

## Summer 2024

### Algebra 1 Summer Packet

All students entering Algebra 1 (not Algebra 1A/1B) must complete this packet before school starts. The use of apps or websites such as PhotoMath or Mathway, or the use of AI such as ChatGPT to solve problems is strictly prohibited and is a violation of the Honor Code. You may be tested at the teacher's discretion on any of the packet topics when school starts. You may ask for help from family, friends, or a tutor, and you may use the websites listed below to re-learn things you have forgotten, but the work in the packet must be your own. Use the provided answer key to check and correct your work.

The expectation in this course is that you show all of your work, and that your work be done neatly so that others can easily follow it. Make sure your 9's don't look like 4's, and your x's and y's are distinctly different. No work = no credit, and work that is not neat and legible will not be graded in this course.

Calculators are discouraged when working on this packet. We will not use calculators for at least the first semester of the school year.

If you can't remember how to do one or more of the skills in this packet, we recommend that you go to the following website. For each topic, there is an excellent quick review of how to do the skill with an example:

Big Ideas Math Skills Review (<https://www.bigideasmath.com/external/srh/2019/hs.html>)

We also recommend the following websites if you need more help with any of the topics:

[www.khanacademy.org](http://www.khanacademy.org)

[www.purplemath.com](http://www.purplemath.com)

[www.mathbitsnotebook.com](http://www.mathbitsnotebook.com)

[www.mathantics.com](http://www.mathantics.com)

For Algebra 1, the following materials will be required:

- Graphing calculator (TI-84 Plus or TI-84 Plus CE). Casio calculators are not permitted.
- Graph paper and loose leaf paper
- Pencils
- Colored pens or or colored pencils for correcting your work
- 6-inch ruler

**Pace yourself, and have a great summer!**

Name: \_\_\_\_\_

1. What is the prime factorization of 45?

2. What is the prime factorization of 140?

3. What is the greatest common factor of 24, 28, and 40?

4. What is the greatest common factor of 30, 22, and 8?

5. What is the greatest common factor of 32, 50, and 26?

6. Write three fractions equivalent to  $\frac{4}{20}$ . Scale the numerator and denominator up for the first two and down for the third.

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale down by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

7. Write three fractions equivalent to  $\frac{6}{18}$ . Scale the numerator and denominator up for the first two and down for the third.

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale down by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

8. Write three fractions equivalent to  $\frac{3}{9}$ . Scale the numerator and denominator up for the first two and down for the third.

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale up by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

Scale down by: \_\_\_\_\_ Equivalent fraction: \_\_\_\_\_

9. Simplify:  $\frac{16}{72}$

10. Simplify:  $\frac{36}{88}$

11. Simplify:  $\frac{45}{54}$

12. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{3}{10} - \frac{9}{8}$$

13. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{5}{8} + \frac{1}{20}$$

14. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{3}{20} + \frac{7}{16}$$

15. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{6}{19} - \frac{10}{19}$$

16. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{1}{9} + \frac{8}{27}$$

17. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{7}{6} \cdot \frac{1}{2}$$

18. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$\frac{1}{7} \div -\frac{2}{5}$$

19. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$-\frac{2}{7} \cdot -\frac{2}{5}$$

20. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$-\frac{9}{4} \div \frac{9}{2}$$

21. Compute:

$$1 - 6$$

22. Compute:

$$(-6) - 8$$

23. Compute:

$$-11 - 10$$

24. Compute:

$$9 - (-8)$$

25. Compute:

$$(-8) + 7$$

26. What is the value of the expression  $6y^2 + 8y - 9$   
when  $y = 2$ ?

27. What is the value of the expression  $w^2 + 3w - 10$   
when  $w = 7$ ?

28. Solve for  $z$ .

$$-6 + 3z = 6$$

29. Solve for  $y$ .

$$48 = 45 - \frac{y}{6}$$

30. Solve for  $y$ .

$$-42 - 11y = -97$$

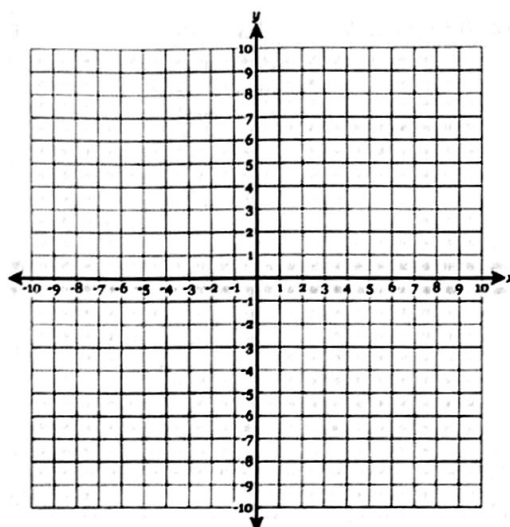
31. Solve for  $x$  and simplify your answer.

$$-1 = \frac{5}{2}x$$

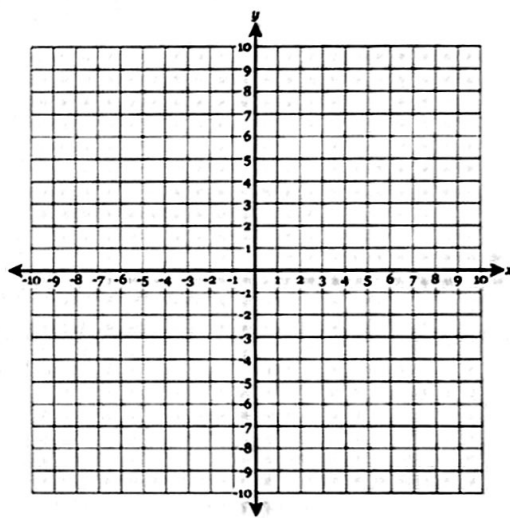
32. Solve for  $x$  and simplify your answer.

$$-\frac{4}{5}x = -10$$

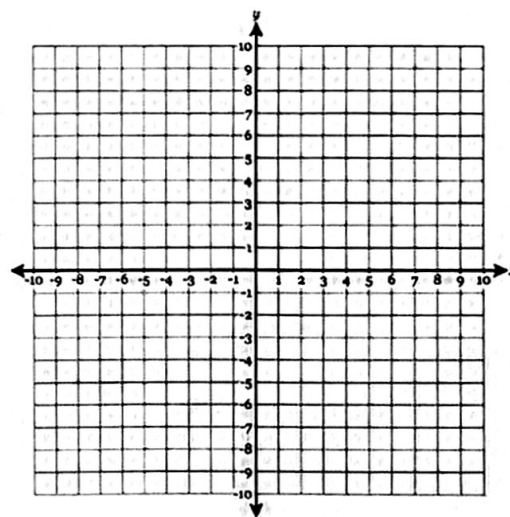
33. Plot the point  $(-4, -6)$ .



34. Plot the point  $(-2, 6)$ .



35. Plot the point  $(0, 3)$ .



36. Select the point which lies in the fourth quadrant.

- A.  $(-8, -1)$
- B.  $(-1, 8)$
- C.  $(7, -4)$
- D.  $(4, 4)$

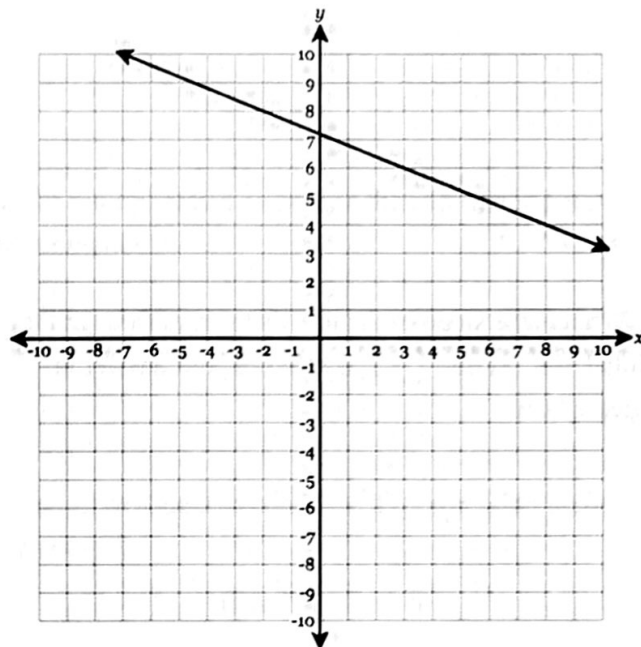
37. Select the point which lies in the third quadrant.

- A.  $(5, 2)$
- B.  $(-3, -3)$
- C.  $(-1, 7)$
- D.  $(7, -6)$

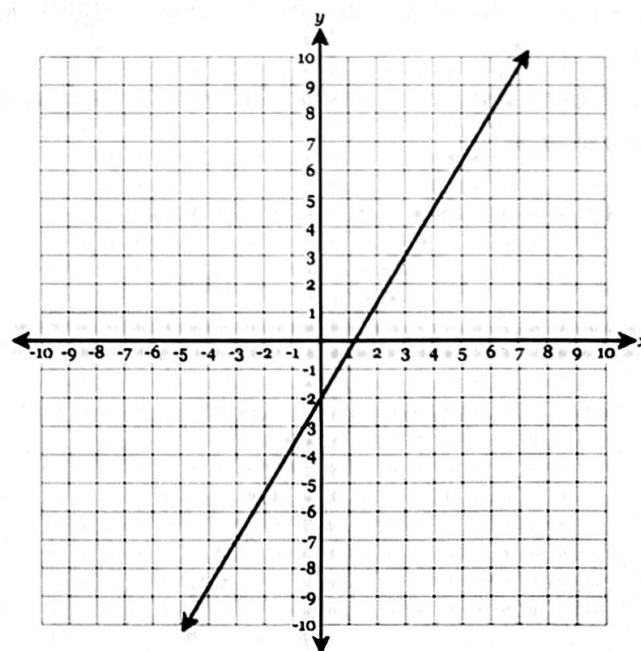
38. In which quadrant does the point  $(-2, 4)$  lie?

- A. Quadrant 1
- B. Quadrant 2
- C. Quadrant 3
- D. Quadrant 4

39. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



40. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



41. What is the slope of the line that passes through the points (5, 8) and (11, 5)? Write your answer in *simplest form*.

42. What is the slope of the line that passes through the points (-4, 2) and (-5, 0)? Write your answer in *simplest form*.

43. A triangle has side lengths of  $(6v + 3)$  centimeters,  $(2v + 5)$  centimeters, and  $(8w + 5)$  centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

- A.  $9v + 7 + 13w$     B.  $8w + 8v + 13$   
C.  $8v + 8 + 13w$     D.  $16v + 13w$

44. Combine like terms.

$$-5 - 2x^2 + 6 - 2y - 2y - 5x^2 + 6x^2$$

45. Combine like terms.

$$2y - y + 7 - 1 + 3 + 7x^2 - 4y$$

46. Write an equivalent expression by distributing the "-" sign outside the parentheses:

$$-10m - (-7.6n + 1)$$

47. Write an equivalent expression by distributing the "-" sign outside the parentheses:

$$-(-4.2r - s + 3.9)$$

48. Use the distributive property to write an equivalent expression.

$$8(10k - 10m + 1)$$

49. Use the distributive property to write an equivalent expression.

$$7(q - 4r + 1)$$

50. Rewrite in simplest terms:

$$10(-7k - 9m) + 4m - 5(3m + k)$$

51. Use multiplication to expand the expression below. Then compute.

$$3^4$$

52. Use multiplication to expand the expression below. Then compute.

$$2^5$$

53. Use an exponent to condense the expression below. Then compute.

$$6 \times 6 \times 6 \times 6$$

54. Use an exponent to condense the expression below. Then compute.

$$3 \times 3 \times 3 \times 3 \times 3$$

55. Use an exponent to condense the expression below. Then compute.

$$-10 \times -10 \times -10 \times -10$$



56. Use multiplication to expand the expression below.  
Then compute.

$$(-1)^3$$

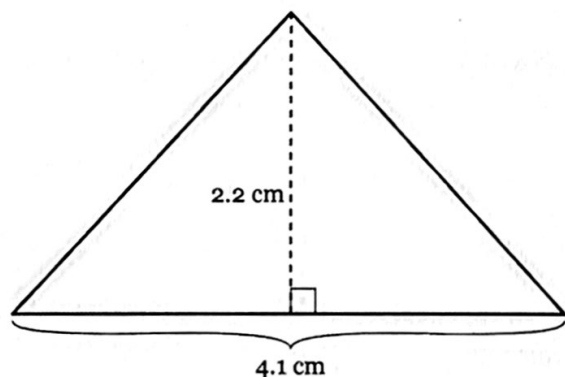
57. Use an exponent to condense the expression below.  
Then compute.

$$-6 \times -6$$

58. Use an exponent to condense the expression below.  
Then compute.

$$-4 \times -4$$

59. What is the area, in square centimeters, of the shape below?



60. Round 6.116 to the nearest tenth.

61. Round 9.5 to the nearest whole number.

62. Round 2.74 to the nearest tenth.

63. Round 0.283 to the nearest hundredth.

64. Round 4.88 to the nearest tenth.

65. Jackson has a points card for a movie theater.

- He receives 35 rewards points just for signing up.
- He earns 8.5 points for each visit to the movie theater.
- He needs 154 points for a free movie ticket.

Write and solve an equation which can be used to determine  $x$ , the number of visits Jackson must make to earn a free movie ticket.

66. Members of a softball team raised \$1186.50 to go to a tournament. They rented a bus for \$842.50 and budgeted \$21.50 per player for meals. Write and solve an equation which can be used to determine  $x$ , the number of players the team can bring to the tournament.

Name:

**ANSWER KEY**

1. What is the prime factorization of 45?

$$3 \times 3 \times 5 = 3^2 \times 5$$

2. What is the prime factorization of 140?

$$2 \times 2 \times 5 \times 7 = 2^2 \times 5 \times 7$$

3. What is the greatest common factor of 24, 28, and 40?

4

4. What is the greatest common factor of 30, 22, and 8?

2

5. What is the greatest common factor of 32, 50, and 26?

2

## Algebra 1 Summer Packet

6. Write three fractions equivalent to
- $\frac{4}{20}$
- . Scale the numerator and denominator up for the first two and down for the third.

Possible answers:

Scale up by: 2      Equivalent fraction:  $\frac{8}{40}$

Scale up by: 3      Equivalent fraction:  $\frac{12}{60}$

Scale down by: 4      Equivalent fraction:  $\frac{1}{5}$

7. Write three fractions equivalent to
- $\frac{6}{18}$
- . Scale the numerator and denominator up for the first two and down for the third.

Possible answers:

Scale up by: 2      Equivalent fraction:  $\frac{12}{36}$

Scale up by: 3      Equivalent fraction:  $\frac{18}{54}$

Scale down by: 6      Equivalent fraction:  $\frac{1}{3}$

8. Write three fractions equivalent to
- $\frac{3}{9}$
- . Scale the numerator and denominator up for the first two and down for the third.

Possible answers:

Scale up by: 2      Equivalent fraction:  $\frac{6}{18}$

Scale up by: 3      Equivalent fraction:  $\frac{9}{27}$

Scale down by: 3      Equivalent fraction:  $\frac{1}{3}$

9. Simplify:
- $\frac{16}{72}$

$$\frac{2}{9}$$

10. Simplify:
- $\frac{36}{88}$

$$\frac{9}{22}$$

11. Simplify:
- $\frac{45}{54}$

$$\frac{5}{6}$$

12. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{3}{10} - \frac{9}{8}$$

$$-\frac{33}{40}$$

13. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{5}{8} + \frac{1}{20}$$

$$\frac{27}{40}$$

14. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{3}{20} + \frac{7}{16}$$

$$\frac{47}{80}$$

15. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{6}{19} - \frac{10}{19}$$

$$-\frac{4}{19}$$

16. Evaluate the expression shown below and write your answer as a fraction in simplest form.

$$\frac{1}{9} + \frac{8}{27}$$

$$\frac{11}{27}$$

17. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{7}{6} \cdot \frac{1}{2}$$

$$\frac{7}{12}$$

18. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$\frac{1}{7} \div -\frac{2}{5}$$

$$-\frac{5}{14}$$

19. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$-\frac{2}{7} \cdot -\frac{2}{5}$$

$$\frac{4}{35}$$

20. Perform the operation and reduce the answer fully.  
Make sure to express your answer as a simplified fraction.

$$-\frac{9}{4} \div \frac{9}{2}$$

$$-\frac{1}{2}$$

21. Compute:

$$1 - 6$$

$$-5$$

22. Compute:

$$(-6) - 8$$

$$-14$$

23. Compute:

$$-11 - 10$$

$$-21$$

24. Compute:

$$9 - (-8)$$

$$17$$

25. Compute:

$$(-8) + 7$$

$$-1$$

26. What is the value of the expression  $6y^2 + 8y - 9$   
when  $y = 2$ ?

$$31$$

27. What is the value of the expression  $w^2 + 3w - 10$   
when  $w = 7$ ?

$$60$$

28. Solve for  $z$ .

$$-6 + 3z = 6$$

$$z = 4$$

29. Solve for  $y$ .

$$48 = 45 - \frac{y}{6}$$

$$y = -18$$

30. Solve for  $y$ .

$$-42 - 11y = -97$$

$$y = 5$$

31. Solve for  $x$  and simplify your answer.

$$-1 = \frac{5}{2}x$$

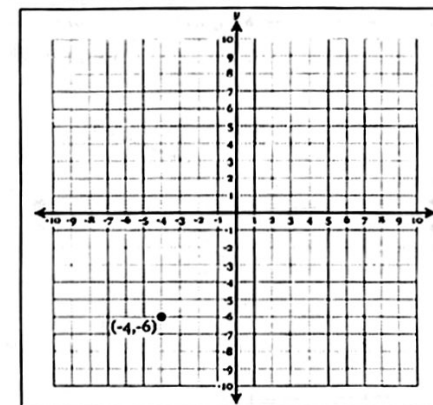
$$-\frac{2}{5} = x$$

32. Solve for  $x$  and simplify your answer.

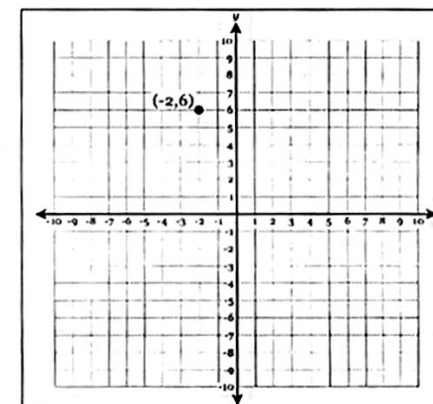
$$-\frac{4}{5}x = -10$$

$$x = \frac{25}{2}$$

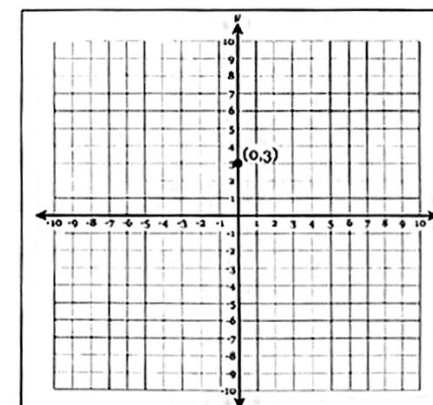
33. Plot the point  $(-4, -6)$ .



34. Plot the point  $(-2, 6)$ .



35. Plot the point  $(0, 3)$ .



36. Select the point which lies in the fourth quadrant.

- A.  $(-8, -1)$
- B.  $(-1, 8)$
- C.  $(7, -4)$
- D.  $(4, 4)$

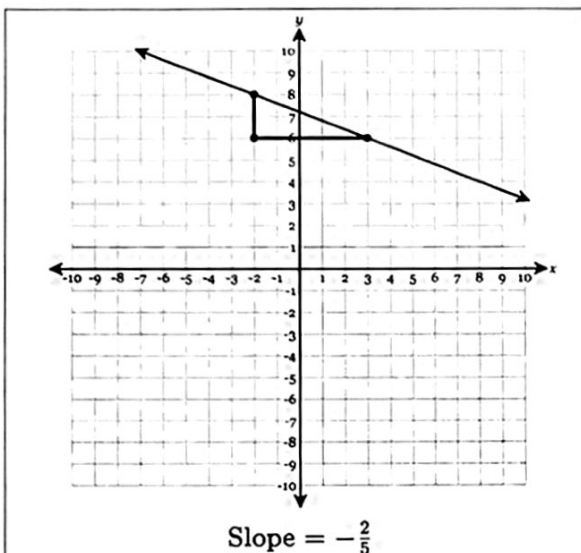
37. Select the point which lies in the third quadrant.

- A.  $(5, 2)$
- B.  $(-3, -3)$
- C.  $(-1, 7)$
- D.  $(7, -6)$

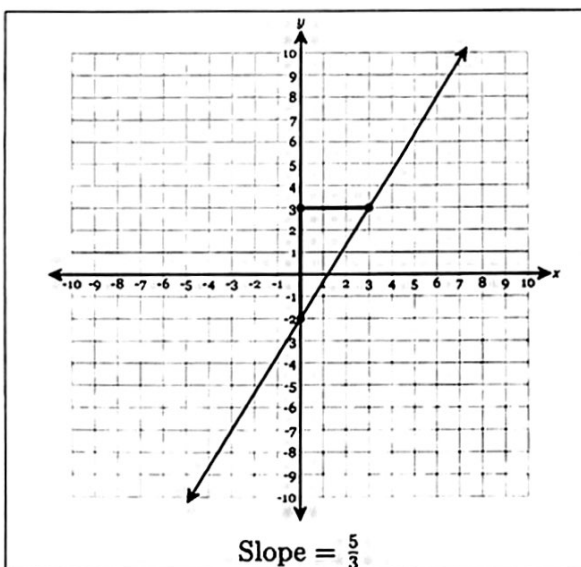
38. In which quadrant does the point  $(-2, 4)$  lie?

- A. Quadrant 1
- B. Quadrant 2
- C. Quadrant 3
- D. Quadrant 4

39. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



40. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.



41. What is the slope of the line that passes through the points  $(5, 8)$  and  $(11, 5)$ ? Write your answer in simplest form.

$$-\frac{1}{2}$$

42. What is the slope of the line that passes through the points  $(-4, 2)$  and  $(-5, 0)$ ? Write your answer in simplest form.

$$2$$

43. A triangle has side lengths of  $(6v + 3)$  centimeters,  $(2v + 5)$  centimeters, and  $(8w + 5)$  centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

- A.  $9v + 7 + 13w$
- B.  $8w + 8v + 13$
- C.  $8v + 8 + 13w$
- D.  $16v + 13w$

44. Combine like terms.

$$-5 - 2x^2 + 6 - 2y - 2y - 5x^2 + 6x^2$$

$$1 - x^2 - 4y$$

45. Combine like terms.

$$2y - y + 7 - 1 + 3 + 7x^2 - 4y$$

$$-3y + 9 + 7x^2$$

46. Write an equivalent expression by distributing the "-" sign outside the parentheses:

$$-10m - (-7.6n + 1)$$

$$-10m + 7.6n - 1$$

47. Write an equivalent expression by distributing the "-" sign outside the parentheses:

$$-(-4.2r - s + 3.9)$$

$$4.2r + s - 3.9$$

48. Use the distributive property to write an equivalent expression.

$$8(10k - 10m + 1)$$

$$80k - 80m + 8$$

49. Use the distributive property to write an equivalent expression.

$$7(q - 4r + 1)$$

$$7q - 28r + 7$$

50. Rewrite in simplest terms:

$$10(-7k - 9m) + 4m - 5(3m + k)$$

$$-75k - 101m$$

51. Use multiplication to expand the expression below. Then compute.

$$3^4$$

$$3 \times 3 \times 3 \times 3 = 81$$

52. Use multiplication to expand the expression below. Then compute.

$$2^5$$

$$2 \times 2 \times 2 \times 2 \times 2 = 32$$

53. Use an exponent to condense the expression below. Then compute.

$$6 \times 6 \times 6 \times 6$$

$$6^4 = 1296$$

54. Use an exponent to condense the expression below. Then compute.

$$3 \times 3 \times 3 \times 3 \times 3$$

$$3^5 = 243$$

55. Use an exponent to condense the expression below. Then compute.

$$-10 \times -10 \times -10 \times -10$$

$$(-10)^4 = 10000$$

56. Use multiplication to expand the expression below. Then compute.

$$(-1)^3$$

$$-1 \times -1 \times -1 = -1$$

57. Use an exponent to condense the expression below. Then compute.

$$-6 \times -6$$

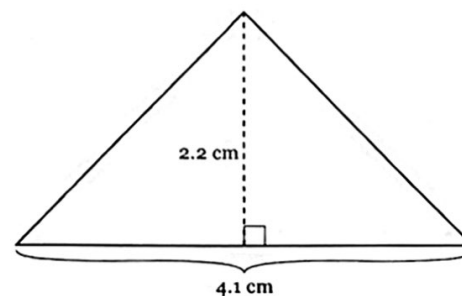
$$(-6)^2 = 36$$

58. Use an exponent to condense the expression below. Then compute.

$$-4 \times -4$$

$$(-4)^2 = 16$$

59. What is the area, in square centimeters, of the shape below?



$$A = 4.51 \text{ cm}^2$$

60. Round 6.116 to the nearest tenth.

$$6.1$$

61. Round 9.5 to the nearest whole number.

$$10$$

62. Round 2.74 to the nearest tenth.

$$2.7$$

63. Round 0.283 to the nearest hundredth.

$$0.28$$

64. Round 4.88 to the nearest tenth.

$$4.9$$

65. Jackson has a points card for a movie theater.

- He receives 35 rewards points just for signing up.
- He earns 8.5 points for each visit to the movie theater.
- He needs 154 points for a free movie ticket.

Write and solve an equation which can be used to determine  $x$ , the number of visits Jackson must make to earn a free movie ticket.

$$\text{Answer: } x = 14$$

66. Members of a softball team raised \$1186.50 to go to a tournament. They rented a bus for \$842.50 and budgeted \$21.50 per player for meals. Write and solve an equation which can be used to determine  $x$ , the number of players the team can bring to the tournament.

$$\text{Answer: } x = 16$$