Directions: You must show all work, even for multiple choice. Any graphing problem should be done without a graphing calculator. This assignment is due on the ***first day of school***. You will be held accountable for this material upon your return to school. Yes, that means a test or a quiz on this material is going to happen.

Multiple Choice

1. The graph below was created by an employee at a gas station.
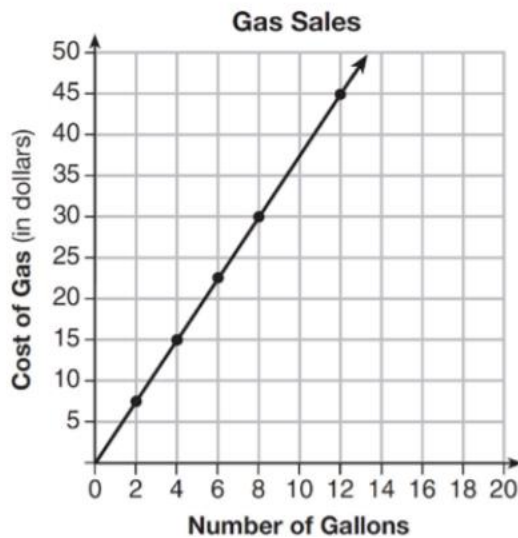

Which statement can be justified by using the graph?
1) If 10 gallons of gas was purchased, $35 was paid.
2) For every gallon of gas purchased, $3.75 was paid.
3) For every 2 gallons of gas purchased, $5.00 was paid.
4) If zero gallons of gas were purchased, zero

2. Given the following expressions:

   I. $-\dfrac{5}{8} + \dfrac{3}{5}$ III. $\left(\sqrt{5}\right) \cdot \left(\sqrt{5}\right)$

   II. $\dfrac{1}{2} + \sqrt{2}$ IV. $3 \cdot \left(\sqrt{49}\right)$

   Which expression(s) result in an irrational number?
   1) II, only
   2) III, only
   3) I, III, IV
   4) II, III, IV

3. Which inequality is represented by the graph below?
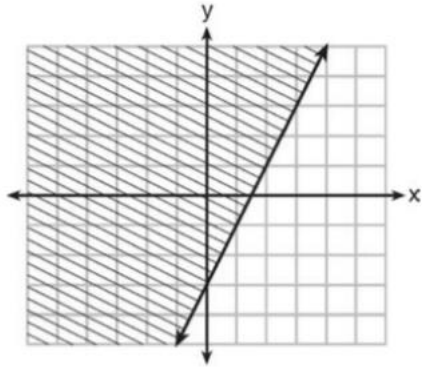
1) $y \le 2x - 3$
2) $y \ge 2x - 3$
3) $y \le -3x + 2$
4) $y \ge -3x + 2$

4. Which ordered pair is *not* in the solution set of
$y > -\frac{1}{2}x + 5$ and $y \le 3x - 2$?

1) (5,3)
2) (4,3)
3) (3,4)
4) (4,4)

5. If the quadratic formula is used to find the roots of the equation $x^2 - 6x - 19 = 0$, the correct roots are

1) $3 \pm 2\sqrt{7}$
2) $-3 \pm 2\sqrt{7}$
3) $3 \pm 4\sqrt{14}$
4) $-3 \pm 4\sqrt{14}$

6. The expression $3(x^2 - 1) - (x^2 - 7x + 10)$ is equivalent to

1) $2x^2 - 7x + 7$
2) $2x^2 + 7x - 13$
3) $2x^2 - 7x + 9$
4) $2x^2 + 7x - 11$

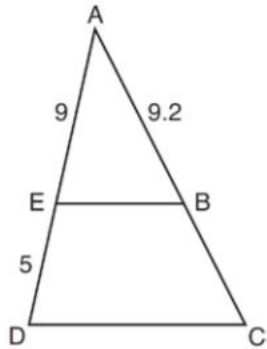7. What are the roots of the equation $x^2 + 4x - 16 = 0$?

(1) $2 \pm 2\sqrt{5}$ (3) $2 \pm 4\sqrt{5}$

(2) $-2 \pm 2\sqrt{5}$ (4) $-2 \pm 4\sqrt{5}$

8. In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.

What is the length of $\overline{AC}$, to the *nearest tenth?*
1) 5.1
2) 5.2
3) 14.3
4) 14.4

9. The center of circle Q has coordinates $(3,-2)$. If circle Q passes through $R(7,1)$, what is the length of its diameter?
1) 50
2) 25
3) 10
4) 5

10. Beach Bike Rentals charges $5.00 to rent a bike plus $0.20 per mile. Write an equation for the total cost C of renting a bicycle and riding it m miles.

1) $C = 5 + 0.20m$
2) $C = 0.20 + 5m$
3) $m = 5 + 0.20C$
4) $m = 0.20 + 5C$

11. Write the equation of the line below in slope-intercept form.
$$y + 3 = 2(x - 1)$$

1) $y = 2x - 5$
2) $y = 2x + 5$
3) $y = -2x + 5$
4) $y = -2x - 5$

12. Solve the inequality:
$$-2(6z + 9) \leq -6(2z - 4)$$

1) All real numbers
2) No solution
3) $-24z \leq 42$
4) $z \leq 42$

13. Put into scientific notation: 0.00241
   1) 24.1×10^{-4}
   2) 241×10^{-5}
   3) 2.41×10^{-3}
   4) 0.241×10^{-2}

14. Put into scientific notation: 354.21
   1) 3.5421×10^{-2}
   2) 35421×10^{2}
   3) 0.35421×10^{3}
   4) 3.5421×10^{2}

Free Response Questions
Show all work for the following problems.

15. Find the missing sides of the special right triangle below. Use the relationships you learned in geometry. Answers should be left in radical form.

$$3\sqrt{2} \quad 45° \quad x$$
$$y$$
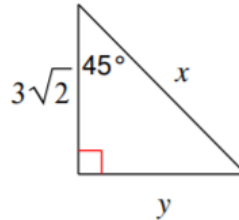
16. Find the missing sides of the special right triangle below. Use the relationships you learned in geometry. Answers should be left in radical form.

$$x \quad y$$
$$60°$$
$$16$$
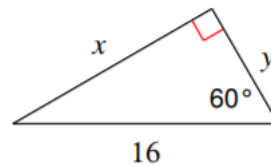
17. Solve the system of equations by using either substitution or elimination.

$$2x + 2y = 16$$
$$3x - y = 4$$

18. The volume of a cylinder is found by using the formula: $V = \pi r^2 h$. Solve for r.

19. Find the x and y intercepts for the function: $3x - 2y = 6$.

20. $f(x) = (2x - 1)(x + 3) - 4x + 7$. Multiply and combine like terms. Write answer in standard form.

21. Find the slope and y-intercept for the linear equation below.

$5x - 2y = 8$

22. Find the equation of a line in either point-slope form or slope intercept form that passes through the point $(-3,2)$ that is parallel to the line $2y = 6x - 10$.

23. Find the equation of a line in either point-slope form or slope intercept form that passes through the point $(6, -1)$ that is perpendicular to the line $y = \frac{2}{3}x + 4$.

24. Find the area of a circle that has a circumference of $6\pi \; centimeters$. Leave your answer in terms of π.

25. Solve for x in the equation below. Answer should be in left in fraction form and don't forget to show all work.

$$\frac{1}{2}x + 6 = -2x + 7$$

26. If $f(x) = -5x^2 + 2x - 1, \; find \; f(-1)$.

27. Solve the compound inequality and shade answer on a number line.

$$x + 2 \geq 1 \quad and \quad x - 4 < 3$$

28. The sum of two numbers is 90. Their difference is 12. Write an equation and use it to find the numbers.

#29-31: Simplify completely. Leave no negative exponents.
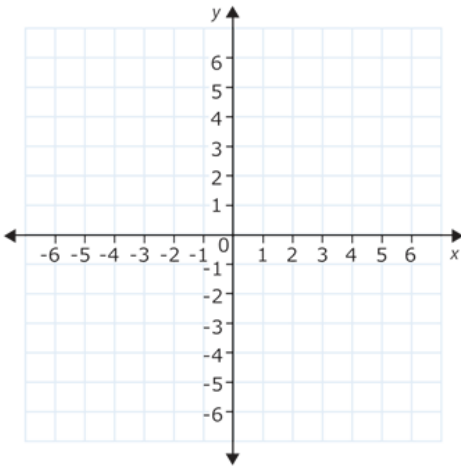
29. $(a^{-4}b^3)(a^2b)$

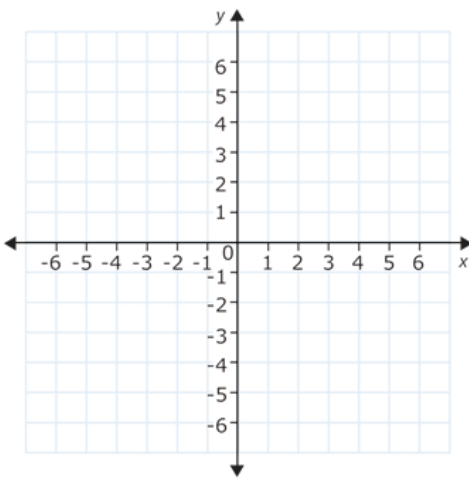30. $\dfrac{4x^{-3}y^8}{x^4y^3}$

31. $(5x^{-2}y^3)^2$

32. Simplify without using a calculator.

$$7\left(\frac{1}{2}\right) - \frac{3}{4} + 5\left(\frac{1}{4}\right)$$
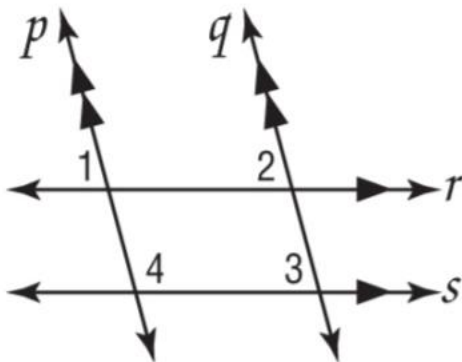
33. Graph the line $y = 4.$ What is the slope of this line?

34. Graph the line $3y + 12 = 4x$

35. In the figure below. $m\angle1 = 3x + 15, m\angle2 = 4x - 5, m\angle3 = 5y,$ find the values of x and $y.$

36. Simplify the radical expression. Leave answers in simplest radical form.

$$\sqrt{45} - 3\sqrt{20} + 4\sqrt{50}$$

37. Find the values of x *and* y in the figure below.

$90°$

$(15x + 30)°$

$(3y + 18)°$

$10x°$