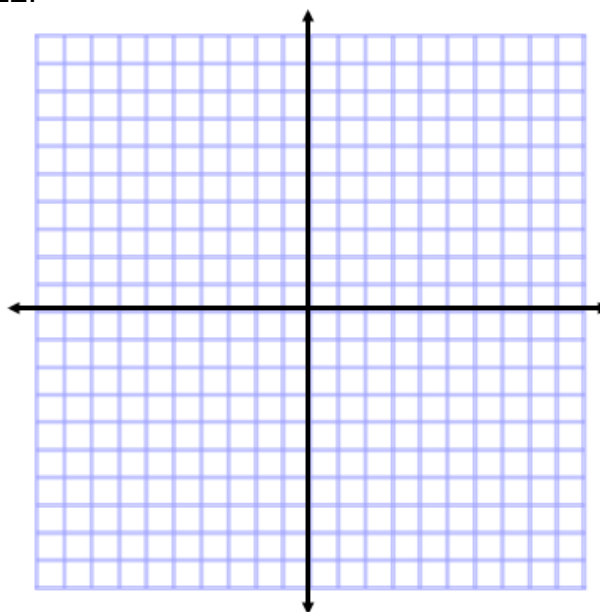
Algebra

Parent Graphs

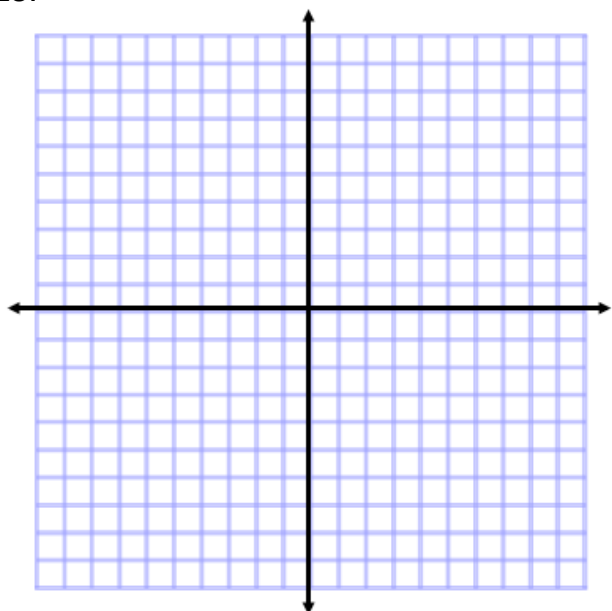
21.



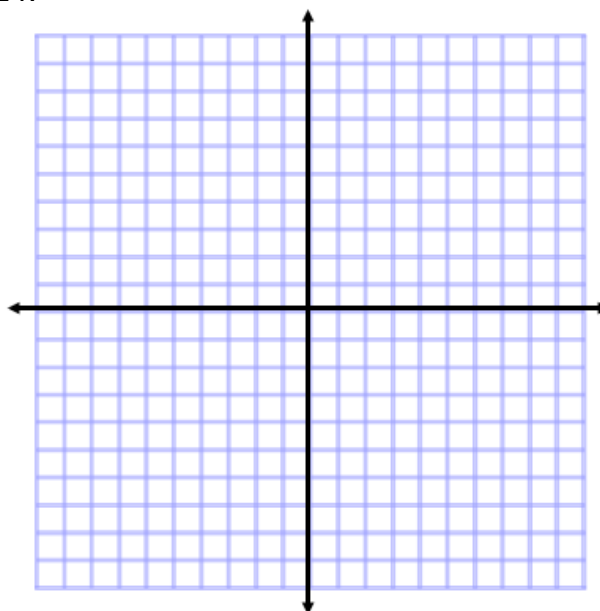
22.



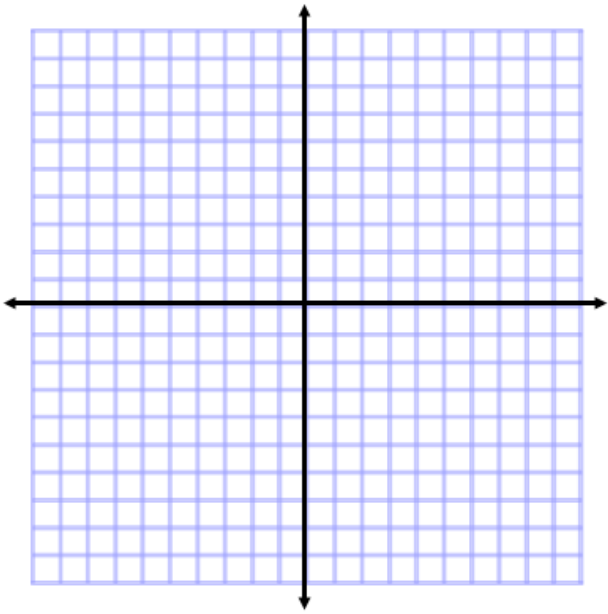
23.



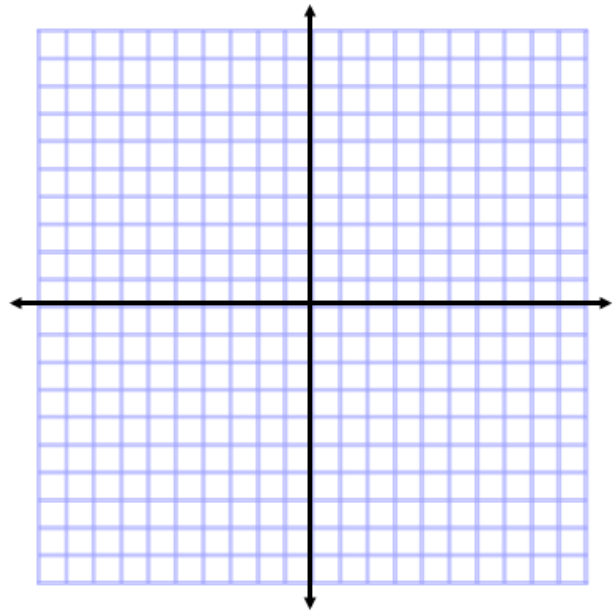
24.



25.



26.



Transformations of Basic Functions

27.

28.

Even and Odd Functions

29.

30.

Operations with Polynomial, Radical, and Rational Expressions

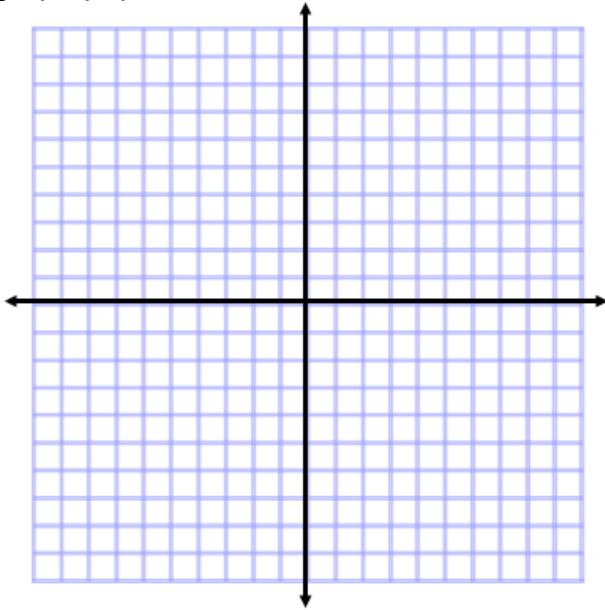
31.

32.

33.	34.	35.
36.		37.
38.		39.
40.	41.	42.
43.	44.	45.
46.		47.
48.		49.

Quadratic Equations

50. Use graph paper



51.

52.

Characteristics of Graphs

53.	54.
-----	-----

Writing Equations of Graphs

55.

56.

Arithmetic Sequences and Series

57(a)

57(b)

57(c)

Quadratic Formula and the Discriminant

58.
Discriminant _____

Nature of Solutions _____

59.

60.

61.

62.

Solve in two ways: quadratic formula & completing the square

63.

64.

Solve.

65.

66.

67.

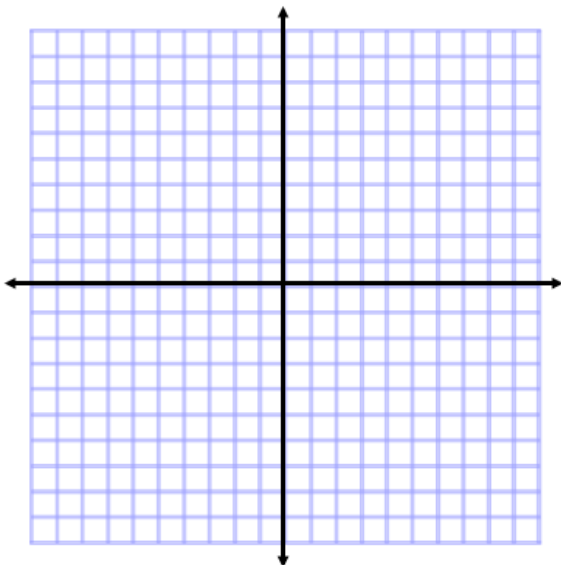
Piecewise Functions

68(a)

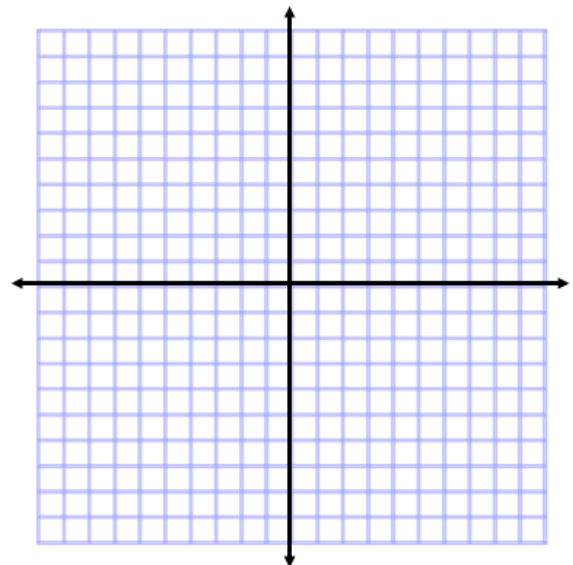
68(b)

68(c)

69.



70.



71.	72.
-----	-----

Geometry

Distance and Midpoint Formulas

73. Distance _____ Midpoint _____	74. Distance _____ Midpoint _____
--------------------------------------	--------------------------------------

Language of Mathematical Argument and Justification

75.

If-then: _____

Converse: _____

Inverse: _____

Contrapositive: _____

76.

If-then: _____

Converse: _____

Inverse: _____

Contrapositive: _____

Congruent Triangles

77.	78.
79.	80.

Properties of Triangles	
81.	82.
83.	84.
85.	86.
Properties of Quadrilaterals	
87.	88.
89. Complete the chart.	

Property	Parallelogram	Rectangle	Rhombus	Square	Kite	Trapezoid
Both pairs of opposite angles are \cong						
Both pairs of opposite angles are \cong						
Exactly one pair of opposite sides are \cong						
Exactly one pair of opposite angles are \cong						
Consecutive angles are supplementary						
Exactly one pair of opposite sides are parallel						
Diagonals bisect each other						
Diagonals are perpendicular to each other						

Properties of Polygons		
90.	91.	
92.	93.	
Angle, Arc, Secant, Tangent, and Chord Measures		
94(a)	94(b)	
94(c)	94(d)	
94(e)	94(f)	94(g)
95.	96.	
97.	98.	
Area of a Sector		
99.	100.	
Spheres		
101.	102(a)	
	102(b)	
Data Analysis and Probability		
Permutations and Combinations		
103.	104.	
105.	106.	107.

Basic Probability	
108.	109.
110.	111.
Statistics & Sample Measurements	
112.	
113.	
Association between Two Variables	
114.	115.