

Name: \_\_\_\_\_ Instructor: \_\_\_\_\_ Score: \_\_\_\_\_

There are 5 bonus points on this exam. Maximum score is 105. Problems 1 to 9 : 3 points each.

Show your work. Answers without sufficient work may not receive credit.

Simplify the expression, using positive exponents only in your answer.

1.  $(3^0 Y^4 X)^4$  1. \_\_\_\_\_

2.  $(16X^7)(2X^4)^{-1}$  2. \_\_\_\_\_

3. Write  $\sqrt[9]{A^7}$  using an exponent, without the radical. 3. \_\_\_\_\_

Factor Completely.

4.  $25X^2 - 16$  4. \_\_\_\_\_

5.  $6X^3 - 13X^2 - 5X$  5. \_\_\_\_\_

Perform the indicated operations and simplify as much as possible.

6.  $\frac{x^2 - 6X + 9}{x - 3}$  6. \_\_\_\_\_

7.  $\frac{5}{x} - \frac{2}{5}$  7. \_\_\_\_\_

8.  $\sqrt{y} \ 3 - 7\sqrt{y}$  8. \_\_\_\_\_

9. Write  $\sqrt{2700 X^2 Y^3}$  in simplest radical form, where X and Y are positive numbers.

No decimal answers here!

9. \_\_\_\_\_

Problems 10 –15: 4 points each.

Solve the following equations. You must show your work to receive credit.

10.  $5\sqrt{8x + 9} = 45$

10. \_\_\_\_\_

11.  $\frac{7}{2x + 4} = \frac{1}{2}$

11. \_\_\_\_\_

12.  $2x^2 = 32x - 128$

12. \_\_\_\_\_

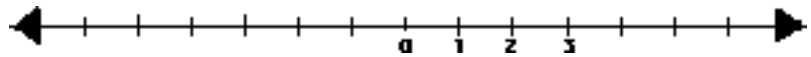
13. Solve  $3x^2 + 4x - 1 = 0$  using the quadratic formula, **correctly** rounding your answers to the nearest **hundredth**.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

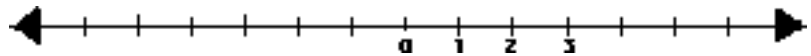
13. \_\_\_\_\_

14. Solve the inequalities below and use the number line to graph your solutions.

a)  $2 - 3X \leq 8$



b)  $X - 2 > 2$



15. Solve the following system of equations.

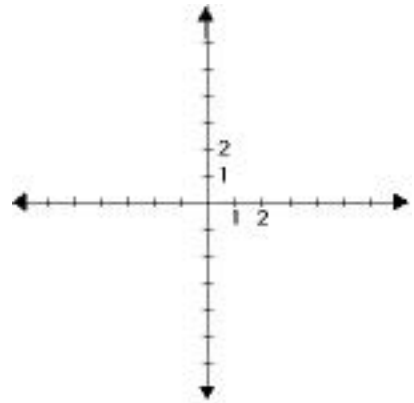
$$3X - 2Y = 4$$

$$-X + Y = 2$$

15.  $(X,Y) = ( \underline{\hspace{1cm}} , \underline{\hspace{1cm}} )$

Problems 16: 8 points. Problem 17: 4 points.

16. The graph of a line goes through the points with coordinates  $(-3, 2)$  and  $(1, -2)$ .



- a) Graph the line.
- b) The slope of the line is \_\_\_\_\_ .
- c) The equation of the line in slope intercept form is: \_\_\_\_\_.
- d) What is the slope of any line perpendicular to this line? \_\_\_\_\_

17. Solve for x. (Exact value: no decimals.)  $3^{2x + 5} = 9$ .

17. \_\_\_\_\_.

Problem 18: 8 points. Problem 19: 4 points.

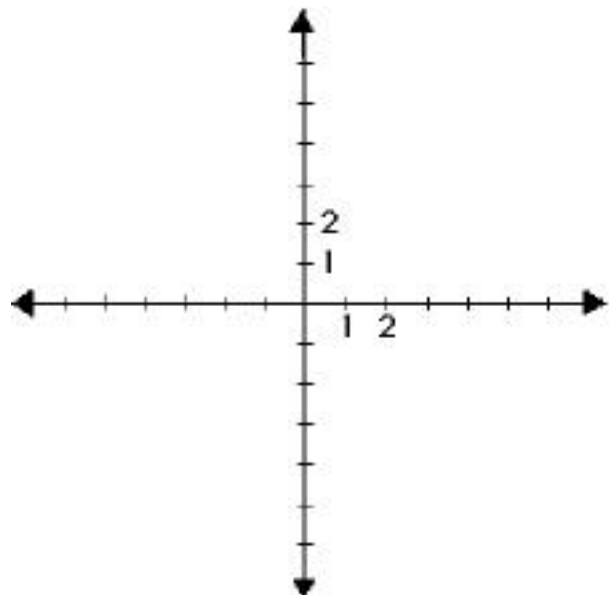
18. The value of a company is increasing at constant rate. In January 1990 the company was worth 10 million dollars and in January 2006 it was worth 66 million dollars.

If  $y$  stands for the value of the company in millions of dollars and  $x$  stands for the time in years after 1990 (so  $x = 0$  corresponds to 1990) the graph of the relation between  $x$  and  $y$  will be a line.

- a) The slope of the line is \_\_\_\_\_ .
- b) What are the units of this slope? \_\_\_\_\_.
- c) The equation of the line in slope intercept form is \_\_\_\_\_.
- d) Assuming the company's growth rate continues in the future, when (during which calendar year) will the company be worth 100 million dollars?  
\_\_\_\_\_.

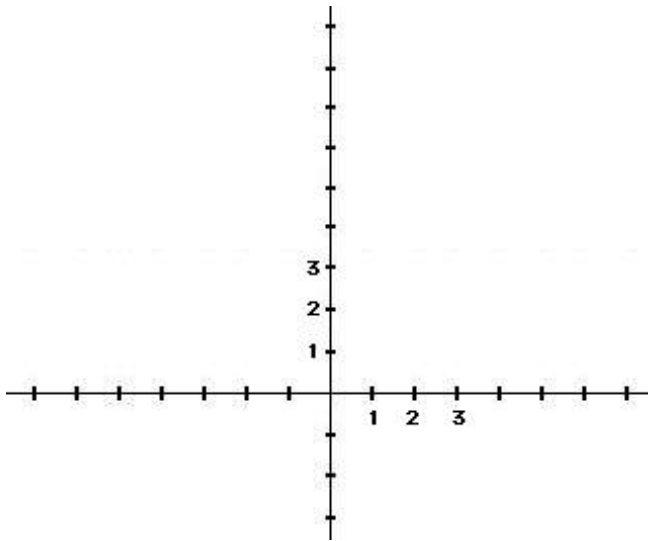
19. A line is parallel to the line  $5Y - 3X = 3$  and goes through the point with coordinates  $(-5, 0)$ .

- a) The  $Y$  - intercept has coordinates  $(\text{_____}, \text{_____})$ .
- b) Draw a graph of this line.



Problem 20 and 21: 8 points each.

20. Graph  $Y = -X^2 + 2X + 8$



20. a) vertex ( \_\_\_\_\_ , \_\_\_\_\_ )

20. b) y - intercept ( \_\_\_\_\_ , \_\_\_\_\_ )

20. c) x - intercepts ( \_\_\_\_\_ , \_\_\_\_\_ )

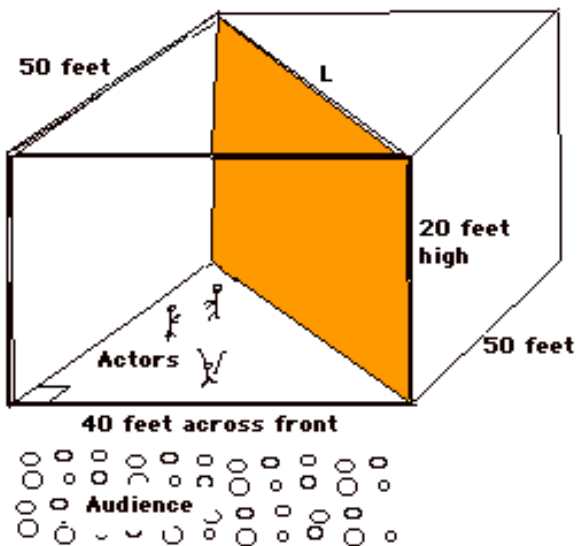
( \_\_\_\_\_ , \_\_\_\_\_ )

21. A stage manager wants to hang a partially transparent curtain across the diagonal of a rectangular stage to create a special lighting effect.

The curtain must be 20 feet high. The stage is 40 feet across the front and 50 feet deep.

21. a) Find the exact length of the curtain, shown as **L** on the diagram.

**L** = \_\_\_\_\_



21. b) How many square feet of curtain material (rounded to the nearest square foot) must the stage manager order to make this curtain?

Square Feet of Material =

\_\_\_\_\_

Problem 22: 8 points, problem 23: 6 points.

22. 75 raffle tickets are sold to support an annual neighborhood block party. "Boosters" paid \$5 per ticket while "Supporters" paid \$15 per ticket. A total of \$675 was collected.

a) Write a system of equations to model the situation.

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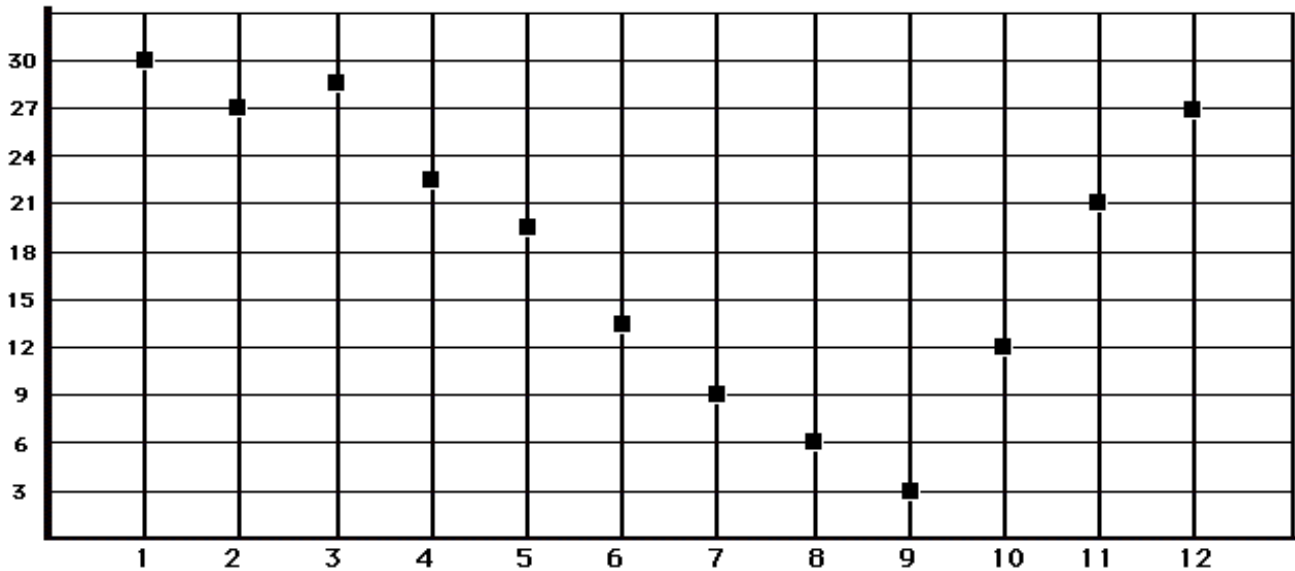
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b) Solve the system.

number of Boosters: \_\_\_\_\_

number of Supporters: \_\_\_\_\_

23. The figure below shows the average monthly snowfall in inches at a weather station on Mt. Baker. On the horizontal axis, 1 stands for January while 12 stands for December. The snowplows at the station have a full - time crew during months when the expected snowfall is 25 inches or more, and a half - time crew if the snowfall is expected to be 15 inches or more but less than 25 inches.



a) During which months is there a full - time snowplow crew? \_\_\_\_\_

b) During which months is there a half - time snowplow crew? \_\_\_\_\_

c) What was the total average annual snowfall at this weather station? \_\_\_\_\_