

**Elementary Algebra**  
**Sample Final Examination**

**NAME:** \_\_\_\_\_  
**Fall 2019**

**You will have 2 hours to complete this exam. You may use a calculator but must show all algebraic work in the space provided to receive full credit. Read all directions carefully, simplify all answers fully, and clearly indicate your answer. Good Luck!**

**Solve each equation. Show all algebraic work for full credit. (3 points each)**

1)  $18 - x = 22$

1) \_\_\_\_\_

2)  $\frac{3}{4}x = 21$

2) \_\_\_\_\_

3)  $2y - 5 = 11 + 4y$

3) \_\_\_\_\_

**Solve each equation. Show all algebraic work for full credit. (3 points each)**

4)  $4(3x - 5) = 16$

4) \_\_\_\_\_

5)  $\frac{1}{3} + \frac{1}{2}x = \frac{5}{6}$

5) \_\_\_\_\_

6)  $7t + 3 - (t + 2) = 13$

6) \_\_\_\_\_

**Solve the equation. Show all algebraic work for full credit. (3 points)**

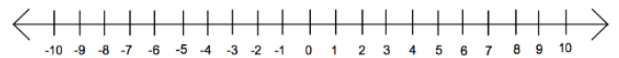
7)  $2(3y - 6) = 3(2y + 1)$

7) \_\_\_\_\_

**Solve each inequality and graph the solution on the number line provided. (3 points each)**

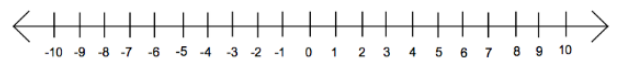
8)  $-4x + 7 > 23$

8) \_\_\_\_\_



9)  $0.3x + 1.25 \geq 0.22x + 1.89$

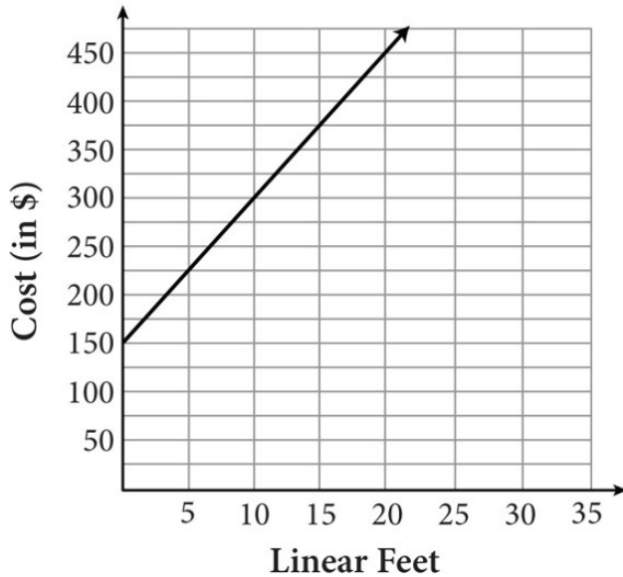
9) \_\_\_\_\_



10) Write the equation of a line that has a slope of  $-3$  and intersects the  $y$ -axis at  $(0, 5)$ . (2 points)

11) The graph shows the cost to have a fence installed. Write the equation of the line for the graph shown if  $x = \text{feet of fence}$  and  $y = \text{total cost of fence in dollars}$ . (3 points)

**Fence Installation**



12) Find the slope of each line. Then state whether the two lines are parallel, perpendicular or neither. Show your work and justify your answer for full credit. (3 points)

$$y = -4x + 2$$

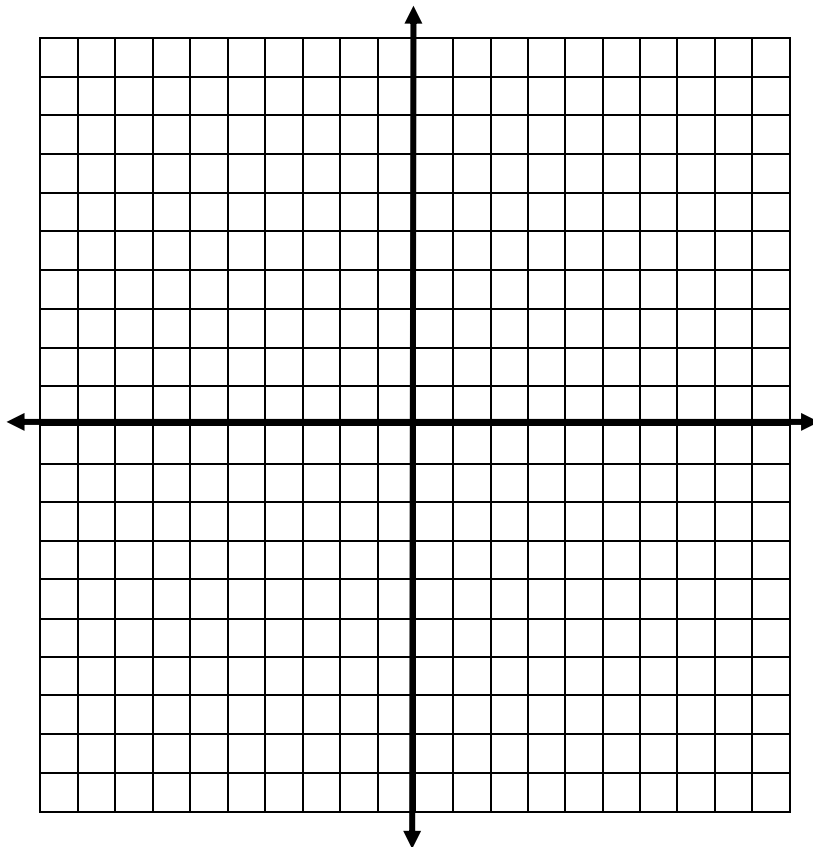
Slope of first line \_\_\_\_\_

$$4y = x - 8$$

Slope of second line \_\_\_\_\_

Answer with reason: \_\_\_\_\_

13) Given the line  $-2x + 4y = 12$ , find the following. (1 point each)



a) x-intercept: \_\_\_\_\_

b) y-intercept: \_\_\_\_\_

c) slope: \_\_\_\_\_

d) Graph.

14) The graph below shows the amount of money in a savings account in dollars. Use the graph to find the rate at which money is being saved. Include the proper units in your answer. (2 points)



14) \_\_\_\_\_

15) Marco buys a car for \$20,000 and it decreases at a rate of \$2000 every year.

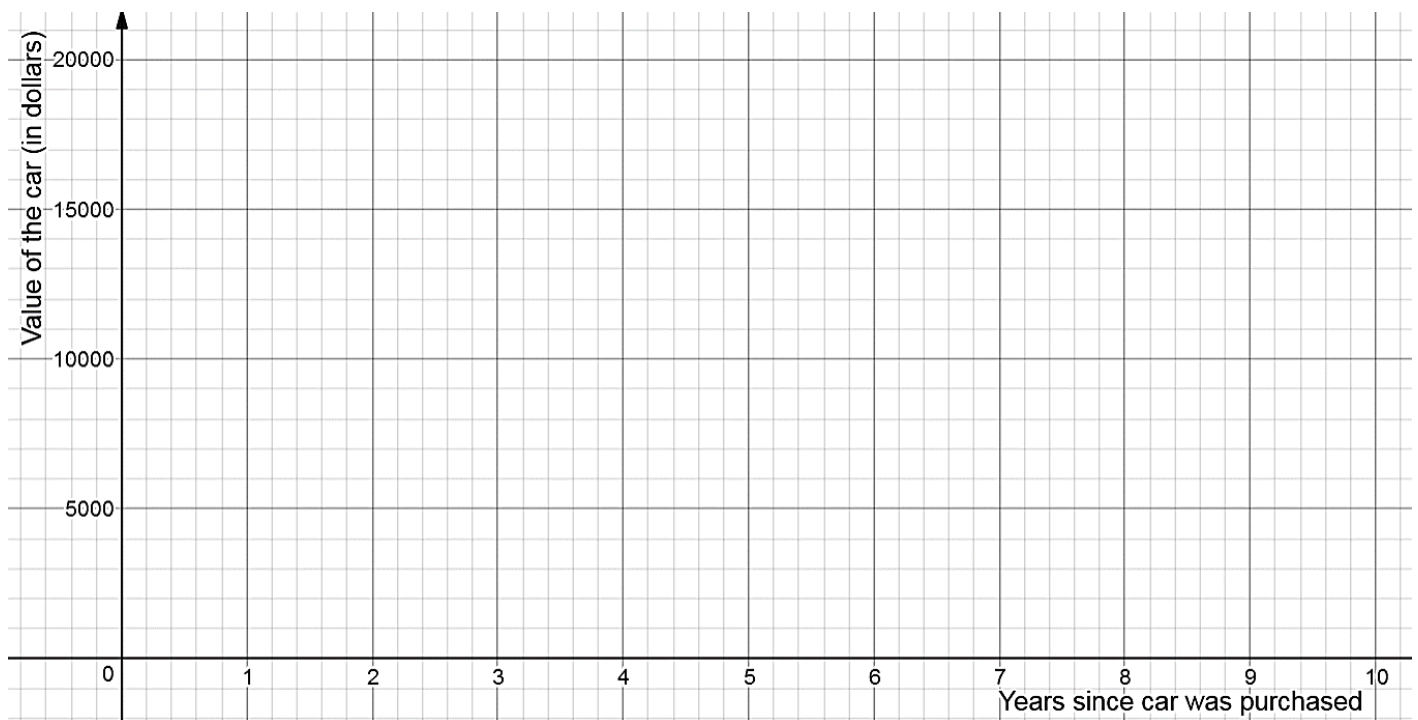
a) How much will the car be worth after 4 years? \_\_\_\_\_ (1 point)

b) How much will the car be worth after 7 years? \_\_\_\_\_ (1 point)

c) Write an equation that models this situation if :  
 $x =$  the number of years since the car was purchased and  
 $y =$  the value of the car (in dollars)

Equation: \_\_\_\_\_ (2 points)

d) Graph. (2 points)



16) Write the equation of the line that contains the points  $(-2, 5)$  and  $(6, 9)$ . (3 points)

17) If  $f(x) = x^2 + 5x + 2$ , then find  $f(0)$  and  $f(-3)$ . (1 point each)

a)  $f(0) =$

16a) \_\_\_\_\_

b)  $f(-3) =$

16b) \_\_\_\_\_

18) Solve the system of equations by substitution. (3 points)

$$\begin{aligned}x &= y - 8 \\3x + 2y &= 1\end{aligned}$$

19) Solve the system of equations by the elimination (addition) method. (3 points)

$$\begin{aligned}4x - 8y &= 20 \\-2x + y &= -4\end{aligned}$$



**Simplify each expression. Write the result using positive exponents. Please circle your final answer.**  
(2 points each)

20)  $a^{-4} \cdot a^7 \cdot a$

21)  $(-4xy^3)^2$

22)  $(4c^8d)(6c^{-2}d^{-5})$

23)  $\frac{12x^6y^8}{-3x^4y^{-3}}$

24) The length of the shortest wavelength of visible light (violet) is 0.0000004. Write this number in scientific notation. (1 point)

24) \_\_\_\_\_

25) The distance from the sun to the nearest star (Proxima Centauri) is  $3.99 \times 10^{13}$  km. Write this number in standard form (decimal notation). (1 point)

25) \_\_\_\_\_

26) Multiply. Write your answer in scientific notation. (2 points)

$(2.3 \times 10^6)(4.2 \times 10^{-11})$

26) \_\_\_\_\_

**Perform the indicated operations. Simplify answers fully. (2 points each)**

27)  $9x - x^2 + 4 - 3x^2 + 6x$

28)  $(7a - 9b + 12) - (2b - 4a + 3)$

29)  $10t(t^3 + 6t - 3)$

30)  $(5x + 4)(2x - 1)$

**Perform the indicated operations. Simplify answers fully. (2 points each)**

31)  $(4x - 7)(4x + 7)$

32)  $(6x - 2)^2$

33)  $\frac{24x^2 - 18x + 12}{6}$

**Applications. Show your algebraic work for each problem. Include the proper units. Circle your final answer.**

34) A roof rises 3 feet for every 14 feet horizontally. Determine the pitch of the roof. Express your answer as a percent rounded to the nearest tenth. (2 points)

35) The formula below is used to estimate the lung capacity  $L$  (in liters) of a female with height  $h$  (in centimeters) and age  $A$  (in years). Find the lung capacity of a 50-year-old woman who is 170centimeters tall. (2 points)

$$L = 0.04h - 0.018A - 2.69$$

**\*Choose 4 out of the following 5 word problems to complete. Please put a large X through the problem that you do not want graded. You must use algebra to receive credit and you must show all work for each problem. (3 points each)**

36) After leaving a 20% tip, the cost of your meal at Joey Garlic's was \$62.88. What was the cost of the meal before tip? Round your answer to the nearest cent.

37) The Tunxis marketing department is purchasing custom Tunxis car magnets to give out to new students. The company charges a one-time setup fee of \$50 plus \$1.75 for each magnet. How many magnets can Tunxis purchase if they want to spend less than \$2000?

38) Two angles are complementary (their sum is  $90^\circ$ ). One angle is 9 more than two times the other angle. Find the measure of the two angles.

39) A club sold T-shirts and hats for a fundraiser. The hats were sold for \$15 each and the T-shirts were sold for \$12 each. The club collected a total of \$855 and sold 65 items. Find the number of shirts and the number of hats that were sold.

40) Tessa traveled by boat for 4 hours with a 3 mph current to reach a campsite. The return trip against the same current took 6 hours. Find the speed of Tessa's boat in still water.

**BONUS: (2 points)**

Find two integers that have a sum of 10 and a product of -24.

Bonus: \_\_\_\_\_