

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) $10 - x = -2$

1) _____

2) $-\frac{2}{3}x + 11 = 25$

2) _____

3) $3 - 4y = 30 - y$

3) _____

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

4) $2(12 - 6y) = 48$

4) _____

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

5) _____

6) $-9x - (7x - 2) = -34 - 7x$

6) _____

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

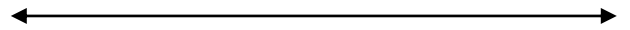
7) $3(y + 2) = 4(y - 4) + 10y$

7) _____

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

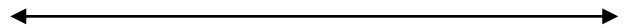
8) $5x \geq 2x - 18$

8) _____



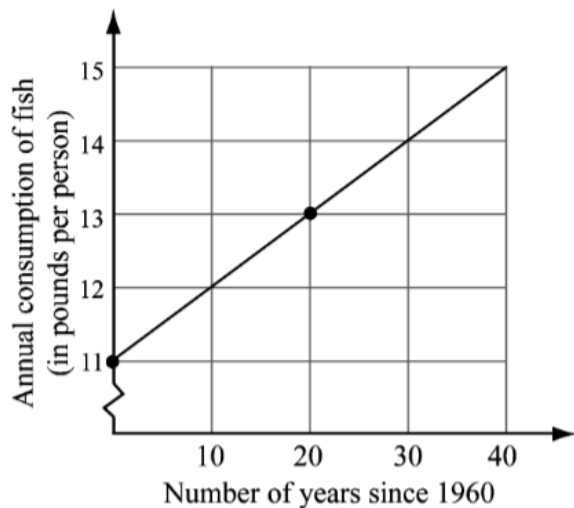
9) $3.6x + 43.2 - 1.5x > -8.4x + 5 - 3.8$

9) _____



10) Write the equation of a line that has a slope of $\frac{1}{4}$ and intersects the y-axis at (0, -5). (2 points)

11) Write the equation of the line for the graph shown. (2 points)



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)

$$y = 3x - 5$$

Slope of first line _____

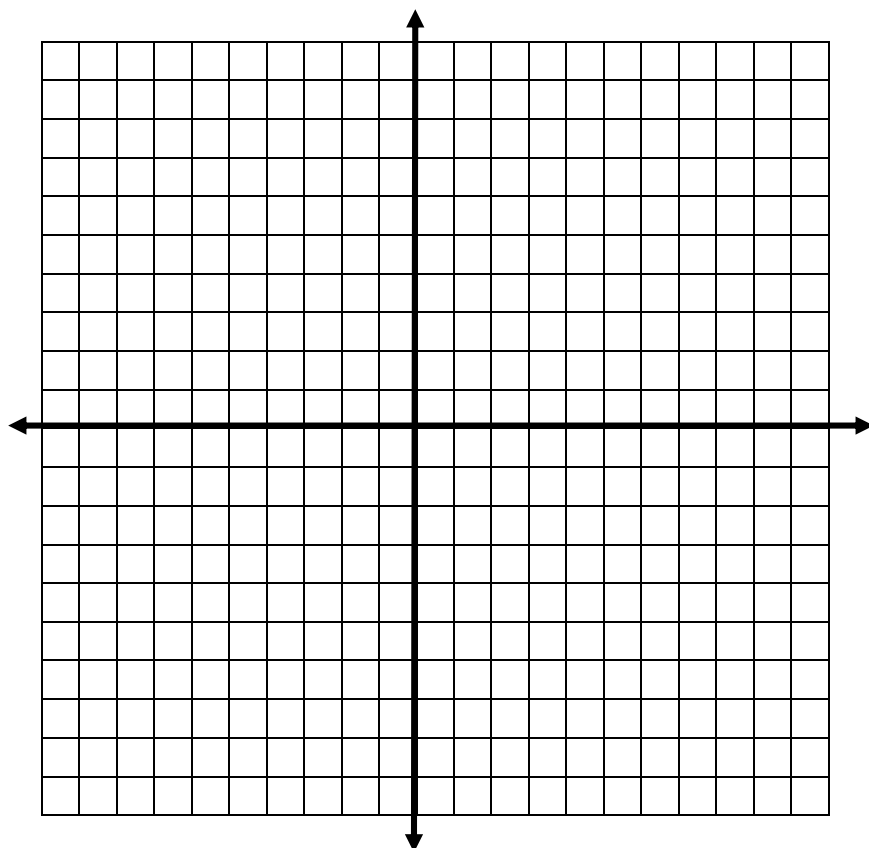
$$-3x + y = 4$$

Slope of second line _____

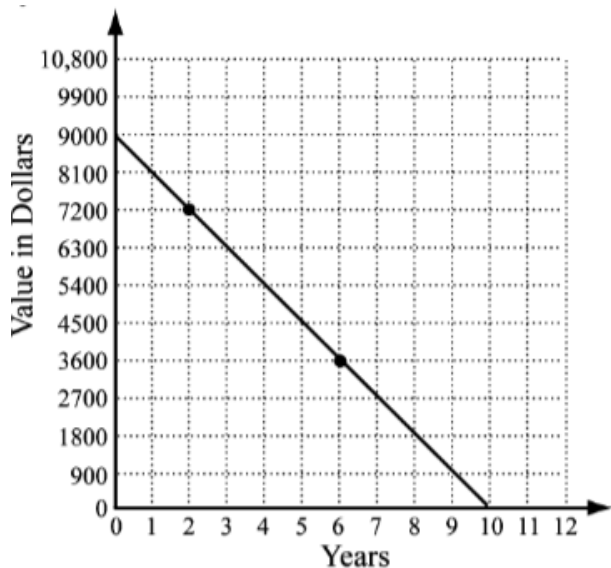
Answer with reason: _____

13) Given the line $5x + 3y = 15$, find the following. (1 point each)

- a) x-intercept: _____
- b) y-intercept: _____
- c) slope: _____
- d) Graph.



14) Use the graph to find the rate of change of the value of a computer over time. Please include units in your answer. (1 point)



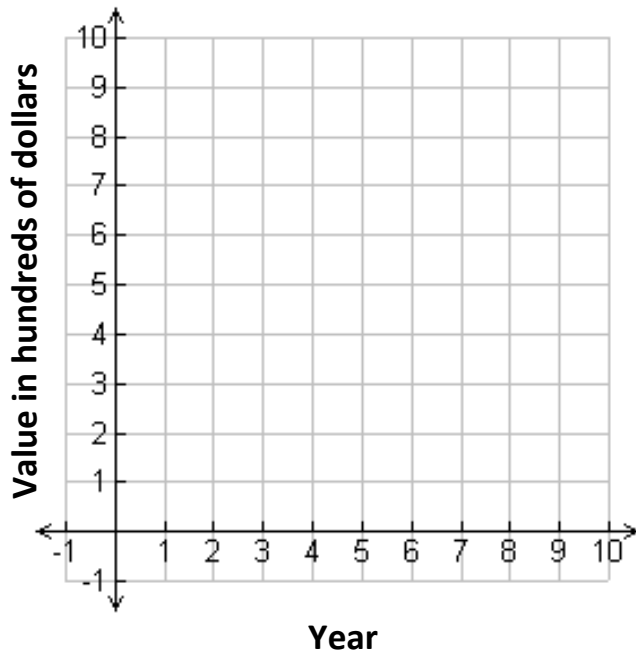
14) _____

15) The value v of a shopkeeper's inventory software program, in hundreds of dollars, is given by:

$$v = -\frac{1}{2}t + 4$$

where t is the number of years since the shopkeeper first bought the program. (1 point each)

- a) Graph the equation.
- b) What was the initial value of the software program? _____
- c) Use the graph to estimate what the program is worth 4 years after it was first purchased. _____
- d) Find the rate, in dollars per year, that the value of the software program was decreasing. _____



16) Write the equation of the line that contains the points (6, -4) and (-5, 7). (3 points)

17) If $f(x) = \frac{5x+6}{3}$, then find $f(0)$ and $f(-3)$. (1 point each)

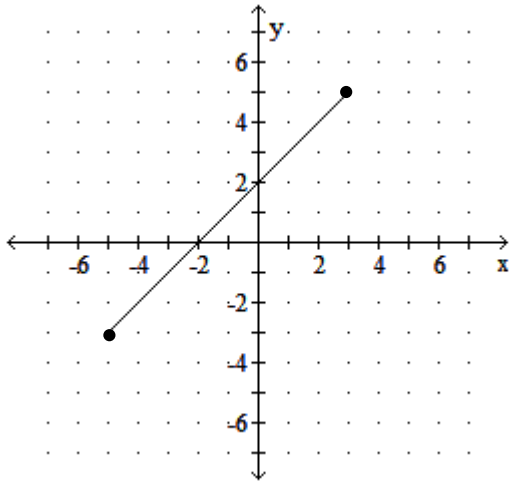
a) $f(0) =$

17a) _____

b) $f(-3) =$

17b) _____

- 18) What is the domain and range of the following function? Write your answer in interval notation.
(1 point each)



Domain: _____

Range: _____

- 19) Find the point of intersection of the two lines using the substitution method. (3 points)

$$3x + 2y = 1$$

$$y = x + 8$$

20) Find the point of intersection of the two lines using the elimination (addition) method. (3 points)

$$\begin{aligned}3x - y &= 8 \\x + 2y &= 5\end{aligned}$$

21) Express 2,800,000,000 in scientific notation. (1 point)

21) _____

22) Write 2.35×10^{-6} in standard form (decimal notation). (1 point)

22) _____

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

$$(2.7 \times 10^{12})(3 \times 10^{-8})$$

23) _____

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

24) $x^6 \cdot x \cdot x^{-2}$

25) $(5^2)^3$

26) $(-3x^{-4}y^5)^2$

27) $\frac{9x^4y^3}{12x^{-2}y^8}$

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

28) $14x^2 + 7x - 8 - 5x + 2 - 9x^2$

29) $(-4x^2 + 2x - 9) - (12x^2 - 4x + 1)$

30) $-5y(y^2 - 8y + 3)$

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

31) $(3x + 6)^2$

32) $(7p + 2)(7p - 2)$

33) $(6x - 5y)(x - 2y)$

34)
$$\frac{16x^4 + 40x^3 - 24x^2}{-8x^2}$$

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

35) A road rises 168.5 feet vertically over a horizontal distance of 2,336 feet. What is the grade of the road as a percent? Round to the nearest tenth of a percent. (2 points)

36) A parking garage charges \$2 to park plus \$0.75 for each additional hour. Write the equation of the line that models this relationship. (2 points)

37) When all n teams in a baseball league play every other team twice, a total of G games are played, where $G = n^2 - n$. If a baseball league has 16 teams and all teams play each other twice, how many games are played? (2 points)

- 38) You paid \$95.12 for a meal including a 15% tip. How much was the cost before the tip? Round your answer to two decimal places. (3 points)
- 39) The equation $T = \frac{1}{4}N + 40$ can be used to determine the temperature T, in degrees Fahrenheit, given the number of times N that a cricket chirps per minutes. Determine the number of chirps per minute for a temperature of 76 °F. (3 points)
- 40) Karen's financial aid stipulates that her tuition not exceed \$3,000. If her local community college charges a \$150 registration fee plus \$1,200 per course, what is the greatest number of courses for which Karen can register? (3 points)

41) At a school fundraiser, student tickets cost \$3 each and adult tickets cost \$7 each. A total of 147 tickets were sold and \$849 was collected. How many student tickets were sold? How many adult tickets were sold? (3 points)

BONUS: (3 points)

How many perfect squares are there between 0 and 150?

Bonus: _____