

San Domenico Summer Packet

Rising Algebra (students who have just completed Pre-Algebra at SD, and **new students entering 8th grade**)

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!

If you are unsure on a concept, please use the resources available to solve! You may have to spend time reviewing certain concepts.

Simplifying Expressions:

1.  $4 \times ((-1) - 2) \times (-7)$

2.  $\frac{21}{6+1} \times 4$

3.  $\frac{5}{7} \div (-\frac{3}{8})$

4.  $7 \div 1\frac{3}{5}$

5. Simplify the following expression. Please show all of your work.

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

6.  $2 - 4(6 - 2)^2 + 25 \div 5 =$

7.  $(-3^2 + 2^2 \cdot 7)(\sqrt{289} - 6)$

8.  $5^3 - 4(8 + 7) \div 6$

9. Insert Parentheses ( ) to make the following statements true.

$$22 - 4 \div 2 = 9$$

$$5 \cdot 5 + 5 - 5 = 45$$

*Simplify. Don't forget what you know about order of operations!*

$$10. \quad 2(2+4) + 3 \div 3 \quad 11. \quad 6 - (6 - 5) - 2 + 2$$

$$12. \quad ((4 - 1) \times 2) \div 6 \quad 13. \quad 2 + 5^2 - 2$$

$$14. \quad 8\frac{7}{15} + 4\frac{4}{5}$$

$$15. \quad 18 - 8\frac{3}{4}$$

$$16. \quad \text{Mental Math: } 6\frac{4}{8} + 8\frac{2}{4}$$

Combining Like Terms: Simplify each expression by combining like terms.

$$17. \quad -2 - 5a - 8a$$

$$18. \quad 2b - 9b$$

$$19. \quad -x - 6x$$

$$20. \quad 8(v - 1) + 8$$

$$21. \quad (n^2 - 3n + 14) + (3n^2 + n - 25)$$

$$22. \quad (5 - 8k) - (8k - 13 + 2k^2)$$

$$23. \quad (2x^2 + 3x - 2) - (x^2 - 4x - 1)$$

$$24. \quad -5 + 7(1 + 6n)$$

$$25. \quad 4 - 4(1 + 3k)$$

Solving Equations: Solve the following equations:

$$26. \quad 5x - 3 = 2$$

27.  $\frac{x}{5} + 9 = 6$

28.  $-4(x + 8) = 60$

29.  $3(a + 1) - 5 = 3a - 2$

30.  $\frac{2}{3}x = 12$

31.  $5x = -\frac{2}{3}$

32.  $-\frac{3}{4}x = \frac{5}{8}$

33.  $\frac{3}{5x} = -3$

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

35.  $-2 = \frac{2x}{5} + 5$

36.  $\frac{-3x-4}{3} = \frac{1}{2}$

37.  $\frac{2}{5}x + 9 = -4$

38.  $\frac{2}{3}x + 1 = 7$

39.  $\frac{3}{5}x = \frac{9}{10}$

Exponents. Simplify. Your answer should only contain positive exponents.

40.  $(2x)^2$

41.  $6n^3 \cdot 5n^2$

42.  $6r^0 \cdot 4r^3 \cdot 4r^2$

43.  $7m \cdot m^2 \cdot 8v^5$

44.  $(4x^3y^5)^3$

45.  $(2v)^{-2} \cdot (6v^{-7})^3$

46.  $(n^3 \cdot 4n^3)^2$

47.  $\frac{7x^4}{5x^2}$

48.  $\frac{5x^2y^4}{8x^4y^0}$

49.  $3y \cdot 8x^3y^{-3}$

50.  $(-3)^3$

51.  $-3^3$

52.  $8^{-2}$

53.  $(-4)^0$

54. Which expression below has the same value as  $x^5$ ?

A.  $5x$

B.  $x \div 5$

C.  $x * x * x * x * x$

D.  $5x * 5x * 5x * 5x * 5x$

55. The sum of a number ( $n$ ) and 23 is 48. Which equation shows this relationship?

A.  $23 + n = 48$

B.  $48n = 23$

C.  $23 - n = 48$

D.  $48 + n = 23$

56. The Martinez family went on a vacation. They started with \$2500. If they spent \$250 each day, which expression represents how much money they had after  $x$  days?

A.  $2250x$

B.  $2500 - 250x$

C.  $250x$

D.  $2500 + 250x$

57. What number below can replace the variable  $r$  to correctly solve  $3r + 2 = -10$ . Please show your work.

A.  $-4$

B.  $-3$

C.  $3$

D.  $4$

58. Find the value of the expression,  $5a + 3b$ , if  $a = 2$  and  $b = 8$

59. Evaluate the following expressions by substituting the values below.

$$a = 4, b = 6, \text{ and } c = 11$$

$$2c + 3a - b$$

$$(b + c) - (a + b)$$

Graphing Inequalities

Solve each inequality and graph the solution on a number line. (Remember what you need to do when you multiply or divide by a negative number!)

60.  $n - 10 > 14$       61.  $98 \leq x + 5$       62.  $\frac{k}{-5} < -4$
63.  $-9a \leq 81$       64.  $\frac{w+3}{2} < 6$

Simplifying Fractions. Write each fraction in simplest form.

65.  $\frac{12}{16}$       66.  $\frac{27}{72}$       67.  $\frac{16}{56}$

68. In a race, a triathlete runs  $\frac{1}{3}$  of the total distance, cycles  $\frac{2}{5}$  of the total distance, and swims the remaining distance. He swims 1,200 meters. What is the total distance of the race?

Percentages

Use a proportion or the percent formula ( $\text{part} = \text{percent} \cdot \text{whole}$ ) to solve. **You should NOT be using a calculator.**

69. 24 is what percent of 32?      70. What is 4% of 350?
71. What percent of 25 is 23?      72. 40% of 25 is what number?
73. 8 is what percent of 400?      74. 21 is what percent of 168
75. A school holds classes from 8:00 AM to 2:00 PM. For what percent of a 24-hour day does this school hold classes?
76. A school holds classes from 8:00 AM to 2:00 PM. For what percent of a 24 hour day are students NOT in school? (how can you solve this without math!)
77. Of the 250 people at a concert, 160 are men. Half of the remaining people are children. What percent of the people are adult women?

- A. 9%    B. 16%    C. 18%    D. 36%

*Write each percent as a decimal.*

78. 65%

79. 2%

80. 1.8%

81.  $62\frac{1}{2}\%$

82. Serena and Derek have 270 stickers in all. Serena has 25% more stickers than Derek. How many stickers does Derek have?

83. Mrs. Li bought some crackers. She gave 30% of the crackers to her neighbor and ate 50% of the remaining crackers. Mrs Li had 42 crackers left. How many crackers did Mrs. Li buy?

84. The tires Mary wants to buy for her cart cost \$200 per tire. A store is offering the following deal, "Buy 3 tires and get the 4th tire for 75% off!" Mary will buy 4 tires using the deal. The sales tax is 8%. How much money will Mary save by using the deal versus paying the full price for all 4 tires?

85. Fernando put 20 crickets in his pet lizard's cage. After one day, Fernando's lizard had eaten 20% of the crickets he had put in the cage. By the end of the next day, the lizard had eaten 25% of the remaining crickets. How many crickets were left in the cage at the end of the second day?

86. Kimberlin and Leila are comparing the number of pages that they read for pleasure over the summer. Kimberlin read 2,500 pages, which was 75% of the number of pages that Leila read. How many pages did Leila read?

Slope of a Line: Find the slope of the line through each pair of points. Simplify if possible. Need help? Remember (or look up) the slope formula.

87.  $(1, -4), (-9, 8)$

88.  $(4, 9), (2, 9)$

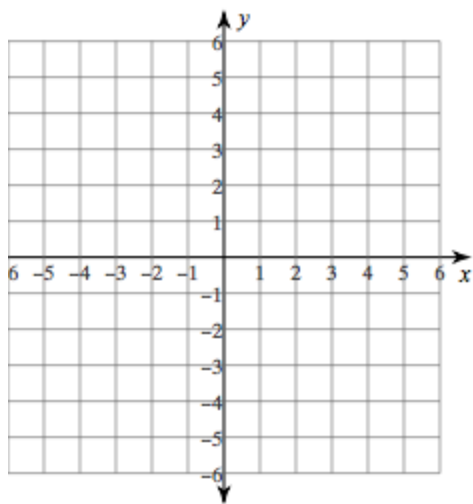
Graphing Linear Equations:

Sketch the graph of each line. (***You may graph directly on the paper***)

Need help? Remember (or look up) slope-intercept form.

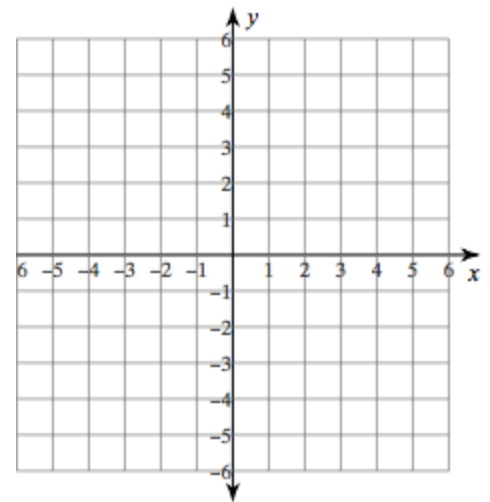
89.

$$y = \frac{1}{3}x + 4$$



90.

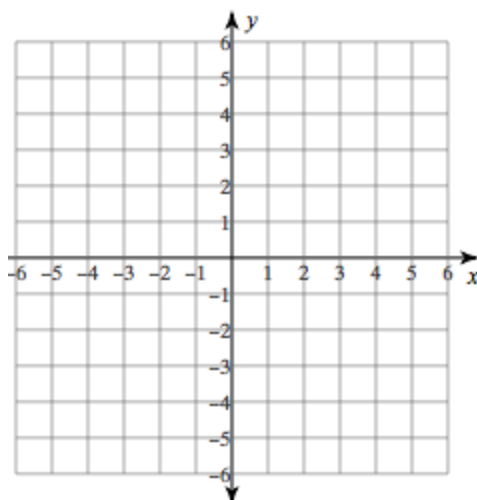
$$y = 3x - 4$$



91.

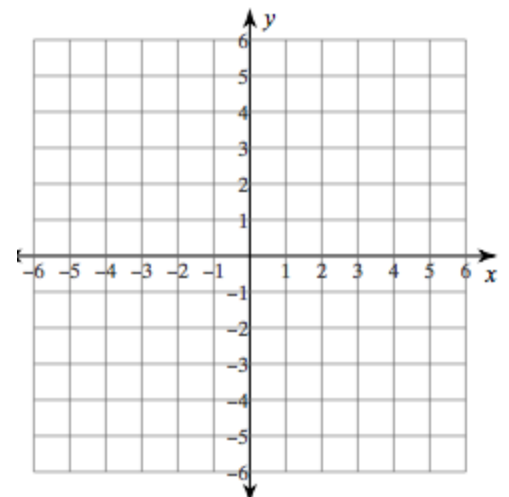
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$$0 = 1 + y$$



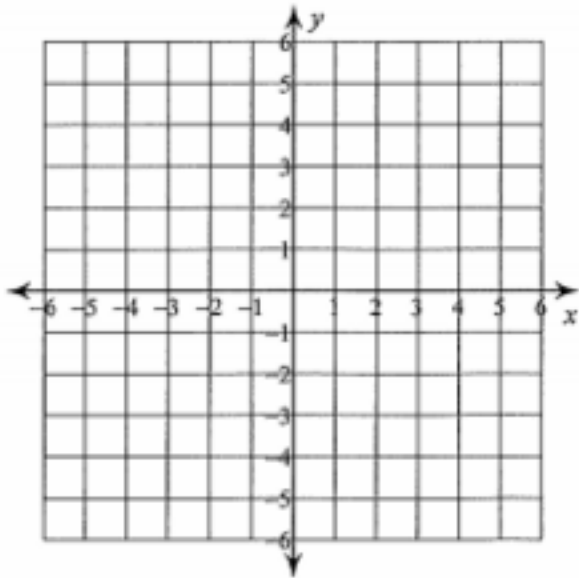
92.

$$x - y = 4$$

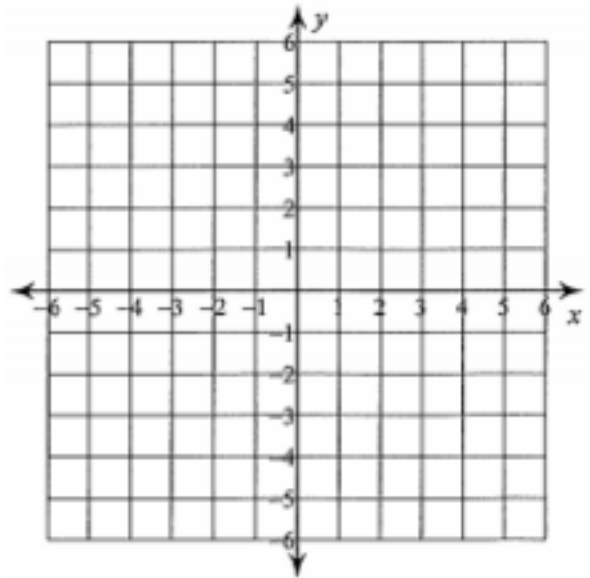


Linear Equations: Sketch the graph of the line. Label the slope ( $m=$ ) and the y-intercept ( $b=$ )

93.  $y = \frac{2}{3}x - 4$



94.  $y = 3$



95. Henry is  $x$  years old. Betty is three times as old as Henry. Peter is 4 years older than Betty.

- Express Peter's age in terms of  $x$
- If Henry is 4 years old, how old is Peter?

96. Andy has  $3r - 3$  baseball cards. Micah has  $2r + 5$  baseball cards.

- If  $r = 14$  who has more cards?
- For what value of  $r$  will the two boys have the same number of cards?

97. Kevin goes to the store to buy some bread. He has some quarters and dimes. If he has \$1.15 in all, how many quarters and how many dimes could he possibly have?

98. Mr. Gordon wants to rent a car for  $x$  days. The car rental company charges a fixed fee of \$120 and an extra \$18 for each day of the rental.

- Find, in terms of  $x$ , the cost of renting the car
- If  $x = 8$  find the cost of renting the car.

99. The length of a rectangle is  $\frac{2}{5}$ -meter. Its width is one-fourth of its length. Find the perimeter of the rectangle.



100. Christine bought  $\frac{5}{9}$  pound of granola. She repacked it equally in 20 bags to distribute to her coworkers. If 7 bags were leftover, how many pounds of granola were leftover?

101. In the repeating decimal  $\overline{.053412}$  what is the 50th digit?

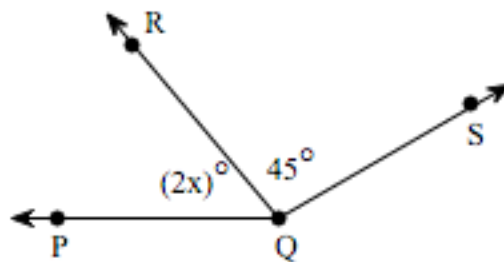
Circles

102. Find the circumference of a circle with a radius of 8.5 cm. Use 3.14 for  $\pi$ . Round your final answer to the nearest tenth. You must show all of your work.

103. A circle has a circumference of 10 cm. What is the area of the circle? Use 3.14 for  $\pi$  and round all intermediate values to the nearest thousandth. Your final answer should be rounded to the nearest tenth.

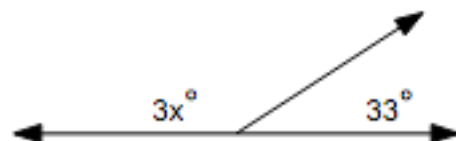
Angles

104. The measure of  $\angle PQS$  is  $91^\circ$ . What is the value of  $x$ ?



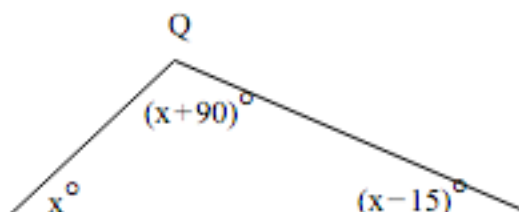
105.  $\angle 1$  and  $\angle 2$  are complementary angles. The measure of  $\angle 1$  is  $60^\circ$ . The measure of  $\angle 2$  is  $10x^\circ$ . Find the value of  $x$ .

106. Write an equation to find the value of  $x$  in this figure. What is the value of  $x$ ?



107. For the figure, find the value of  $x$  and the measure of  $\angle Q$ . Need Help? Remember: What do the interior angles of a triangle add up to?

X=



$m \angle Q =$

Scientific Notation.

108. Express the number 80,000 in scientific notation.

109. The diameter of a star is about  $9.3 \times 10^5$ . Express this diameter in standard form.

110. Express the number  $5.2 \times 10^{-6}$  in standard form.

111. A scientist has two colonies of bacteria, A and B. Colony A has  $6.6 \times 10^7$  bacteria. Colony B has 3,300,000 bacteria.

- a. Express the number of bacteria in Colony B in scientific notation.
- b. The number of bacteria in Colony A is how many times the number of bacteria in Colony B?

112. Express 0.00000298 in scientific notation.

113. Write  $3.91 \times 10^{-2}$  in standard form.

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

\*A quadrilateral is formed with vertices  $(-3, -3)$ ,  $(-3, 1)$ ,  $(2, 3)$ ,  $(4, -3)$ . What is the area of the quadrilateral? (You will need to graph these points)

\*Leonardo can paint a wall in 6 hours. Georgia can paint the wall in 4 hours. Working together, how long will it take them to paint the wall? Give your answer in hours and minutes to the nearest minute.

\*One year ago, the number of years in Jane's age was a perfect square, and one year from now, her age will be a perfect cube. How many years old is Jane?

Pythagorean Theorem. Need Help? You should look up the Pythagorean Theorem

\*A plot of land is 300 feet wide. A diagonal across the rectangle is 350 feet. What is the length of the rectangular plot of land? Round your final answer to the nearest tenth as needed.

\*A rope is attached to the top of a tent pole. Assume that the tent pole forms a ninety degree angle with the ground. The rope is pegged into the ground 6 feet from the tent. If the rope is 12 feet long, how long is the tent pole? Round to the nearest tenth as needed.

\*What is one value of B that will make the product **negative**?

$$\frac{1}{3} * -5 * 37 * -240 * -\frac{1}{3} * B$$

\*What is one value of B that will make the product **positive**?

$$\frac{1}{3} * -5 * 37 * -240 * -\frac{1}{3} * B$$