

San Domenico Summer Packet
Rising Geometry (students who have completed 7th grade Algebra only)

Please show your work to solve the following problems. All work should be completed on a **separate sheet** of paper, or digitally on notability (You must include the question number, and please box your answer). You will be graded on completion and level of understanding shown. Be sure to make your thinking visible!

Number Operations

1. Simplify the following expression.

$$\frac{-5^2 + 3(2^2 - 6^2)}{-6^2 + (-5)^2}$$

2. Jessica completed $\frac{7}{8}$ of a training run in 2 hours and 55 minutes. If Jessica runs at a constant pace, what is the number of minutes left in her run?

3. One-fourth of Holtown High School's students are seniors, one-third are juniors, and the other 300 students are sophomores. Of the seniors, two-fifths are boys. How many senior girls are students at Holtown High School?

Equations

Evaluating Expressions. Evaluate each expression using the values given.

4. $z + y^2 - \frac{x}{3}$ use $x = -9$, $y = -3$, $z = -4$

5. $y - z + \frac{z^2}{4}$ use $y = -9$, $z = 2$

Solve each proportion.

6. $\frac{5}{4} = \frac{x}{12}$

7. $\frac{x+10}{10} = \frac{18}{12}$

8. $\frac{8}{2z} = \frac{15}{60}$

Solve for the indicated variable

9. $r - 2s = 14$ for s 10. $V = \frac{1}{3}bh$ for b 11. $P = 2(l + w)$ for l

Use the Least Common Multiple to CLEAR the fractions in the following equations and then solve.

12. $\frac{1}{2}x - \frac{2}{3}x = \frac{5}{3}$

13. $\frac{1}{3}x - \frac{1}{4}x = \frac{1}{12}$

14. $\frac{6x}{7} - \frac{x}{2} = 5$

15. $\frac{7}{9}x - \frac{2}{3} = -2x + \frac{1}{3}$

Solve each equation for the variable indicated.

16. $-2(9a - 9) = 6(8 - 4a)$

17. $8|-8 + x| = 112$

18. $-5 + |6p| = 7$

19. $25n^2 - 4 = 96$

20. $\frac{2}{3} = \frac{x+2}{x-6}$

21. $r^2 - 5r - 24 = 0$

22. If a number is added to its square, the result is 240. Find the number(s). You will need to write an equation!

23. If a number is subtracted from its square, the rest is 30. Find the number(s). You will need to write an equation.

24. A positive number is 12 less than its square. Find the number(s). You will need to write an equation.

25. Find two consecutive negative integers whose product is 56. You will need to write an equation.

26. The length of a rectangle is 8 cm. greater than its width. Find the dimensions of the rectangle if its area is $105cm^2$

27. The length of a rectangle is 6 cm less than twice its width. Find the dimensions of the rectangle if its area is $108 cm^2$

28. In a mayor's race of three candidates, Isaac received 4000 votes, Bennett received 6000 votes, and Rene received $\frac{1}{3}$ of the votes. What was the total number of votes cast in the election?

29. If x is 150% of y , what percent of $3x$ is $4y$? Express your answer to the nearest whole number.

Inequalities

Solve each inequality and graph its solution on a number line.

30. $-72 < -4(x + 3)$

31. $2(1 + k) < 0$

32. $-104 \geq -8(7 + n)$

33. $|6 + k| \geq 3$

34. $232 > -2 - 6(8p + 1)$

35. $|8m - 2| > 82$

Functions

Find the indicated outputs for these functions.

36. $f(x) = x^2 - 9$ Find $f(3)$, $f(0)$, $f(-3)$, $f(-2)$. Please write your answers as ordered pairs.

37. $f(x) = 3x - 4$ Find $f(2)$, $f(-1)$, $f(-3)$, $f(5)$. Please write your answers as ordered pairs.

38. Travis rented a computer for \$50, plus \$5 per day. Find the cost of keeping the computer for 11 days.

39. Robert earned \$7.50 per hour for painting his neighbor's garage, plus a bonus of \$50 if he finished the job in less than 20 hours. How much did he earn if it took him 18 hours to complete the job?

40. Adriana bought 14 yards of carpet for \$32.50 per yard, plus a cutting fee of \$35. What was the total cost of the carpet?

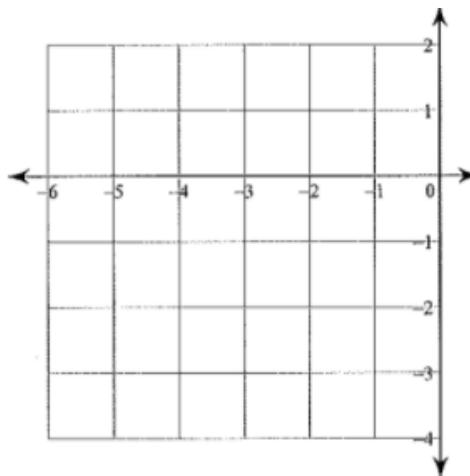
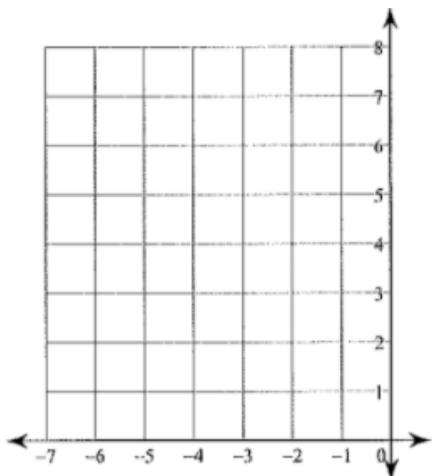
41. Jeff ordered 7 CD's online from Amazon that cost \$11.50 each. The shipping charge is \$8.50. What was the total bill?

Sketch the graph of each function. Label the vertex. You may graph directly on this paper.

42. $y = x^2 + 8x + 19$

$y = x^2 + 6x + 6$

43.



Linear Functions

Determine whether each set of ordered pairs satisfies a linear function

44. $\{(2, 4), (5, 3), (8, 2), (11, 1)\}$ 45. $\{(-10, 10), (-5, 4), (0, 2), (5, 0)\}$

Write a linear equation in slope-intercept form using the given point and slope.

46. $(2, 7) m = 3$

47. $(4, -2) m = -\frac{1}{2}$

Write an equation in slope-intercept form for the lines with the given slope and y-intercept.

48. $m = -2, b = 3$

49. $m = 5, b = 0$

50. $m = 0, b = -2$

51. Find the x-intercept, y-intercept (b), and the slope (m) of the line. $y = 4x + 2$

52. Write the equation of the line that goes through the points (0, 3) and (5, 1)

53. Write the equation of the line that is parallel to the line $(-2, -3)$ and $(1, 2)$

54. Write the equation of the line that is perpendicular to the line $(4, 1)$ and $(-6, -4)$

Slope. Find the slope (m) **and** y-intercept (b) of each line.

55. $x = 3$

56. $y = 3x - 4$

57. $y = 2$

58. The salary s an hourly employee earns varies directly with the number of hours, h , worked. When the salary is \$204.00, the hours worked is 24.

- Write an equation that relates the two variables (s and h)
- Use the equation to find the salary for a 40 hour work week

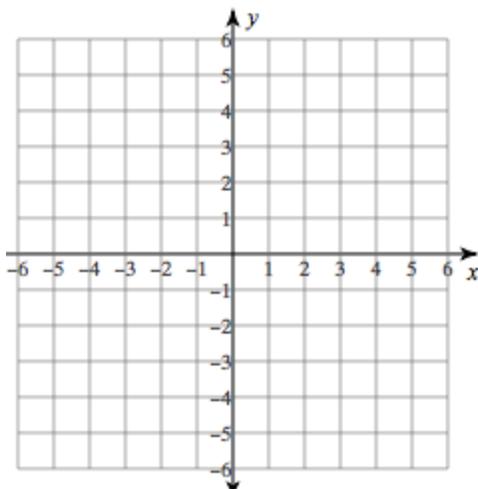
59. A river has risen 22 inches above flood stage (above the river bank). Beginning at $t = 0$, the water level drops at a rate of 2 inches per hour.

- Write an equation to model this situation
- Graph the equation over the 12 hour period (from $t = 0$ to $t = 12$)

Sketch the graph of each line. This may mean that you re-write the equation first. You may write directly on the graph.

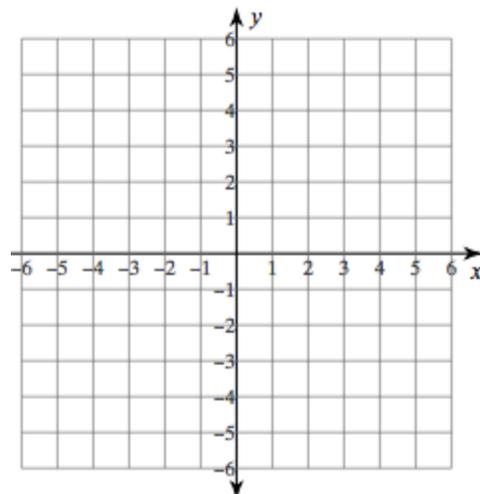
60.

$$5x + 4y = 0$$



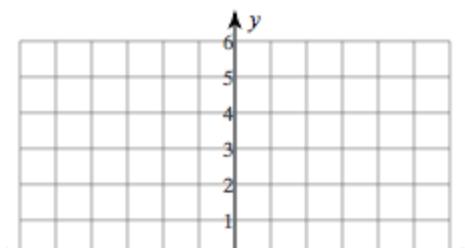
61.

$$x + 2y = -4$$



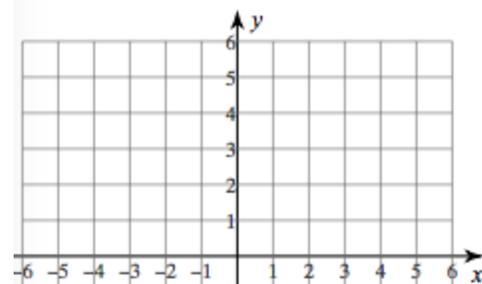
62.

$$0 = 1 + y$$



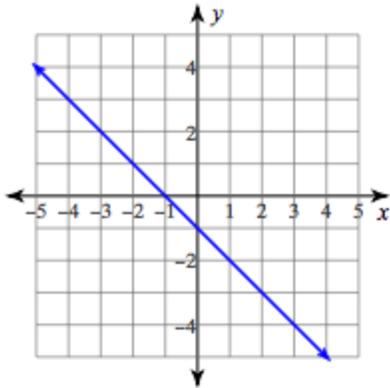
63.

$$6x + 5y + 5 = 0$$

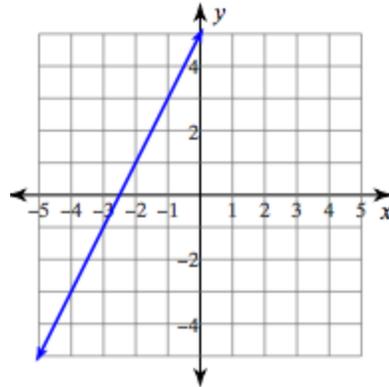


Write the slope-intercept form of the equation of the line.

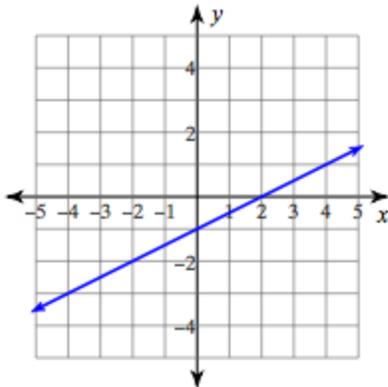
64.



65.



66.



67. Given the line $y = 2x + 6$. Give the x-intercept as an ordered pair, give the y-intercept as an ordered pair. Is the ordered pair $(-1, 3)$ on the line? How do you know?

68. Point A has coordinates $(4, 1)$. The x-coordinate of point B is 7. The distance between point A and Point B is 5 units. What is a possible coordinate of point B? List as many as you can find!

Name the coordinates of each reflection.

69.

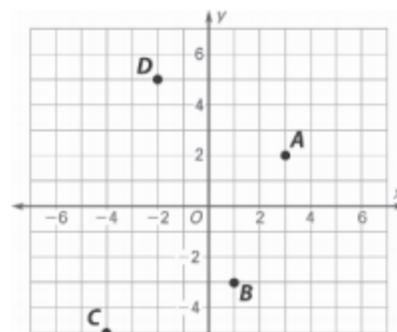
1. Point A across the x-axis

New point: (_____, _____)

2. Point B across the y-axis

New point: (_____, _____)

3. Point C across the x-axis



70. Quadrilateral ABCD has vertices at $A(-2, 3)$, $B(1, 4)$, $C(2, -2)$, $D(-3, -1)$. Find the area of quadrilateral ABCD to the nearest tenth of a unit.

Systems of Equations and Inequalities

Solve the following system of equations. You may use any method. Write your answer as an ordered pair.

71. $4x - 10y = -26$
 $-2x + 8y = -8$
 $-2x - 7y = 25$

72. $x - 2y = 15$
 $6x + y = 25$

73.
 $6x + 10y = 24$

74. 4 boxes of Nerds and 3 Smartees are worth one Wonka Bar. 2 boxes of Nerds and 6 Smartees are also worth one Wonka Bar. What fraction of a Wonka Bar is one box of Nerds worth? Give your answer as a fraction in lowest terms. (Use a system of equations).

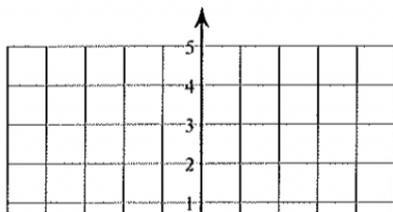
75. Find the value of two numbers if their sum is 12 and their difference is 4. Use a system of equations to solve.

76. Casey orders 3 pizzas and 2 orders of breadsticks for a total of \$29.50. Rachel orders 2 pizzas and 3 orders of breadsticks for a total of \$23. How much does a pizza cost?

Sketch the solution to each system of inequalities.

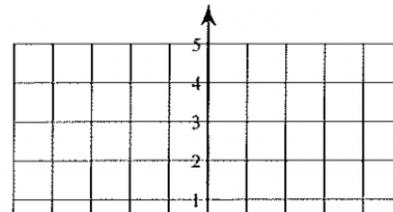
77.

$y \geq \frac{1}{3}x + 1$
 $y > \frac{4}{3}x - 2$



78.

$5x + 3y \leq -6$
 $y \leq 3$



Exponents and Polynomials

Simplify. Your answer should contain only positive exponents.

79. $\frac{5^2(3^2 - 2^3)}{25}$

80. $4x(3a^2x)^2$

81. $\left(\frac{-3}{5}\right)^3$

82. $\left(\frac{2x^3y^0}{6xz^4}\right)^2$

83. $6 \div 3(-4)$

84. $3p^3 \cdot p^{-3} \cdot 3p^0$

85. $4n^{-3} \cdot 2n^2$

Simply the following expressions. Your answers should include only positive exponents.

86. $(4xy)^2$

87. $(x^3) \cdot (2x^{-1})^0$

88. $a^{-2}b^3 \cdot (2b)^4$

89. $x^{-4}y^2 \cdot (x^0y^0)^{-3}$

Simply the following expressions.

90. $-6(-8a + 9) + 4a$

91. $7a(1 + 8a) - 8a(a + 9)$

92. $(2x - 7)(x + 6)$

93. $(7x + 8y)(8x + y)$

94. $(5p + 6)(3p^2 + p + 6)$

95.

$(3n - 2 - 8n^2) - (7 - 8n - 7n^2)$

Factoring Polynomials

Factor completely. Do not solve.

96. $4k^2 - 100$

97. $2x^2 + 4x$

Factor completely. Look for a possible GCF first!

98. $-12n^2 - 16n$
 $5v^2 - 20v - 105$

99. $p^2 - 14p + 40$

100.

101. $14b^2 - 40b - 6$

102. $21x^2 + 36x + 15$

Quadratic Functions and Equations

Solve each equation by using the quadratic formula only. (You may need to refresh your memory on the Quadratic formula)

103. $x^2 - 5x - 24 = 0$

104. $x^2 + 3x = 0$

Solve the following using any method.

105. $x^2 + x - 42 = 0$

106. $4x^2 + 24x + 36 = 0$

107. $x^2 + 4 = 29$

108. $27 - 2x^2 = -53$

Pythagorean Theorem

109. A rectangular park measures 250 ft by 400 ft. A sidewalk runs diagonally from one corner to the opposite corner. Find the length of the sidewalk. Round your answer to the nearest tenth.

110. How long is a pipeline that runs diagonally across a square field that has a side of 10 kilometers? Round your answer to the nearest tenth.

111. A rope from the top of a mast on a sailboat is attached to a point on the deck 7 feet from the base of the mast. Assume that the mast and the deck intersect at a right angle. If the rope is 12 feet long, how high is the mast?

Circles *You may need to refresh your memory on the formula for area of a circle, and circumference of a circle

112. A water sprinkler sends water out in a circular pattern. How large is the watered area if the radius of the watering pattern is 15 feet? Use **3.14** for π .

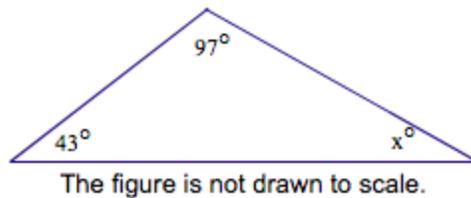
113. Find the circumference of a circle with radius 18 inches. Use 3.14 for π . Round to the nearest tenth as needed.

114. A circle has a circumference of 10 cm. What is the area of the circle? Use 3.14 for π and round to the nearest square centimeter.

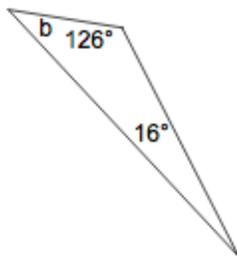
115. How many flowers, spaced every 4 inches, are needed to surround a circular garden with a 200 ft. radius. Use 3.14 for π

Triangles:

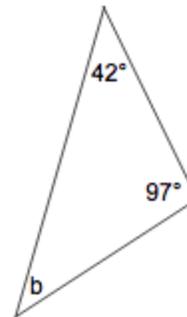
116. Determine the value of x .



117. Determine the value of b .

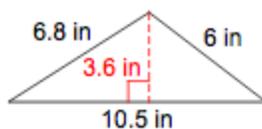


118. Determine the value of b .

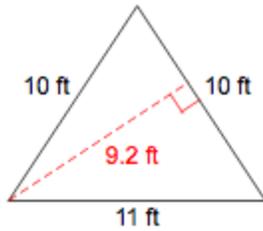


Find the area of the triangles. Don't forget units!

119.

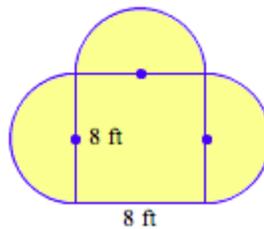


120.



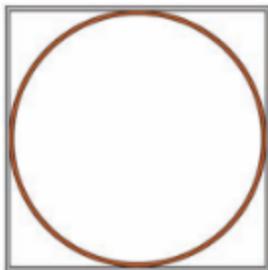
***Optional (Feel free to do any or all!)**

*Find the perimeter of the figure a student has drawn in art class. Use 3.14 for π

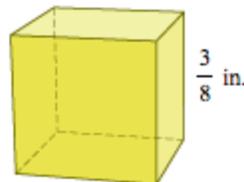


*A bicycle wheel makes five rotations. The bicycle travels 37.94 ft. Find the diameter of the wheel in inches. Use 3.14 for π . Round your answer to the nearest tenth.

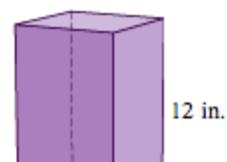
*An artist used silver wire to make a square that has a perimeter of 40 inches. She then used copper wire to make the largest circle that could fit in the square, as shown below. How many more inches of silver wire did the artist use compared to copper wire? Use 3.14 for π .



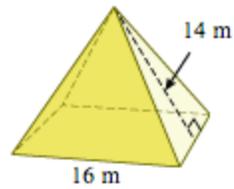
*Find the surface area and volume of the cube.



*Find the surface area and volume of the rectangular prism.



*Find the surface area of the square pyramid.



*A rectangular tank has a base of 16 cm by 11 cm and a height of 36 cm. It is partially filled with water to a height of 12 cm. How much water has to be poured out so that it is only one-quarter full?

*A prism has a square base with edges that measure 5 centimeters. The ratio of its height to its width is 4:1. Find the volume of the rectangular prism in cubic centimeters.

*Consider a circle that has a circumference of 28π centimeters. What is the area, in cm^2 , of this circle?