

## 2021 Grade: 8 Algebra 1 H Summer Practice

Below is optional summer practice for those students who are interested in reinforcing concepts covered during this past school year. The purpose is to give students the opportunity to practice previously learned material based on the standards for the completed grade level and to maintain a solid mathematical foundation to adequately prepare for the 2021-2022 school year. Please note that these problems are optional.

### NO CALCULATORS

#### Section 1

---

Solve each equation.

1.  $a - 10 = 12$

2.  $-3x = 27$

3.  $6n + 3 = 21$

4.  $10 = \frac{m}{5} + 2$

5.  $-b + 2 = -\frac{1}{2}$

6.  $7g - 4 = 10$

Simplify each expression.

7.  $6x + 4 - 3x$

8.  $7(h - 5)$

9.  $13q + 91 - 13q$

10.  $-(8z + 2z - 1)$

Solve each equation.

11.  $16 = -(2 - 2b)$

12.  $0 = 1.5(7 - k) - k$

13.  $123 = 9y + 4 - 7y$

14.  $4(2.2d - 1) - 0.8d = 23$

15.  $2(x + 3) = 2x + 2 + 4$

16.  $4y - (y - 3) = 3(y + 4)$

## Section 2

---

Write the fraction in simplest form.

1.  $\frac{20}{25}$

2.  $\frac{7}{77}$

3.  $\frac{-9}{42}$

4.  $\frac{36}{63}$

Write each decimal as a mixed number or fraction in simplest form.

5. 0.45

6. 12.2

7.  $0.\bar{8}$

Compare. Write  $<$ ,  $=$ , or  $>$ .

8.  $\frac{25}{36}$  \_\_\_\_\_  $0.6\bar{94}$

9. 2.7 \_\_\_\_\_  $\frac{10}{3}$

10. -4.3 \_\_\_\_\_ -4.2

11.  $\frac{-17}{5}$  \_\_\_\_\_ -15.9

Simplify. Write each answer in simplest form.

12.  $-\frac{3}{8} + \frac{7}{8}$

13.  $3\frac{1}{2} - (-\frac{11}{14})$

14.  $\frac{-3}{7} \cdot \frac{5}{9}$

15.  $-4\frac{5}{24} \cdot (-6)$

$$16. -2\frac{1}{2} \div 6$$

$$17. -25 \div \frac{5}{7}$$

Evaluate each expression.

$$18. -3^2 - (-8)$$

$$19. (-2)^3 + 4 \div 2 - 3$$

$$20. (3 - 4)^5 - 17 + 1^{12}$$

$$21. 2r^2 + 6r - 7 \text{ for } r = -9$$

$$22. -c^3 + 2c^2 - c + 8 \text{ for } c = 3$$

Section 3 - Calculator Allowed for this Section.

Identify each number as *rational* or *irrational*.

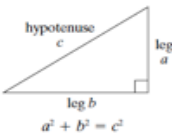
$$1. 1.020304$$

$$2. \sqrt{25}$$

$$3. \sqrt{26}$$

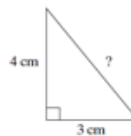
$$4. 5.63\overline{663}$$

Use the Pythagorean theorem to find the hypotenuse of the right triangle from the given lengths of the two legs.

<p><i>The Pythagorean Theorem</i></p> <p>The sum of the squares of the lengths of the legs of a right triangle is equal to the square of the length of the hypotenuse.</p>	
--	--

Example 1: Find the length of the hypotenuse.

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3^2 + 4^2 &= c^2 \\ 9 + 16 &= c^2 \\ 25 &= c^2 \\ \sqrt{25} &= c \\ 5 &= c \end{aligned}$$



$$5. 3,4$$

$$6. 10,24$$

$$7. \sqrt{2}, \sqrt{7}$$

Given leg  $l$  and hypotenuse  $h$  determine the length of the missing leg of the right triangle.

$$8. l = 7, h = 25$$

$$9. l = 7.5, h = 12.5$$

Multiply. Write your answer in scientific notation.

$$10. (1 \times 10^3)(2.6 \times 10^8)$$

$$11. (7 \times 10^2)(8 \times 10^{10})$$

**Simplify each expression.**

12.  $(-4x^2)(3x^4)$

13.  $4x^2(2x - 7)$

14.  $\frac{4^7}{4^5}$

15.  $\frac{x^{15}}{x^{12}}$

16.  $2^{-3}$

17.  $\frac{6y^3}{2y^8}$

18.  $(2x^3)^4$

19.  $(9x^3)(2x^2)^3$

**Write each number in scientific notation.**

20. 400,000,000

21. 8,750,000

22. 0.00000021

23. 0.0345

## Section 4

### Constructed Response Tasks---Calculator Allowed for this Section.

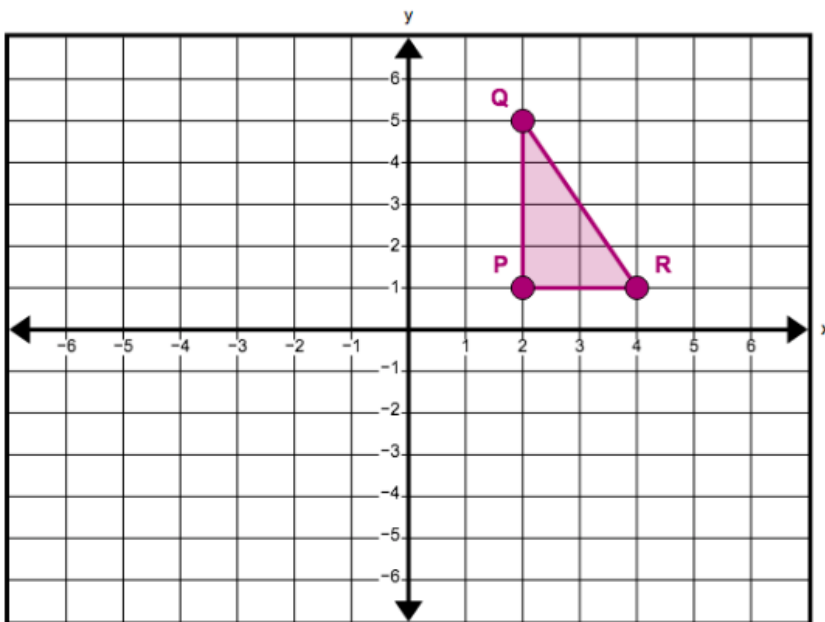
---

Respond fully to each task. Be sure to show all work.

1.

#### Part A

The coordinate plane shows a triangle with the coordinates  $(2, 1)$ ,  $(2, 5)$ , and  $(4, 1)$ . Plot the coordinates of the image of the triangle after it is translated 4 units left and 2 units up about the origin.



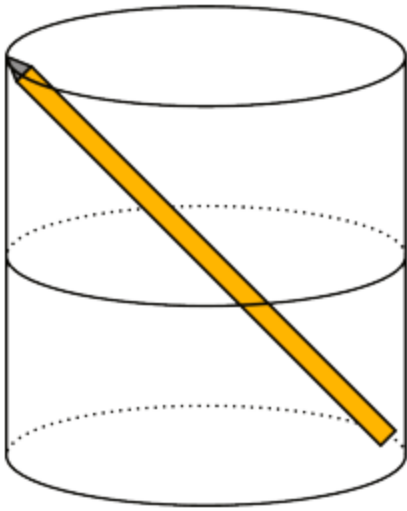
#### Part B

Write the motion rule for the transformation using arrow notation.

#### Part C

If the image was then reflected over the x-axis, would it still be congruent to the original triangle? Explain.

2. Elena wonders how much water it would take to fill her cup. She drops her pencil in her cup and notices that it just fits diagonally (see the diagram below). The pencil is 17 cm long and the cup is 15 cm tall. How much water can the cup hold? Show your work and explain your reasoning.



3. A family purchased tickets to a museum and spent a total of \$38.00. The family purchased 4 tickets. There was a \$1.50 processing fee for each ticket. Write and solve an equation that can be used to find  $x$ , the cost of one ticket to the museum. Show your work and explain your answer.

4. A teacher writes the following expression on the board.

$$12.2x + 50.6y + 3(1.4x - 2.6y)$$

### Part A

A student writes the two expressions shown below:

Expression 1:  $4(4.1x + 10.7y)$

Expression 2:  $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true or false. Show your work for both expressions and explanation below.

### Part B

A different student claims that the expression  $59.2xy$  is equivalent to the teacher's expression. The student's reasoning is below.

*The expression  $59.2xy$  is equivalent to the teacher's expression because both expressions have the same value when  $x = 1$  and  $y = 1$ . This means that the two expressions are equivalent.*

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for  $x$  and  $y$  to support your answer.

Write your answer and explanation below.