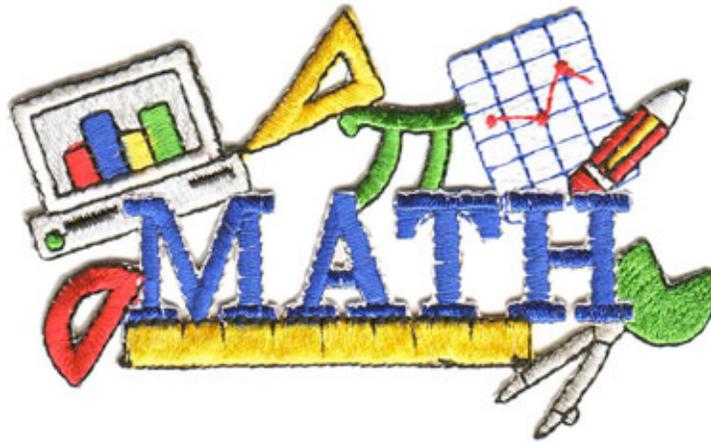


# 6th Grade Math

## Benchmark 3

# Parent Handbook



*This handbook will help your child review material learned this quarter, and will help them prepare for their third Benchmark Test. Please allow your child to work independently through the material, and then you can check their work using the answer key in the back of the handbook. If you have any questions or concerns about this material, please contact your child's teacher.*

*Thank you for your support.*

## Sixth Grade Benchmark #3

### Math Essential Standards

#### Learning Objective #1:

 "Use variables to represent two quantities that change in relationship to one another to solve mathematical problems and problems in real-world context. Write an equation to express one quantity (the dependent variable) in terms of the other quantity (the independent variable). Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation."

#### Practice:

1. The table below shows the cost of different numbers of entrance tickets to the zoo. Write the equation the best represents the relationship between the number of tickets,  $T$ , and their cost,  $C$ ?

Number of Tickets	Cost (\$)
2	8
4	16
5	20
8	32

- a.  $C = 4 + T$
- b.  $C = 4T$
- c.  $T = 4C$
- d.  $C = T/4$

2. The table below shows the cost of going skating at the local skate park. Skates must be rented and the fee is \$3 fee. In addition, it costs \$2 per hour to skate. According to the chart, which equation best represents the relationship between hours skating,  $H$ , and the cost,  $C$ , to skate?

Hours	Cost (\$)
0	3
2	7
4	11
5	13

- a.  $H = 2C + 3$
- b.  $C = 3H + 1$
- c.  $C = 3H - 1$
- d.  $C = 2H + 3$

3. If Mary starts with \$10 in her savings account and wants to add \$20 each week to save for a new phone that costs \$150, how many weeks will she need to save before she has enough money? Write an equation that represents how Mary will save her money.

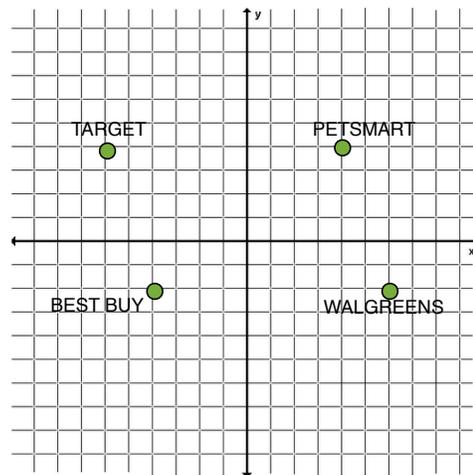
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**Learning Objective #2:**

 "Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques to solve mathematical problems and problems in a real-world context."

**Practice:**

Use the map to answer Questions 4 - 6. The coordinates are represented on the grid with a unit of 5 city blocks.



4. How many city blocks is it from Target to Petsmart?

- a. 50 blocks
- b. 10 blocks
- c. 45 blocks
- d. 9 blocks

5. How many city blocks is it from Best Buy to Walgreens?

- a. 10 blocks
- b. 50 blocks
- c. 45 blocks
- d. 9 blocks

6. If the coordinates representing Target, Petsmart, Best Buy and Walgreens are connected, what polygon is formed? Using the formula: Base x Height, what is the area of the polygon?

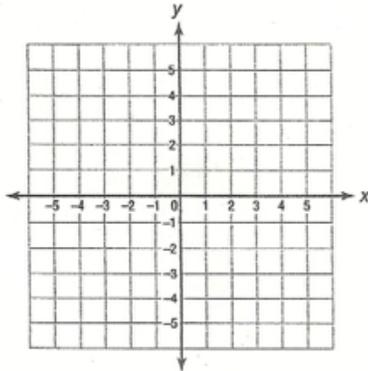
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**Learning Objective # 3:**

📌 **“Solve mathematical problems and problems in real-world context by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.”**

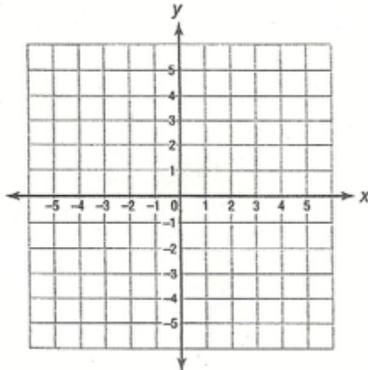
**Practice:**

7. If the points  $(5, 5)$ ,  $(-3, 5)$ , and  $(-3, -3)$  on a coordinate plane are the vertices of a rectangle, what are the coordinates of the fourth vertex?



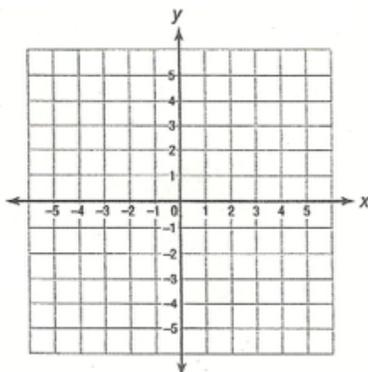
- a.  $(-3, 5)$
- b.  $(-5, -3)$
- c.  $(5, -3)$
- d.  $(-3, -5)$

8. If the points  $(-2, 4)$ ,  $(-2, -2)$ , and  $(2, -2)$  on a coordinate plane are the vertices of a right triangle, what is the height of the triangle?



- a. 6 units
- b. 4 units
- c. 5 units
- d. 10 units

9. If the coordinates of two vertices of a square are  $(3, 3)$  and  $(-2, -2)$ , what are the coordinates of the other two vertices?



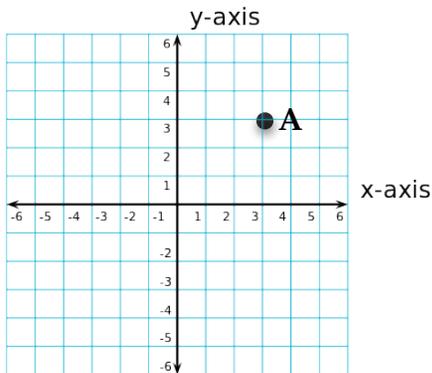
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**Learning Objective #4:**

 "Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates."

**Practice:**

Use the graph below to answer Questions 10 - 13.



10. What are the coordinates for Point A?

- a. (-3, 3)
- b. (3, -3)
- c. (3, 2)
- d. (3, 3)

11. What quadrant is Point A in?

\_\_\_\_\_

12. If you reflect Point A across the y-axis, what are the coordinates?

- a. (-3, 3)
- b. (3, 3)
- c. (3, -3)
- d. (-3, -3)

13. If you reflect Point A across the x-axis, what are the coordinates?

- a. (-3, 3)
- b. (3, 3)
- c. (3, -3)
- d. (-3, -3)

**Learning Objective #5:**

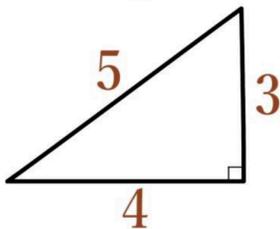
 "Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques to solve mathematical problems and problems in real-world context."

**Practice:**

14. The area of a rectangular pool is 132 square feet. The width of the pool is 11 feet. What is the length?

- a. 11 feet
- b. 12 feet
- c. 12 square feet
- d. 11 square feet

15. What is the area of the right triangle below?

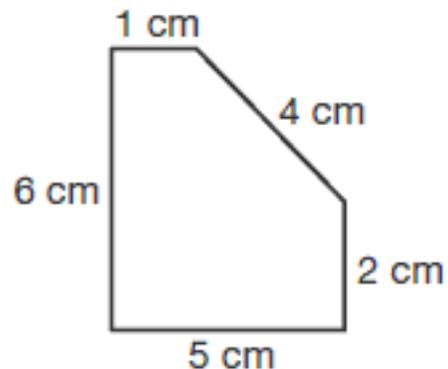


- a. 6 square units
- b. 10 square until
- c. 12 square units
- d. 20 square units

16. What is the area of a triangle with a base of 10 inches and a height of 9 inches?

- a. 90 square inches
- b. 45 inches
- c. 45 square inches
- d. 90 inches

17. Divide the following irregular polygon into triangle(s) and rectangle(s) to determine the area.



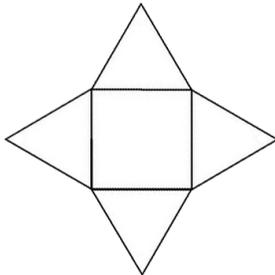
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**Learning Objective # 6:**

 "Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques to solve mathematical problems and problems in real-world context."

*Practice:*

18. The following net represents which type of solid?



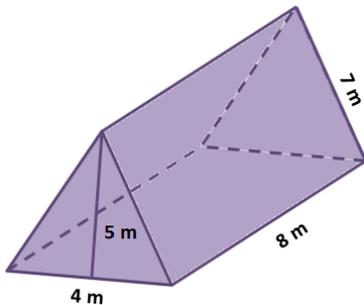
- a. square pyramid
- b. triangular prism
- c. triangular pyramid
- d. cube

19. How many vertices does the figure above (Question #18) have?

- a. 8
- b. 5
- c. 4
- d. 6

20. What is the surface area of a cube with an edge length of 3 cm?

- a. 9 square centimeters
- b. 36 square centimeters
- c. 27 square centimeters
- d. 54 square centimeters



21. Create a net for the given triangular prism above. Then use the net to calculate the surface area of the solid.

**SA =** \_\_\_\_\_

**Learning Objective #7:**

 "Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Understand and use the formula  $V = B \cdot h$ , where in this case,  $B$  is the area of the base ( $B = l \times w$ ) to find volumes of right rectangular prisms with fractional edge lengths in mathematical problems and problems in real-world context."

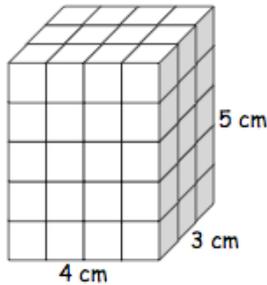
**Practice:**

**Apply the formula  $V = l \cdot w \cdot h$  OR  $V = B \cdot h$  to calculate volume.**

22. Julie has a toy box that measure 4 feet x 5 feet x 2.5 feet. What is the volume of Julie's box?

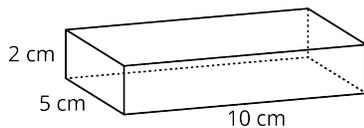
- a. 40 feet<sup>3</sup>
- b. 500 feet<sup>3</sup>
- c. 50 feet<sup>3</sup>
- d. 25 feet<sup>3</sup>

23. What is the volume of the rectangular prism below?



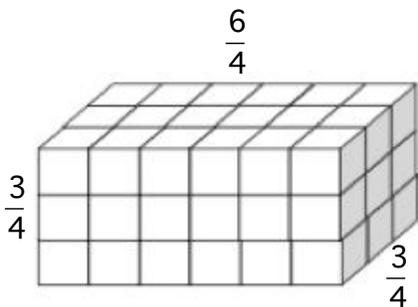
- a. 60 feet<sup>3</sup>
- b. 50 feet<sup>3</sup>
- c. 45 feet<sup>3</sup>
- d. 12 feet<sup>3</sup>

24. What is the volume of the rectangular prism below?



- a. 117 cm<sup>3</sup>
- b. 20 cm<sup>3</sup>
- c. 30 cm<sup>3</sup>
- d. 100 cm<sup>3</sup>

25. What is the volume of the rectangular prism below?



$V =$  \_\_\_\_\_

## Benchmark 3 Essential Math Vocabulary

- ◆ **equation** - A mathematical statement that represents the equality of two expressions involving either constants, variable(s), or both.
- ◆ **input/output chart** - A table that lists independent (x) values and corresponding dependent (y) values.
- ◆ **independent variable** - A variable that can change its value freely and first without being affected by any other variable(s) for its value. Usually, an independent variable is the input to a function and is normally denoted by the symbol  $x$ .
- ◆ **dependent variable** - The output number of a function. Its value depends on the given function and the chosen value(s) for the independent variable(s). Usually, a dependent variable is the output to a function and is normally denoted by the symbol  $y$ .
- ◆ **graph** - To draw a representation of a given mathematical function.
- ◆ **coordinate plane** - A plane formed by the intersection of a horizontal number line called the  $x$ -axis and a vertical number line called the  $y$ -axis.
- ◆ **coordinate points** - An ordered set of numbers on the  $x$ -axis and  $y$ -axis that locate an exact location on a two-dimensional plane.
- ◆ **quadrants** - One of the four sections into which the coordinate plane is divided by the  $x$ - and  $y$ -axes.
- ◆ **vertex** - A point at which the two rays of an angle meet or the intersection point of two sides of a plane figure.
- ◆ **polygon** - A closed plane figure bounded by at least three line segments.
- ◆ **regular polygon** - A polygon which is equiangular and equilateral.
- ◆ **irregular polygon** - A polygon whose interior angles are not equal and / or its sides are not equal in length.
- ◆ **area** - A two-dimensional space measured by the number of square units that can fit into the space.
- ◆ **net** - A two-dimensional representation of the surface of a three-dimensional figure.
- ◆ **surface area** - A measure of the amount of area (in square units) on the surface of a three-dimensional solid.
- ◆ **formula** - A general mathematical equation that relates two or more terms or values.
- ◆ **prism** - A three-dimensional figure made up of two parallel congruent faces and lateral faces that are parallelograms.
- ◆ **rectangular prism** - A solid (3-dimensional) object which has six faces that are rectangles.
- ◆ **cube** - A rectangular prism with six congruent square faces.

- ◆ **triangular prism** - A prism whose bases are triangles.

## **Benchmark 3 Essential Math Vocabulary**

- ◆ **square pyramid** - A pyramid that has a square base and four congruent triangular faces.
- ◆ **square units** - The area of a square each of whose sides measures 1 unit. It is used to measure area.
- ◆ **volume** - The measurement of the amount of space contained in a solid figure. Determining the volume of a space is equivalent to finding out how many standard cubic units it takes to fill that space.
- ◆ **cubic units** - A unit for measuring volume. All 6 faces of a cubic unit are square, and all 12 edges are one unit in length.

## Math ANSWER KEY

1. B
2. D
3. 7 weeks;  $y = 20x + 10$
4. A
5. B
6. parallelogram; 1,500 square blocks
7. C
8. A
9. (3, -2) and (-2, 3)
10. D
11. Quadrant I
12. A
13. C
14. B
15. A
16. C
17. 22 square cm
18. A
19. B
20. D
21. 116 m<sup>2</sup> and
22. C
23. A
24. D
25.  $\frac{27}{32}$  cubic units OR 0.84375 cubic units

Question 21 Net

