



May 2023

### Summer Math Work: Algebra 3 w/Trigonometry

We hope you are enjoying your summer but are also thinking about how to have a great school year next year.

The attached problem set is intended to address algebra topics needed for success. **All Algebra 3 w/Trigonometry students are required to complete the problem set to be turned in to their teacher as a homework assignment when returning to school in the fall.** This is the “summer reading” for your mathematics course. Be sure to show your work clearly in completing the problems.

If you find that there are specific topics that you need to review in more depth, you may want to spend some time doing so. Please consider this in planning your time to work.

You are welcome to receive help on any of the problems or topics covered. Indeed, if you have difficulty, we encourage you to work with a parent, older sibling, friend, or teacher so that you master each topic. You may consult a textbook or online resource if you wish as you work through the problems. **Be sure, however, to show all your work, and that you understand all the work you present. Note that you will have a graded classroom test on this material shortly after the start of school in September.**

We do not expect this packet to be a burden for you. However, we know that reviewing these topics will put you in a much better position to succeed in Algebra 3 w/Trigonometry.

Best wishes for a happy rest of the summer.

*The work in this packet was completed independently by my daughter.*

Parent Signature \_\_\_\_\_

*Please **DO NOT** use a calculator in completing this packet.*

REMEMBER TO WORK ON ABOUT TEN PROBLEMS EACH WEEK SO YOUR BRAIN CAN STAY MATHEMATICALLY ACTIVE ALL SUMMER LONG. THANK YOU!

## Section 1: Simplifying Expressions

Simplify the following expressions by adding, subtracting, multiplying, and dividing where necessary.

1.  $4x(x - 7) - 8x^2$

2.  $(x^2 + 4x + 5) - (3x - 3)$

3.  $(3x + 1)(2x + 5)$

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

## Section 2: Factoring Polynomials

Completely factor the following polynomials. Using the method specified. Factor out the Greatest Common Factor.

5.  $3x^2 - 18x$

6.  $-5rs - 15r^2s + 10rt$

Factor using the Difference of Squares. If the expression is not factorable, write not factorable.

7.  $x^2 - 36$

8.  $4x^2 - 25$

9.  $x^2 + 81$

Factor each into two binomials (remember to check for a GCF first).

10.  $x^2 + 7x + 10$

11.  $x^2 + 10x + 25$

12.  $4x^2 - 8x - 32$

13.  $3x^2 - 11x - 4$

### Section 3: Integer Exponents

Simplify each expression using the Laws of Exponents, express the answer so all exponents are positive.

14.  $(8x^3)^2$

15.  $\frac{x^{-2}y^3}{xy^4}$

16.  $\left(\frac{3x}{4y^2}\right)^{-2}$

### Section 4: Simplifying Radicals

Simplify each expression.

17.  $\sqrt{50}$

18.  $\sqrt[3]{-64}$

19.  $\sqrt{125x^3}$

20.  $2\sqrt{3} + 5\sqrt{3}$

21.  $6\sqrt{12} - 4\sqrt{3}$

22.  $3\sqrt{3} \cdot 4\sqrt{15}$

## Section 5: Solving Linear Equations

Solve the following equations. Check your solution.

23.  $4x - 8 = 2(x - 5)$

24.  $\frac{x}{6} = \frac{9}{2}$

25.  $8x - (3x + 2) = 3x - 10$

26.  $x(2x - 3) = (2x + 1)(x - 4)$

## Section 6: Writing and graphing linear equations.

Slope Formula:  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-Intercept Form:  $y = mx + b$

Point-Slope Form:  $y - y_1 = m(x - x_1)$

Write the slope-intercept form of the equation of the line that passes through the given points.

27. Through:  $(-2, -4)$  and  $(-1, 4)$

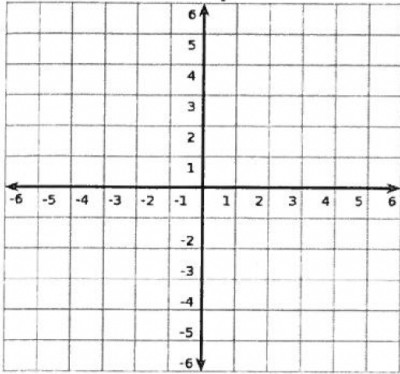
28. Through:  $(0, -2)$  and  $(4, 4)$

29. Write the equation of the line that is parallel to  $y = 2x + 2$  and passes through  $(-1, -2)$ .

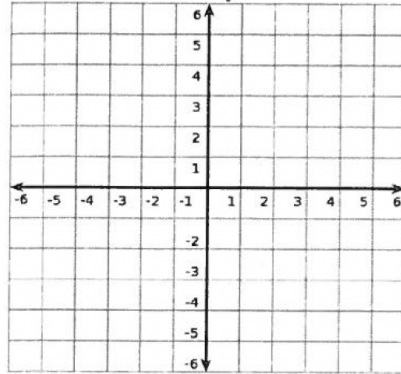
30. Write the equation of the line that is perpendicular to  $y = \frac{1}{4}x - 5$  and passes through  $(1, 1)$ .

Graph the equation.

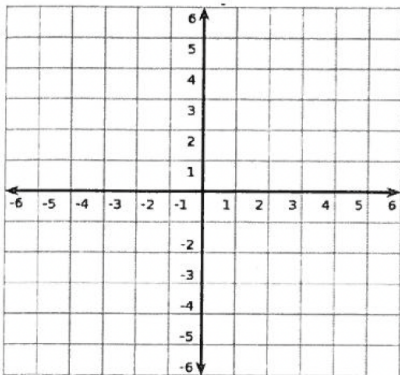
31.  $y = -\frac{2}{3}x + 2$



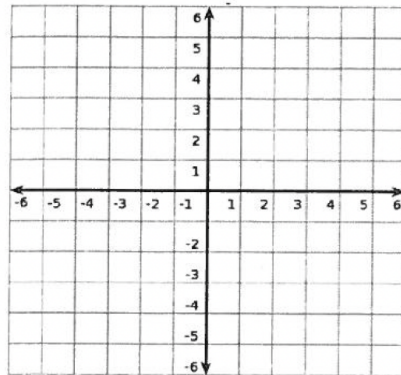
32.  $12 - 4y = -4x$



33.  $y = -4$



34.  $x = 3$



### Section 7: Geometry Review

Find the missing side of the following right triangles using Pythagorean's Theorem.

35.  $a = 2, b = 2, c = ?$

36.  $a = 8, c = 10, b = ?$

37. Find the area of the triangle in #36.



## SAT Practice No Calculator

1

If  $5x + 6 = 10$ , what is the value of  $10x + 3$  ?

- A) 4
- B) 9
- C) 11
- D) 20

2

$$\begin{aligned}x + y &= 0 \\ 3x - 2y &= 10\end{aligned}$$

Which of the following ordered pairs  $(x, y)$  satisfies the system of equations above?

- A)  $(3, -2)$
- B)  $(2, -2)$
- C)  $(-2, 2)$
- D)  $(-2, -2)$

3

A landscaping company estimates the price of a job, in dollars, using the expression  $60 + 12nh$ , where  $n$  is the number of landscapers who will be working and  $h$  is the total number of hours the job will take using  $n$  landscapers. Which of the following is the best interpretation of the number 12 in the expression?

- A) The company charges \$12 per hour for each landscaper.
- B) A minimum of 12 landscapers will work on each job.
- C) The price of every job increases by \$12 every hour.
- D) Each landscaper works 12 hours a day.

5

$$\sqrt{2k^2 + 17} - x = 0$$

If  $k > 0$  and  $x = 7$  in the equation above, what is the value of  $k$  ?

- A) 2
- B) 3
- C) 4
- D) 5



9

The graph of a line in the  $xy$ -plane has slope 2 and contains the point  $(1, 8)$ . The graph of a second line passes through the points  $(1, 2)$  and  $(2, 1)$ . If the two lines intersect at the point  $(a, b)$ , what is the value of  $a + b$  ?

- A) 4
- B) 3
- C) -1
- D) -4

10

Which of the following equations has a graph in the  $xy$ -plane for which  $y$  is always greater than or equal to  $-1$  ?

- A)  $y = |x| - 2$
- B)  $y = x^2 - 2$
- C)  $y = (x - 2)^2$
- D)  $y = x^3 - 2$

11

Which of the following complex numbers is equivalent to  $\frac{3 - 5i}{8 + 2i}$  ? (Note:  $i = \sqrt{-1}$ )

- A)  $\frac{3}{8} - \frac{5i}{2}$
- B)  $\frac{3}{8} + \frac{5i}{2}$
- C)  $\frac{7}{34} - \frac{23i}{34}$
- D)  $\frac{7}{34} + \frac{23i}{34}$

12

$$R = \frac{F}{N + F}$$

A website uses the formula above to calculate a seller's rating,  $R$ , based on the number of favorable reviews,  $F$ , and unfavorable reviews,  $N$ . Which of the following expresses the number of favorable reviews in terms of the other variables?

- A)  $F = \frac{RN}{R - 1}$
- B)  $F = \frac{RN}{1 - R}$
- C)  $F = \frac{N}{1 - R}$
- D)  $F = \frac{N}{R - 1}$



13

What is the sum of all values of  $m$  that satisfy  $2m^2 - 16m + 8 = 0$  ?

- A)  $-8$
- B)  $-4\sqrt{3}$
- C)  $4\sqrt{3}$
- D)  $8$

16

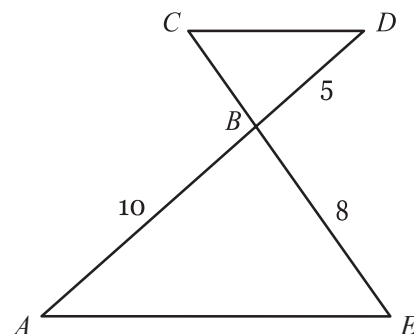
The sales manager of a company awarded a total of \$3000 in bonuses to the most productive salespeople. The bonuses were awarded in amounts of \$250 or \$750. If at least one \$250 bonus and at least one \$750 bonus were awarded, what is one possible number of \$250 bonuses awarded?

17

$$2x(3x + 5) + 3(3x + 5) = ax^2 + bx + c$$

In the equation above,  $a$ ,  $b$ , and  $c$  are constants. If the equation is true for all values of  $x$ , what is the value of  $b$  ?

18



In the figure above,  $\overline{AE} \parallel \overline{CD}$  and segment  $AD$  intersects segment  $CE$  at  $B$ . What is the length of segment  $CE$  ?





20

$$ax + by = 12$$

$$2x + 8y = 60$$

In the system of equations above,  $a$  and  $b$  are constants. If the system has infinitely many solutions, what is the value of  $\frac{a}{b}$ ?

**STOP**

**If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section.**