

The maximum possible score for this exam is 100 points. Point-values for each problem are shown at the right in parentheses. Please show your work to receive full credit.

1. Simplify the expression:  $14 + 18 \div (5 - 8)^2$  1. \_\_\_\_\_ (2)

2. Find the value of  $\frac{\sqrt{16}}{3} - \frac{1}{6}$  2. \_\_\_\_\_ (2)  
(fraction in lowest terms)

3. Simplify each expression and write your answers using only **positive exponents**. (6)

$\frac{12c^3}{c^7} =$  \_\_\_\_\_  $(b^3)^2 =$  \_\_\_\_\_  $8y^0 =$  \_\_\_\_\_

$3x^{-2} =$  \_\_\_\_\_  $7w^2w^5 =$  \_\_\_\_\_  $\frac{-3p^3}{4p^3} =$  \_\_\_\_\_

4. The distance from Seattle to Miami is approximately 5,330,000 meters. Write this number in scientific notation. 4. \_\_\_\_\_ (2)

5. One meter is equivalent to approximately  $6.2 \times 10^{-4}$  miles. Write this number in standard notation. 5. \_\_\_\_\_ (2)

6. The sum of three consecutive integers is 57. Write an algebraic **equation** for this sum. Use  $x$  for the first integer. (You do not need to solve the equation.) 6. \_\_\_\_\_ (3)

7. A raffle ticket costs \$2.50. Write an **expression** that represents the cost of purchasing  $N$  raffle tickets. 7. \_\_\_\_\_ (2)

8. You take a Psychology test worth 160 points. How many points must you get correct in order to earn a 75% on the test? 8. \_\_\_\_\_ (2)

9. Your dad looks in the clothes dryer. He finds that there are 12 pink socks, 9 orange socks, and 4 white socks. What percentage of the socks are orange? 9. \_\_\_\_\_ (2)

10. For each pair, fill in the blank with  $<$ ,  $>$ , or  $=$  to correctly complete the comparisons.

$$\frac{4}{5} \text{ \_\_\_\_\_\_ } \frac{8}{10}$$

$$5 \text{ \_\_\_\_\_\_ } |-7|$$

$$(-6)^2 \text{ \_\_\_\_\_\_ } -6^2$$

(3)

11. Circle **all** of the ordered pairs that are solutions to the equation  $2x - 3y = 9$ .

(0, 3)

(3, -1)

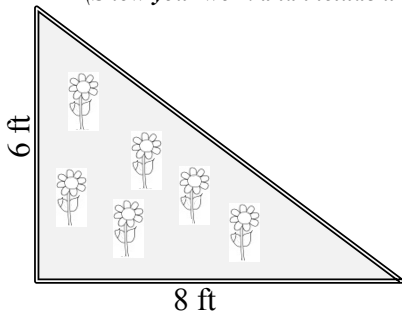
$(\frac{15}{2}, 2)$

(3)

12. You are planting a triangular garden in the corner of your backyard. You know that the sides of the garden are 6 feet and 8 feet (as shown in the diagram below). You need to put a small border along the third side.

a. What is the length of the border you must put along the third side?  
*(Show your work and include units to receive full credit.)*

12a.  $\frac{\text{\_\_\_\_\_\_}}{\text{number}} \frac{\text{\_\_\_\_\_\_}}{\text{units}}$  (3)



b. What is the total area of your garden?  
*(Include units to receive full credit.)* HINT:  $\text{Area} = \frac{1}{2}(\text{base})(\text{height})$

12b.  $\frac{\text{\_\_\_\_\_\_}}{\text{number}} \frac{\text{\_\_\_\_\_\_}}{\text{units}}$  (3)

13. Solve for  $x$ :  $5 - (x - 4) + 11x = 29$

13.  $\frac{\text{\_\_\_\_\_\_}}{\text{\_\_\_\_\_\_}}$  (3)

14. The pressure ( $P$ ) of a gas can be expressed by the equation  $P = dRT$ .  
 Solve this equation for  $T$ .

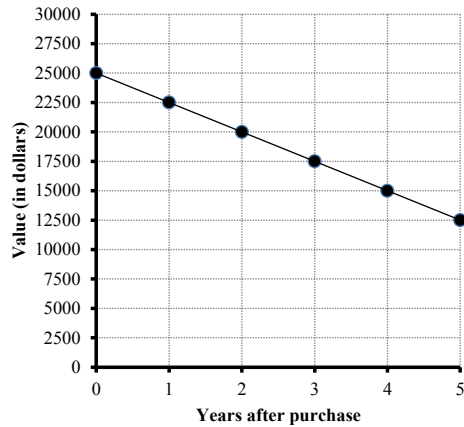
14.  $T = \frac{\text{\_\_\_\_\_\_}}{\text{\_\_\_\_\_\_}}$  (3)

15. Solve for  $x$ :  $\frac{x}{3} + \frac{2}{5} = \frac{7}{15}$

15.  $\frac{\text{\_\_\_\_\_\_}}{\text{\_\_\_\_\_\_}}$  (fraction in lowest terms) (3)

16. Simplify the expression:  $5r - 3r^2 - (2r + 7r^2)$  16. \_\_\_\_\_ (3)
17. Simplify the expression:  $\frac{8w^5 + 16w^3}{4w}$  17. \_\_\_\_\_ (3)
18. Expand and combine like terms:  $(t + 5)(4t - 3)$  18. \_\_\_\_\_ (3)
19. Expand and combine like terms:  $(x - 6)^2$  19. \_\_\_\_\_ (3)
20. Factor completely:  $9c^2d^2 + 12cd^4$  20. \_\_\_\_\_ (3)
21. Factor completely:  $x^2 - 25$  21. \_\_\_\_\_ (3)
22. Solve for  $p$ :  $5p(2p - 7) = 0$  22. \_\_\_\_\_ (3)
23. Solve for  $m$ :  $m^2 - 2m = 3$  23. \_\_\_\_\_ (3)

24. Your sister buys a new car for \$25,000. The value of the car will decrease each year. The graph shows the value of the car after the first 9 years of ownership.



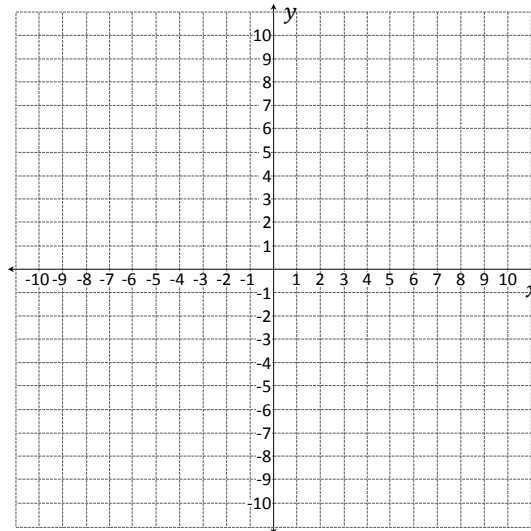
- a. How much is the car worth after 2 years? 24a. \_\_\_\_\_ (2)
- b. How long will he have to own the car until it is worth \$15,000? 24b. \_\_\_\_\_ (2)
- c. Find the slope of this line. (You do not need to include units.) 24c. \_\_\_\_\_ (3)

25. Find the  $x$  and  $y$  intercepts for the line  $4x - 3y = 12$ .

25.  $x$ -intercept:  
 (       ,       ) (2)
- $y$ -intercept:  
 (       ,       ) (2)

26. The equation of line A is  $y = \frac{1}{2}x - 7$ , and the equation of line B is  $2y + 2x = 4$ .

- a. Graph both lines A and B on the grid below and **clearly** label them.



- b. Use the graphs in part a) to solve the system:  
 $y = \frac{1}{2}x - 7$   
 $2y + 2x = 4$

- 26b. Solution:  
 (       ,       ) (2)

27. The length of a swimming pool is twice as long as its width. The perimeter of the pool is 132 meters. Find the length and width of the pool.  
 (Show your work and include units in your answer.)

27. \_\_\_\_\_ (4)

Length =  $\frac{\text{number}}{\text{number}}$   $\frac{\text{units}}{\text{units}}$

Width =  $\frac{\text{number}}{\text{number}}$   $\frac{\text{units}}{\text{units}}$

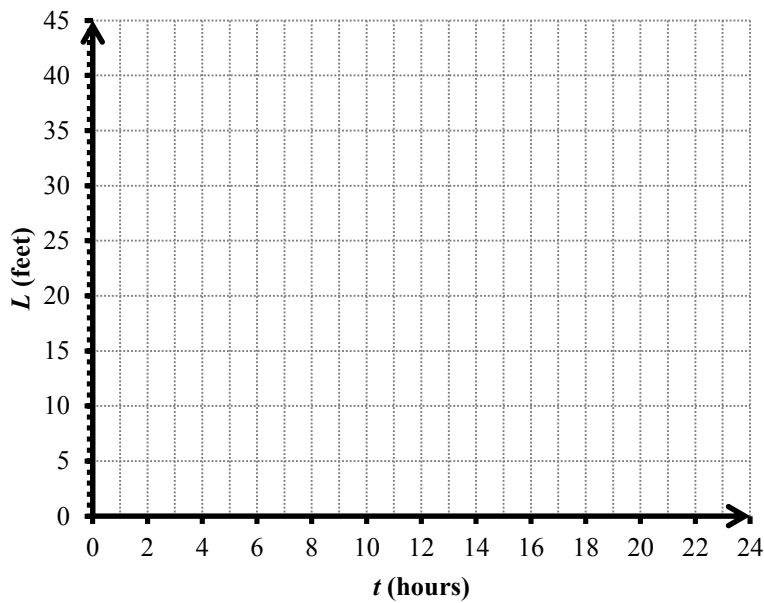
28. During heavy rain, the water level of a river is closely monitored. For a particular storm, the water level of the river is given by the equation  $L = 0.4t + 31$ , where  $L$  is the water level (in feet) and  $t$  is the time (in hours) since the storm began.

a. Use the formula to fill in the missing numbers in the table below

$t$ (hours)	$L$ (water level in feet)
0	
	35
20	

(3)

b. Graph the ordered pairs and draw the line that represents the equation for  $L$ .



(3)

c. What is the slope of the line?

28c. \_\_\_\_\_ (2)  
*(fraction in lowest terms or decimal)*

d. What does the slope mean in this context? Your sentence should include the number and units of slope.

(3)

