Elementary Algebra **NAME: _____**
SAMPLE Final Examination **Spring 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) $7 = -12 + x$ 1)_____

2) $\frac{2}{3}x = 28$ 2)_____

3) $5 - 2x = 25 + 8x$ 3)_____

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

4) $4(3x - 1) = 8$ 4)_____

5) $\frac{5}{2} + \frac{1}{3}x = \frac{21}{6}$ 5)_____

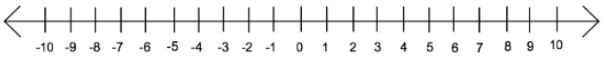
6) $18 - 2(3x - 3) = 0$ 6)_____

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

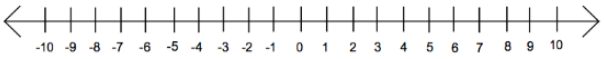
7) $6(y-4) = 3(3y+1)$ 7)_____

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

8) $-6x + 5 > 23$ 8)_____



9) $0.2x + 2.65 \geq 0.15x + 3$ 9)_____



10) Write the equation of a line that has a slope of $\frac{-2}{5}$ and intersects the y-axis at (0, 8). *(2 points)*

11) The graph shows the weekly wages an employee can earn at a company. Write the equation of the line for the graph shown if $x = hours\ worked$ and $y = wages\ earned\ in\ dollars$. *(3 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)*

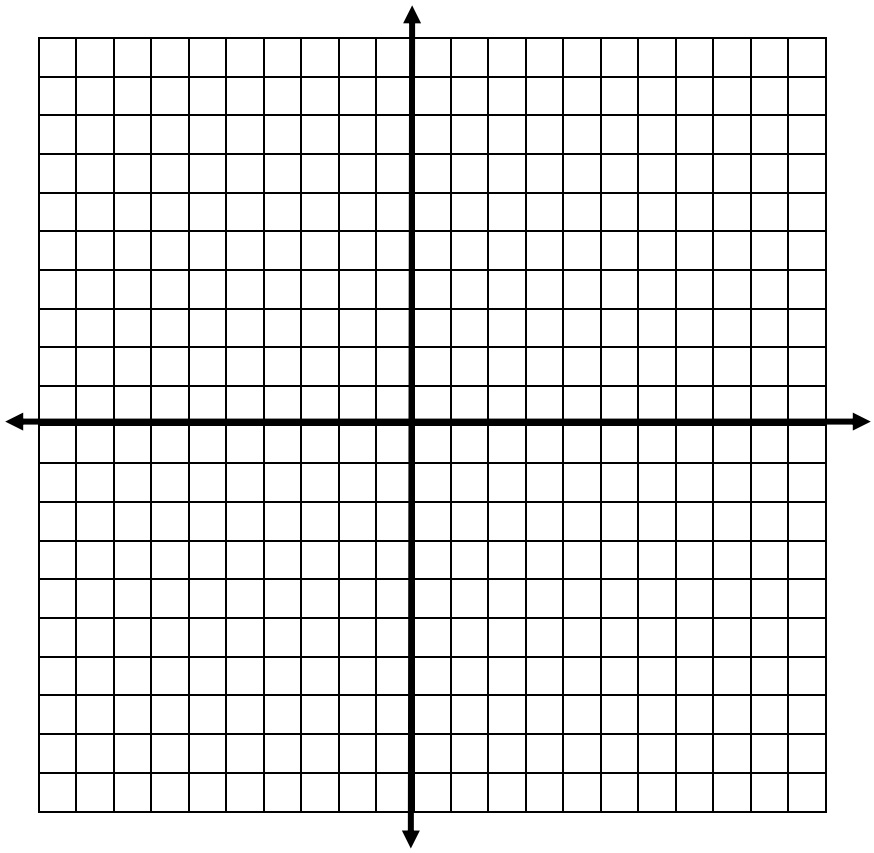
$y = \frac{1}{2}x + 10$ Slope of first line_____

$6y = 3x - 18$ Slope of second line _____

Answer with reason: _____

_____

13) Given the line $3x + 4y = -12$, find the following. *(1 point each)*



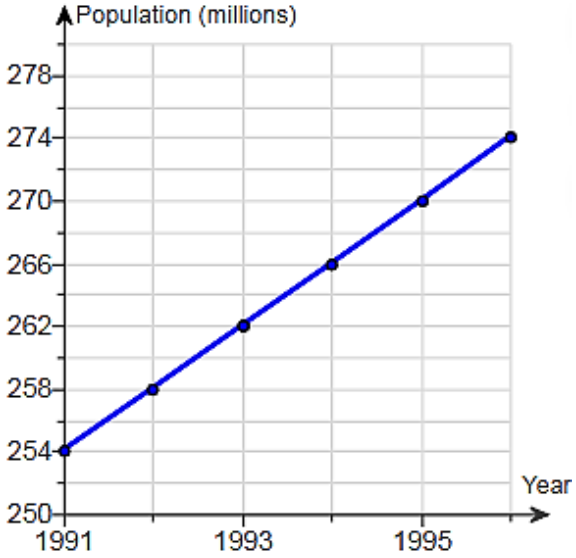
a) x-intercept: _____

b) y-intercept: _____

c) slope: _____

d) Graph.

14) The graph below shows data for the population of a country in millions. Use the graph to find the rate at which the population is growing. Include the proper units in your answer. *(2 points)*



14)_____

15) A taxicab driver charges an initial fee of $3.00 to pick you up. You then pay an additional $2.50 for every mile they drive you.

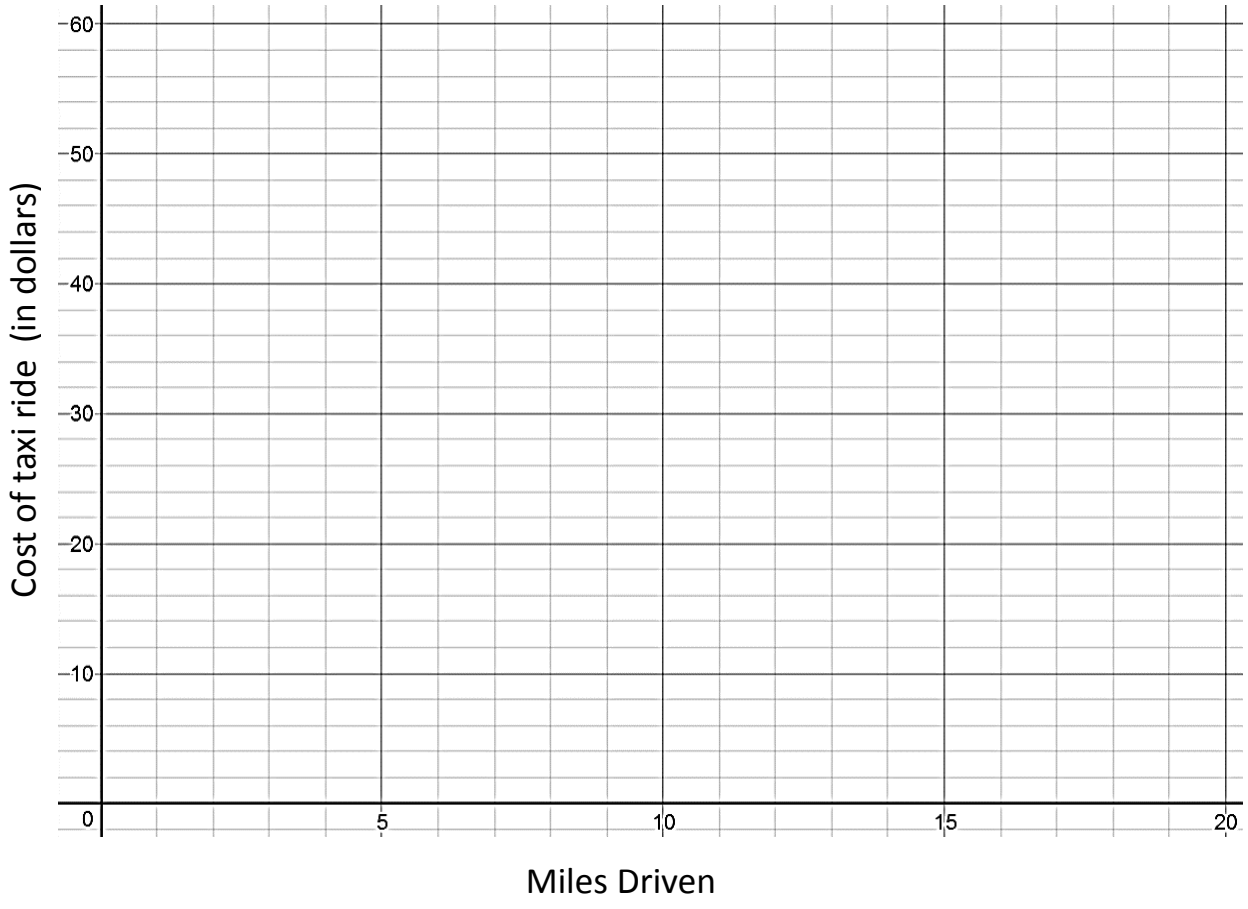
a) How much would it cost you to be driven 2 miles? _____*(1 point)*

b) How much would it cost you to be driven 10 miles? _____ *(1 point)*

c) Write an equation that models this situation if $x = \textit{the number of miles driven}$ and $y = \textit{the cost of the taxi ride } (\textit{in dollars})$

Equation: _____ (*2 points)*

d) Graph. *(2 points)*



16) Write the equation of the line that contains the points (11, 3) and (15, -5). *(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)*

$$x = y + 7$$
$$2x + 6y = -10$$

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

$$3x - y = 8$$
$$x + 2y = 5$$

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

20) $a^5 \cdot a \cdot a^{-2}$

21) $(b^3)^{-2}$

22) $(-2c^3d)(3c^{-1}d^2)$

23) $\dfrac{8\,x^8\,y^3}{12\,x^3\,y^7}$

24) The human population of the world is currently about 7,700,000,000. Write this number in scientific notation. *(1 point)*

24)_____

25) The mass of a dust particle is about 7.53 x10^{-10} kg. Write this number in standard form (decimal notation). *(1 point)*

25)_____

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

$(3.5 \times 10^9)(1.8 \times 10^{-4})$

26) _____

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

27) $-3x^2 + 5x + x^2 + 7 - 2x$

28) $(6a + 5b - 1) - (-2b + 3a + 8)$

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

30) $(x + 3)(2x - 2)$

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

31) $(5x - 2)(5x + 2)$

32) $(3x + 1)^2$

33) $\frac{4x^3 - 16x^2 + 8x}{4x}$

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

34) A ski slope rises 433 feet over a horizontal distance of 1025 feet. Find the grade of the ski slope. Express your answer as a percent rounded to the nearest tenth. *(2 points)*

35) The formula below can be used to determine the number of calories, C, that a female should eat per day, where w = weight in pounds, h = height in inches and a = age in years. How many calories per day should a 25 year old person eat if they are 64 inches tall and weigh 140 pounds? *(2 points)*

$$C = 655 + 4.35w + 4.7h - 4.7a$$

***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. <u>You must use algebra to receive credit and you must show all work for each problem</u>.**
(3 points each)

36) After leaving a 15% tip, the cost of your meal at Red Robin was $39.20. What was the cost of the meal before tip? Round your answer to the nearest cent.

37) A wedding reception hall charges $400 plus $35 per person for food. How many guests can Riley and Bryce invite to their wedding if they want to spend no more than $3000 on the hall and food?

38) Two angles are supplementary (their sum is 180^o). One angle is 12 more than two times the other angle. Find the measure of the two angles.

39) There were 407 tickets purchased for a major league baseball game. The lower reserved tickets cost $9.50 and the upper box tickets cost $10.00. The total amount of money spent was $4002.5. How many of each kind of ticket were purchased?

40) A train leaves a station and travels north at a speed of 75 mph. Two hours later, a second train leaves on a parallel track and travels north at 125 mph. How far from the station will they meet?

BONUS: ***(2 points)***

Find two integers that have a sum of -9 and a product of 18. Bonus: _____