Hello folks,

Here is a packet of problems for you to ponder and work on over the summer, in order to keep your math skills fresh. Try all of the problems, and on your own paper (lined or graph paper), please write up your <u>solutions</u>. This means not just writing your answers, but showing your steps and your thinking! This is the work you will hand in during the first week of classes.

We want to acknowledge that you all are coming off a challenging school year and trying to learn during the pandemic. Most people have lost class time over the past year, and we expect different people will be uncertain about different things. **So our message to you is - please just do your best!** And make note of ideas that feel unfamiliar to you. That will help us in the fall address any learning gaps you may have! We are all in this together - and we will figure it out together as well. We so appreciate your willingness to spend some time doing math this summer!

"What kind of calculator do I need to do this work?"
    No calculators necessary--just use your brain! :)

"How will I get all of these problems done this summer?"
    We think if you spend one to two hours a week (or work through two to three pages each week) consistently this summer, you should be all set!

"I don't know the answers to some of these!"
    That's OK! You aren't supposed to be perfect and may not yet know how to do all of these problems. This is school, after all, and everybody's learning. Check out our [FAQ and Resources](#) for resources on what to do if you feel stuck.

If you have questions about specific problems, or anything else in this packet, you can look at our [FAQ and Resources](#) page, or E-mail teacher Julie at jnelson@waringschool.org or our department chair Joan Sullivan at jsullivan@waringschool.org.

We hope you and your family have a good summer,

The Waring Math Teaching Team

1. Evaluate the following expression, using order of operations rules:

$$3 + 5 \cdot (8 - 6)^2$$

2.   Add or subtract *(remember: addition is the same as adding the opposite)*

   a) -15.3 + 8.7 =   b) -8.5   -   12.9 =

3.   Change to a percentage.

   a)   0.05   b)   0.789   c)   1.04

4.   Compute, using fractions *(remember to find a common denominator!)*

$$6 - (\tfrac{2}{5} + 1\tfrac{3}{4})$$

5. A lover of geometry, our friend Henry, has a collection of circles and triangles. The ratio of circles to triangles in his collection is 5 : 3.

  a) How many circles are there if there are 9 triangles?

  b) If there are 10 circles, how many triangles are there?

  c) If there are 32 objects, how many are circles?

  d) What fraction of Henry's objects are triangles?

6. Suppose Lucine wins 80% of her chess games.
    If she plays 30 games, how many games does she win?

7. Compute. Write your answers in lowest terms (simplify).

  a) $\dfrac{8}{3} \div \dfrac{2}{3}$

  b) $2\dfrac{7}{8} + 3\dfrac{1}{5}$

8.   Find the value:

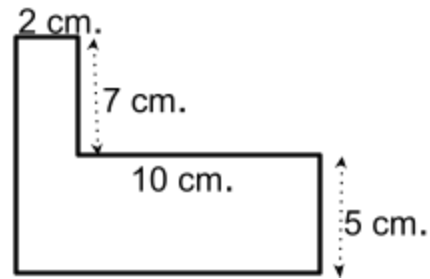   a) 4^3 b) $\sqrt{81}$ c) $5 \cdot 100^2$

9.   Solve for the variable:

   a) $5n = -35$ b) $\dfrac{y+2}{3} = 5$ c) $k + 6.6 = 4.1$

10. Find the area of the object.

2 cm.

7 cm.

10 cm.

5 cm.

11. a)   Plot the point (2,4) on the coordinate grid and label it **A**
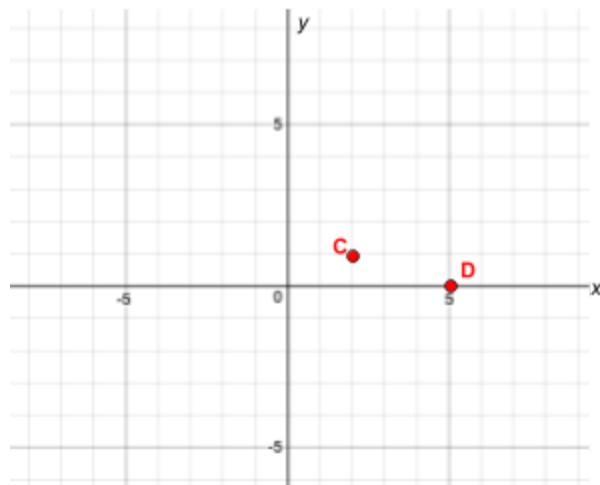
   b)   Plot the point (0,6) on the coordinate grid and label it **B**

   c)   Name the coordinates of
        point C.

        (_____ , _____)

   d)   Name the coordinates of
        point D.

        (_____ , _____)

12. Add or subtract:

   a) -4 + -17 =   b) -6 - ? = -28

13. Pascal lives 5 ¾ miles from the beach.
    He already rode his bike 2 ⅜ miles.
    How many more miles does he have to ride to get to the beach?

14. Find the value of the expression $2x + 4y - 1$ if $x = 3$ and $y = 5$

15. Micah is thinking of a mystery number (x).
    He adds 3 and then multiplies that sum by 5.

    a)   Complete the chart:

He thinks of a number	x
Adds 3	
Multiplies by 5	

    b)   He tells us that at the end his result is 55.

          Find Micah's mystery number by solving for x .

16. Insert parentheses to make the equation true.
     (remember order of operations!)

$$30 \div 3 + 7 - 2 = 1$$

17. Convert to percents:

   a) $\dfrac{7}{25}$ b) $\dfrac{4}{5}$

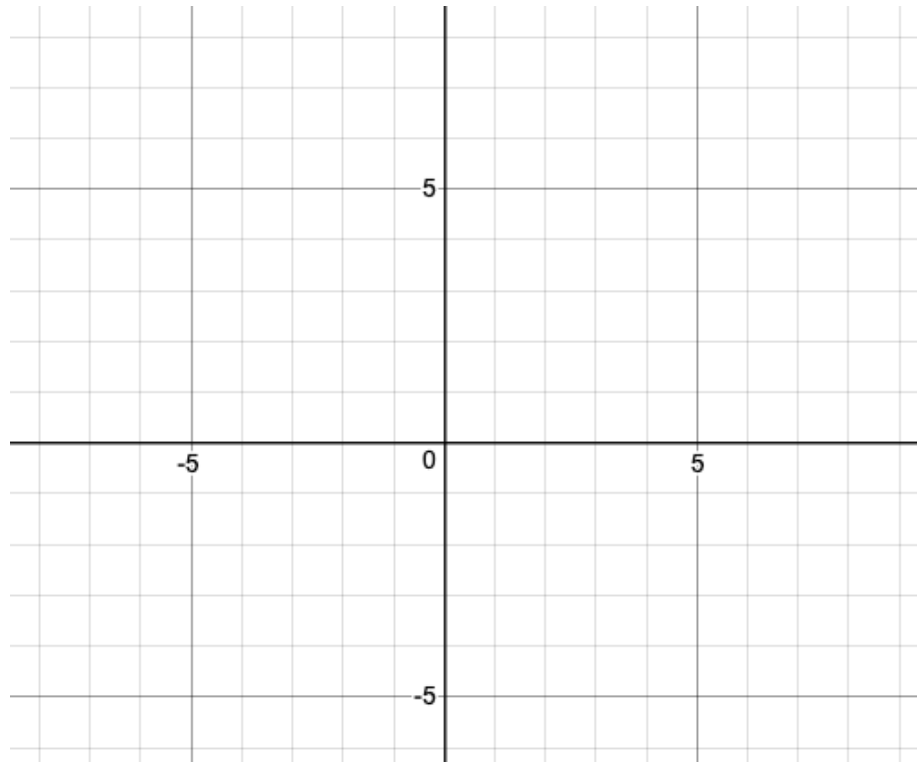18. Find the missing exponent: $6^4 \cdot 6 \cdot 6^8 = 6^?$

19. Find the value of the expression   5a - 3b + 7 if a = 0 and b = -3

20. Solve for the unknown number: $3x + 9 = 30$

21.   Use the equation below to complete the table and plot the points on the coordinate grid.

$y = 2x + 1$

x	y
-3	
-2	
-1	
0	
1	
2	
3	

22.   Find the missing terms in each of the following arithmetic sequences.

(In an arithmetic sequence you are adding the same number from one term to the next, for example you add 3 each time in this arithmetic sequence : 17, 20, 23, 26, 29, 32)

a)   8 , 13 , 18 , _____

b)   25 , _____ , 37 , _____

c)   7 , _____ , _____ , 31

d)   x , 5x + 2 , 9x + 4 , _____ , _____

23.   Compute:

      a)   -15 - 14   b)   36 - 42

      c)   21 - -3   d)   -4 · (10 + -16)
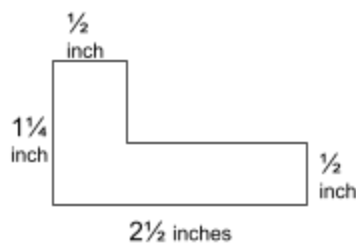
24.   Solve for the unknown number: $2x + 24 = 5x + 15$

25.   Mental Math:

    a)   What is 25% of 60?

    b)   16 is 40% of what number?

26.   Find the area and the perimeter of the figure. Use fractions.

½ inch

1¼ inch

½ inch

2½ inches

27.   Multiply.

      a) $4 \cdot \dfrac{5}{6}$ b) $\dfrac{12}{25} \cdot \dfrac{5}{9}$

28.   a) Plot these points on the coordinate grid at the right.
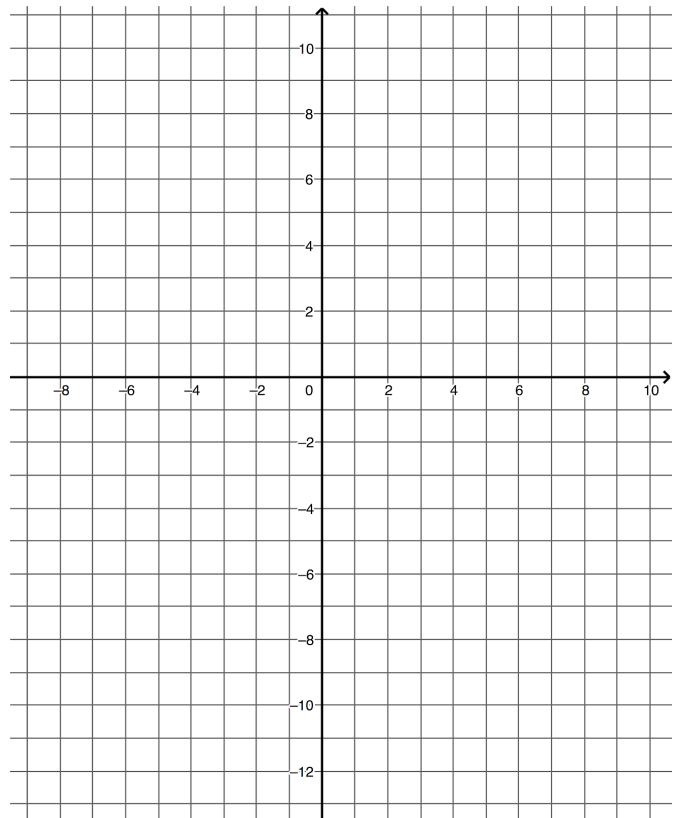
          (- 4 , 8)
          (- 4 , - 1)
          (2 , 8)

b) These three points are three vertices (corners) of a rectangle.
What are the coordinates of the fourth vertex?

c) Find the area of the rectangle.

29. Enna goes running after a soccer ball and takes enormous strides that are 1 ⅔ meters long. If the soccer ball is 15 meters away from Enna, how many strides will she need before she reaches the ball?

30. The ratio of a rectangle's base to its height is 3 : 7.
Its perimeter is 80 feet.
What are its dimensions?
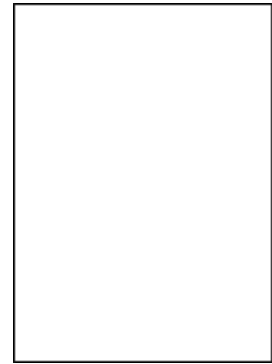
31. If $6x = -30$ then what is the value of $x + 4$?

32. Use the number line to find the following sums:

a) $-1 + 2\frac{2}{6}$ b) $-1\frac{1}{6} + \frac{1}{2}$

33.   Solve for x.   Show your work.

$$3(2x + 4) = 5x + 25$$

34.   A store has a sale, and prices are reduced 15%.
Juliette wants to buy a skateboard that cost $40 originally.
How much will she pay on sale?

35.   Solve for x:

     a) $\frac{4}{5}x = 16$

     b) $\frac{1}{3}x + 15 = x + 1$

36.   Please complete this table of equivalent values:

Fraction	Decimal	Percentage
	0.25	
		40%
1 ½		
		33 ⅓ %

37.   The base of a rectangle is 5 cm shorter than twice its height.
       If the rectangle's perimeter is 56 cm, what is its area?

38.   Compute.

a) $\dfrac{-8}{2} + \dfrac{-8}{-4}$ b) $-3 \cdot (-3 + 10) =$

39.   Find the value of the expression:

$$3 \cdot 10^4 + 2 \cdot 10^3 + 8 \cdot 10 + 9$$
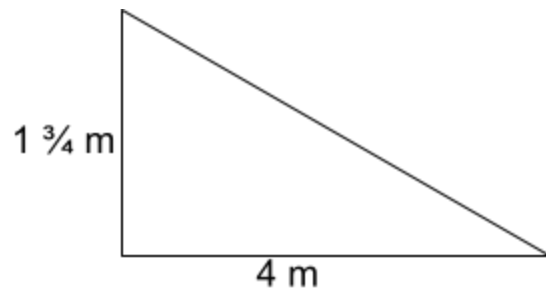
40. Solve for x in each equation:

   a) $x^2 = 64$ b) $2x^3 + 1 = 2001$

   c) $\sqrt{x} = 7$ d) $\sqrt{x + 2} = 3$

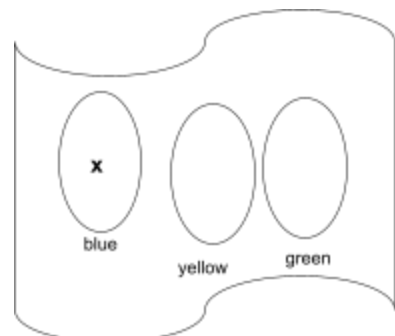41.   Find the area of the triangle.

1 ¾ m

4 m

42.   Gigi has a bag that contains green, yellow, and blue M&M's.
       There are 3 more yellows than blues.
       There are three times as many greens as yellows.

       There are 97 M&M's in all.

       How many are blue? How many are yellow? How many are green?

       Use algebra! Write an equation and solve it!

blue

yellow   green

43.   Solve for the unknown number:

$$4 \cdot (3n - 3) = 36$$

44.   A car's gas tank is $\dfrac{3}{4}$ full.

When it is full, the tank can hold 16 gallons of gas.
The car travels about 30 miles per gallon.

About how far can the car travel before running out of fuel?

45.   Solve for the unknown number: $3(x - 4) = 30$

46.   Compute. *(your answer should be in lowest terms)*

a) $8 \div 3\dfrac{1}{5}$ b) $1\dfrac{3}{7} \cdot \dfrac{14}{25}$

47.   The ratio of sticks to stones is 7 : 4.
       If there are 36 stones, how many sticks are there?

48. Lucy deposits $200 in a bank that pays 10% interest each year.

       a)   How much money will be in the account after 1 year?

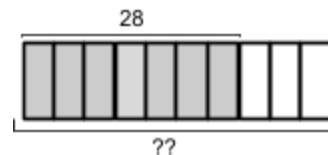   b)   How much money will be in the account after 2 years ?
       *(keep in mind that she will earn 10% on all of the money in the account in the second
       year, not just the $200 she started with)*

49.   Evaluate *(find the value, using order of operations):*

       a) $3 \cdot (-2 + 5)^2$ b)$-6 \cdot 3 + 4 \cdot - 3$

50.   Solve for x: $\dfrac{2}{7}x + 8 = \dfrac{6}{7}x$

51.   28 is 70% of what number?   hint:

52.   a)   Caroline drives from Alphaville to Betaville, a distance of 240 miles, at a rate of 40 miles per hour. How long does it take her to make the trip?

       b)   When she returns to Alphaville, she drives at a rate of 60 mph. How long does it take her to get back?

       c)   If her car can travel 30 miles for every gallon of gas, how many gallons of gas did she need for the entire round trip?

53.   Find the value of $-5k + 7n + p^2$ when $k = 2$, $n = -1$, $p = 4$

54.   Dylan wants to buy some new headphones. There is a 20% off sale. The regular price of the headphones is $60. What was the sale price?

55.   Find the area of the rectangle.

2 ¾ inches

4 inches

56. Suppose Angela uses orange juice and grapefruit juice in a ratio of 7 : 2 in order to create a delicious fruit punch.
    If he wants a total of 45 cups of fruit punch, how much orange juice and how much grapefruit juice does he need?

57.   Una has built a 70 foot tower.

    For whatever reason, I'm not sure, Una decides to build her tower even higher and starts adding onto her tower at a rate of 4 feet per day.

    Carol sees the tower and thinks it's pretty cool, so she decides to build her own tower. She starts at the same time as Una and builds at a rate of 9 feet per day.

a)   Complete the chart: *(it has been started for you)*

Number of days building	Height of Una's tower	Height of Carol's tower
0	70 ft	0 ft
1	*74 ft*	*9 ft*
2		
3		
4		
5		
n		

(*note: for the nth row, you should have algebraic expressions using the variable n*)

b)   Write an equation to represent the situation when the towers are the same height, (Una's tower height after n days = Brad's tower height after n days).

c)   Solve the equation you just wrote to determine how many days of building it will take for the two towers to be the same height.

58.   The figure at right is a square.
      Its perimeter = 1 foot
      Find the area of the square.

59.   After playing 120 games one season, the New York Yankees had won
      90 games. If the season was 160 games long, and the Yankees
      continued to win at the same rate, how many games would you expect
      them to win in all?

60.   Yasmine and Anita got together to make a batch of cookies.
      Their cookie recipe makes 20 cookies, but they wanted to make 70
      cookies.

      If the original recipe calls for 1 ¼ cups of sugar, how much sugar did
      they need to make 70 cookies?

Woohoo! You did it! Your math brain is happy! But if you want more fun,
feel free to keep going….your math brain will be ecstatic!

Remember to bring this packet and all of your written work to your math teacher during the first week of classes in September!

Optional Challenge Problems

Challenge Problem A
You get to make a triple scoop ice-cream cone by picking 3 different flavors from the bin below.
You are not particular about the order in which the flavors are scooped.
How many different cones are possible?

Challenge Problem B
Brad and Dylan are on the road and are trying to find their way to Bub's Barbecue. They have no idea where to turn, and are philosophically opposed to asking questions. "We are here to observe the local population, not to disturb them," is their traveling philosophy. So they choose streets at random.

a)   What is the probability they end up at Bub's?

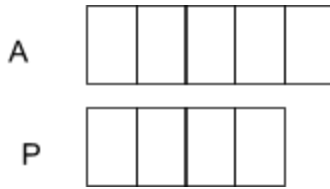b)   What is the probability they end up heading to Mexico?
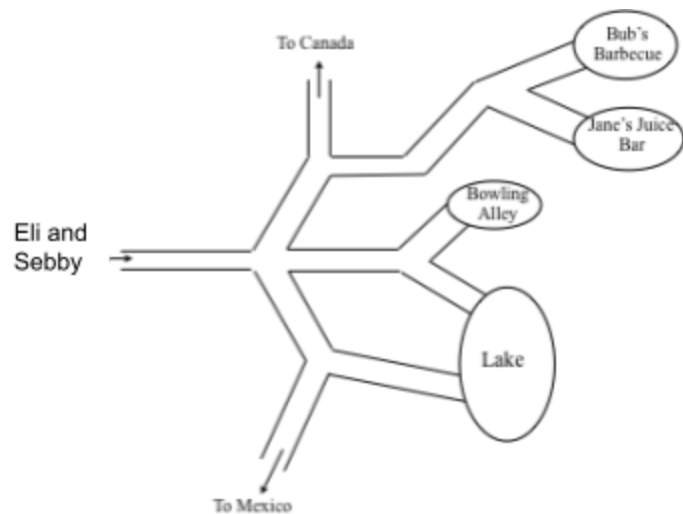
c)   What is the probability they end up by the lake?

Challenge problem C

A box contains apples and pears in a ratio of 5 : 4.

One third of the fruit is rotten. There are twice as many rotten pears as there are rotten apples. There are 30 non-rotten pears in the box. How many apples and how many pears are in the box?

A ▯▯▯▯▯

P ▯▯▯▯

Challenge Problem D

Each of the symbols below represents a "special" operation or rule.

For example, the ⅋ means "add the two numbers and then add 1."

Identify the rule for the "special" operation and then find the missing numbers in the special operations equations below.

a) $4 ⅋ 8 = 13$ b) $3 * 2 = 5$ c) $1 § 8 = 9$
        $2 ⅋ 8 = 11$ $5 * 4 = 19$ $8 § 1 = 65$
        $12 ⅋ 3 = 16$ $6 * 2 = 11$ $2 § 3 = 7$
        $15 ⅋ 3 = 19$ $2 * 6 = 11$ $3 § 2 = 11$
        $3 ⅋ 15 = ?$ $7 * 11 = ?$ $7 § 2 = ?$
        $? ⅋ 15 = 20$ $? * 6 = 65$ $? § 8 = 72$

ANSWER KEY

Recall that these are just answers….how did we get to these answers?
You need to do the thinking!

1.   23

2.   a) -6.6   b)   -21.4

3.   a)   5%   b) 78.9%   c)   104%

4. $3\frac{17}{20}$

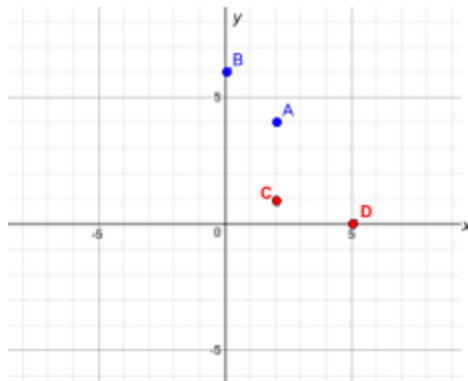5.   a)   15   b) 6   c)   20   d) $\frac{3}{8}$

6.   24

7.   a)   4   b) $6\frac{3}{40}$

8.   a)   64   b)   9   c)   50,000

9.   a)   n = -7   b)   y = 13   c) k = -2.5

10.   64 cm^2

11.   a, b)   c)   (2, 1)   d)   (5, 0)

12.   a)   -21   b)   22

13. $3\dfrac{3}{8}$

14. 25

15. a) x+3 ; 5(x+3) or 5x + 15

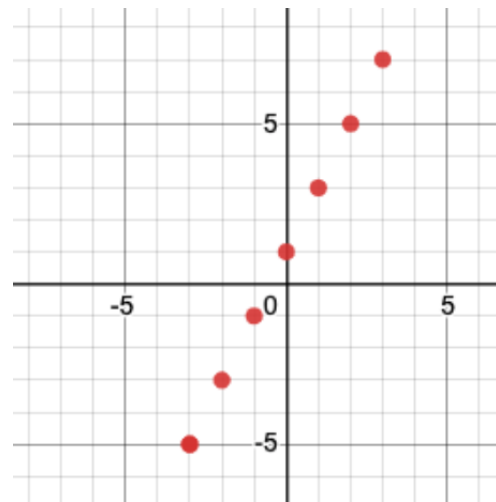16. $30 \div (3 + 7) - 2 = 1$

17. a) 28%   b) 80%

18. ? = 13

19. 16

20. x = 7

21.

x	y
-3	-5
-2	-3
-1	-1
0	1
1	3
2	5
3	7

22. a) 23   b) 31 , 43   c) 15 , 23   d) 13x+6 , 17x + 8
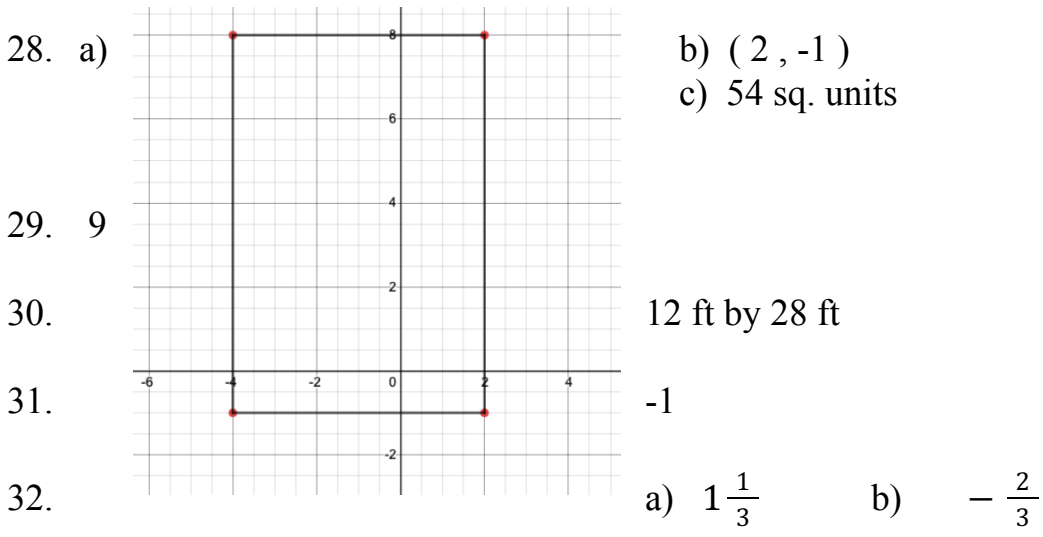
23. a) -29   b) -6   c) 24   d) 24

24. x = 3

25. a) 15   b) 40

26. $7\dfrac{1}{2}$ inches

27.   a) $3\frac{1}{3}$ b) $\frac{4}{15}$

28. a)

29. 9

30. 12 ft by 28 ft

31. -1

32. a) $1\frac{1}{3}$ b) $-\frac{2}{3}$

b) (2 , -1)
c) 54 sq. units

33. x = 13

34. $34

35. a) x = 20   b) x = 21

36.

¼	0.25	25%
⅖	0.4	40%
1 ½	1.5	150%
⅓	$0.3\overline{3}$	33 ⅓ %

37. x = 11

38. a) -2   b) -21

39. 32,089

40. a) x = 8 (or -8)   b) x=10   c = 49   d = 7

41. $3\frac{1}{2}m^2$

42.   x = 17

43.   n = 4

44.   360 miles

45.   x = -6

46.   a) $2\frac{1}{2}$ b) $\frac{4}{5}$

47.   63 sticks

48.   a) $220   b) $242

49.   a)   27   b)   -30

50.   x = 14

51.   40

52.   a)   6 hours   b)   4 hours   c)   16 gallons

53.   -1

54. $48

55.   11 square inches

56.   35 cups orange juice and 10 cups grapefruit juice

57.   a)   b) $70 + 4n = 9n$ c) $n = 14$

78	18
82	27
86	36
90	45
70 + 4n	9n

58. $\dfrac{1}{16}$ sq. ft.

59. 120

60. $4\dfrac{3}{8}$ cups

Optional Challenges:
A)   20
B)   a. $\dfrac{1}{12}$ b. $\dfrac{1}{6}$ c. $\dfrac{1}{3}$
C)   75 apples, 60 pears
D)   a. 19 , 4   b. 76 , 11 c. 51 , 8