El Paso Collaborative for Academic Excellence

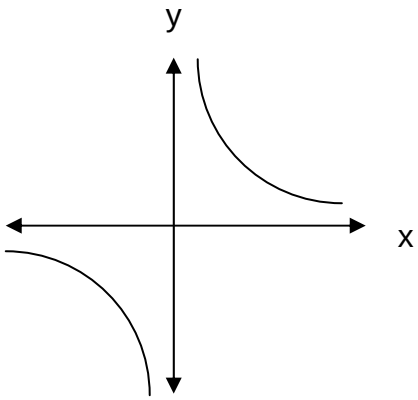
Algebra II End-of-Course Exam

Version II – 2010

Match each equation with the correct graph below. In all cases b > 0.

1. $y = bx^2$
2. $y = \sqrt{x}$
3. $y = \frac{1}{x}$
4. $y = b^x$
5. $y = \log_b x$

a.



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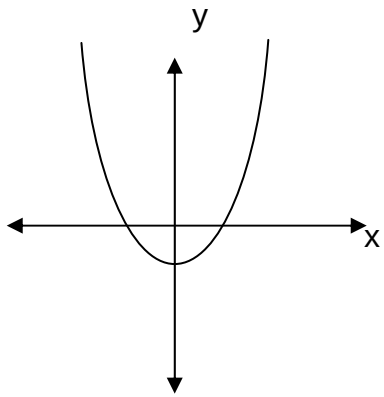

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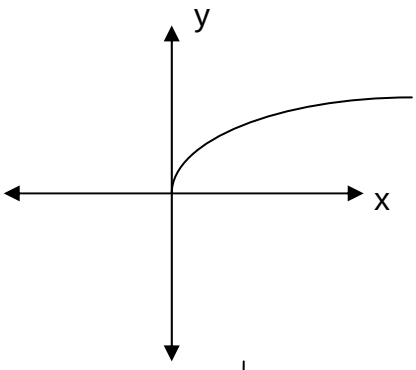

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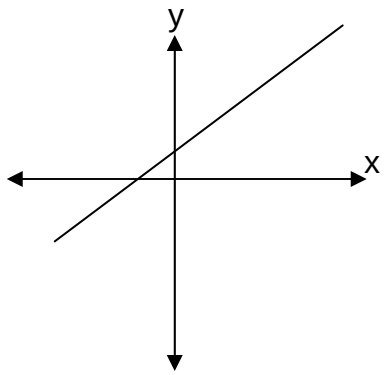

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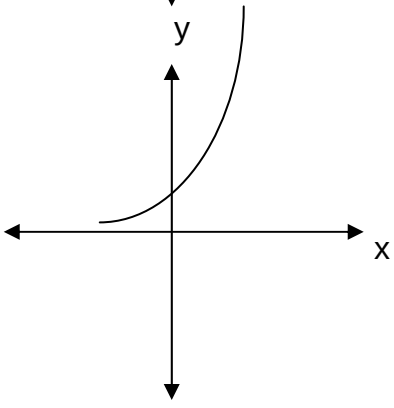

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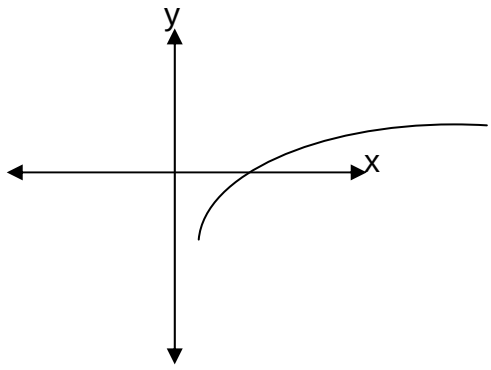


6. Which of the following expressions is equivalent to the expression $(x^m)(x^n)$?
    a. x^{m+n}
    b. x^{m-n}
    c. x^{mn}
    d. $x^{m/n}$

7. For the equation $y = 3x^2 – 4x + 7$, what are the values of a, b, and c?
    a. a = 3, b = 4, c = 7
    b. a = -3, b = -4, c = -7
    c. a = -3, b = 4, c = -7
    d. a = 3, b = -4, c = 7

8. What is the simplified value of the complex number $-4i^2$?
    a. -5
    b. -3
    c. 4
    d. -4

9. Solve the equation: $x^2 + 4x + 5 = 0$
    a. $x = 1 \pm 2i$
    b. $x = -1 \pm 2i$
    c. $x = 2 \pm i$
    d. $x = -2 \pm i$

10. A football on a trajectory path takes 6 seconds to hit a target 75 yards away. When does the football reach maximum height?

    a. right before hitting the target
    b. after one second
    c. halfway to the target
    d. the whole time

11. The total sales of a paper company is given by the equation, $S = xP$, where x is the number of boxes of paper sold and P is the price of one box of paper. The price of one box of paper is given by $P = 15x - 0.9x^2$.

    Determine the expression for S in terms of x.

    a. $S = -0.9x^3 + 45x^2$
    b. $S = -0.9x^3 + 15x^2$
    c. $S = -0.9x^3 - 15x^2$
    d. $S = -0.9x^3 - 45x^2$

12. Given the equations $R = 3.5x^2 - 0.08x^3$ and $R = xp$.

    What is p in terms of x?

    a. $p = 3.5x^3 - 0.08x^4$
    b. $p = x + 3.5x^2 - 0.08x^3$
    c. $p = -0.08x^4 + 3.5x^3$
    d. $p = -0.08x^2 + 3.5x$

13. Expand $(4c - d)^3$

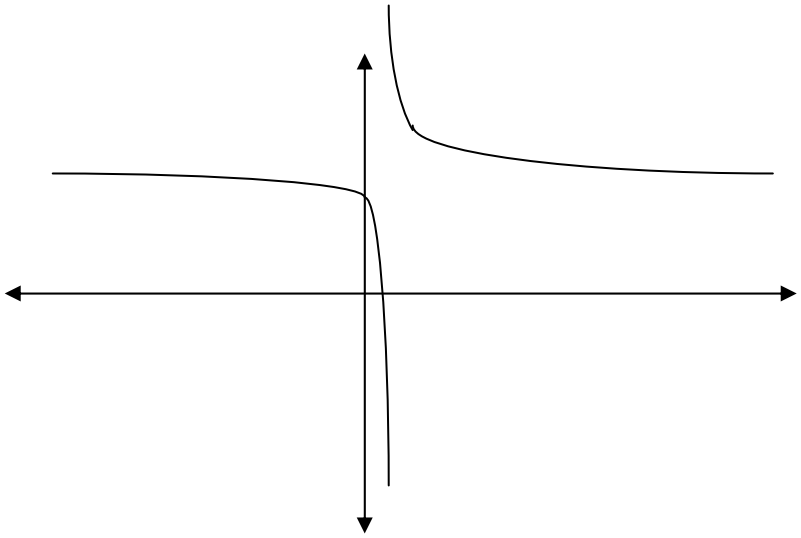
a. $16c^3 – 64c^2d + 64cd^2 – d^3$
b. $64c^3 + d^3$
c. $64c^3 – 48c^2d + 12cd^2 – d^3$
d. $64c^3 – 48c^2d – 12\ cd^2 – d^3$

Use the polynomial, $g(x) = - 6x^5 + 5x^4 + 4x^3 – x^2 + 3x + 2$, to answer 14 and 15 below.

14. What is the degree of the polynomial?
a. - 6
b. 6
c. - 5
d. 5

15. What is the greatest number of possible real zeros for the polynomial?
a. 6
b. 5
c. 4
d. 3

16. Which equation generates the graph below?



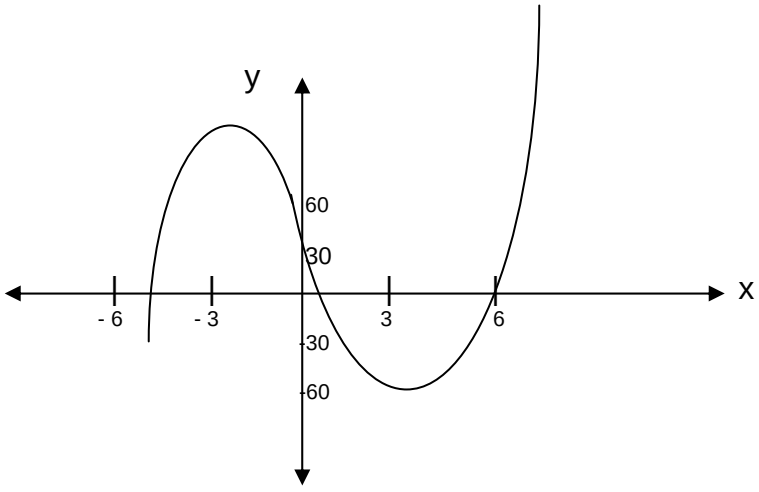
a. $y = \frac{1}{x + 6} + 1$

b. $y = \frac{1}{x - 6} + 1$

c. $y = \frac{1}{x - 1} + 6$

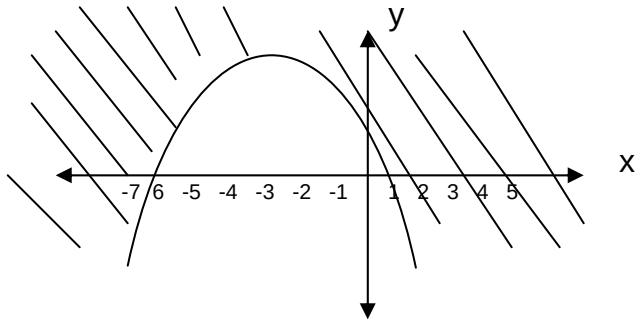
d. $y = \frac{1}{x + 1} + 6$

17. In the graph shown, which of the points listed is a zero of the function?
    a. (0, 60)
    b. (4, - 50)
    c. (-2, 110)
    d. (6, 0)



18. Which graph belongs to the inequality $y \geq -x^2 - 5x + 6$?

a.



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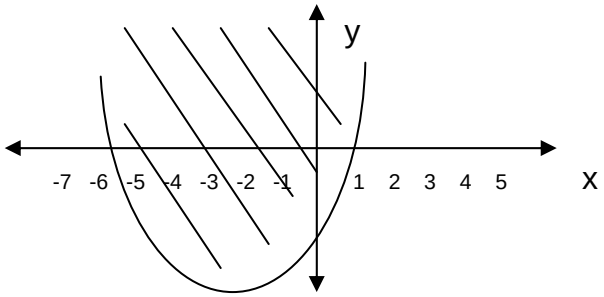

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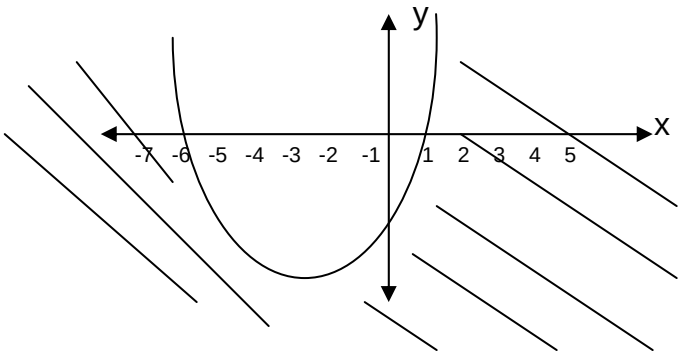

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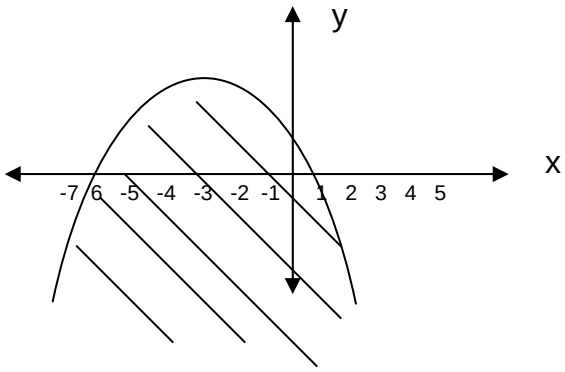


19. A used car is purchased for $18,900. The vehicle decreases in value each year by 15%. Which equation correctly models its value after any given number of years t ?

a. $y = 18{,}900(0.85)^t$
b. $y = 18{,}900 - 0.15t$
c. $y = 18{,}900(0.85)t$
d. y = none of the above

20. Find all real solutions of the equation. $5^{-3x} = 5^{-2x+8}$

a. x = 2
b. x = 8
c. x = -8
d. none of the above

21. Find all real solutions of the equation. $9^{-2x} = 3^{x-5}$

a. x = 2
b. x = 1
c. x = -1
d. none of the above

22. Solve the equation. $\log_5(3x) = 4$

a. $x = \frac{1}{3} \cdot 4^5$

b. $x = \frac{1}{10} \cdot 5^4$

c. $x = \frac{1}{3} \cdot 5^4$

d. none of the above

23. Let f(x) = $\sqrt{cx}$, where c > 0, and g(x) = $\sqrt{dx}$, where d < 0.

What is different about the two functions?

a. the functions are the same
b. the range
c. the domain
d. none of the above

24. Factor completely. $3a^2 - 13a - 10$

a. (3a – 2)(a – 5)
b. (3a – 2)(a + 5)
c. (3a + 2)(a + 5)
d. (3a + 2)(a – 5)

25. Solve for x. $(3x - 5)^{1/2} = 7$

a. x = -4
b. x = 4
c. x = 18
d. x = -18

26. Solve for x. $2^x = 15$

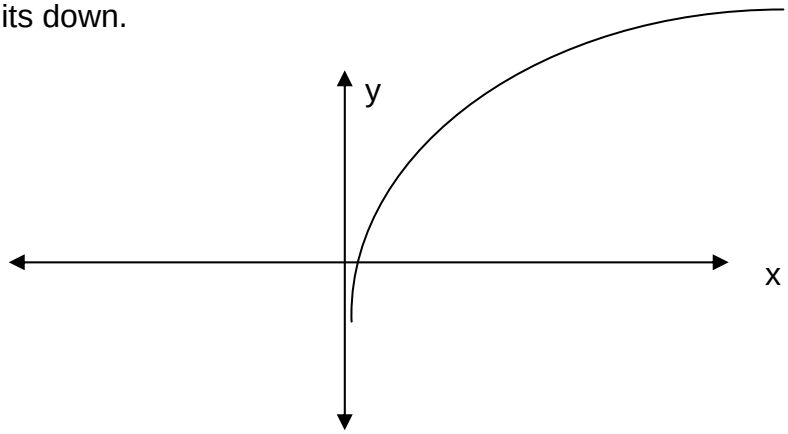
a. x = ln 15 ln2

b. x = ln (15/2)

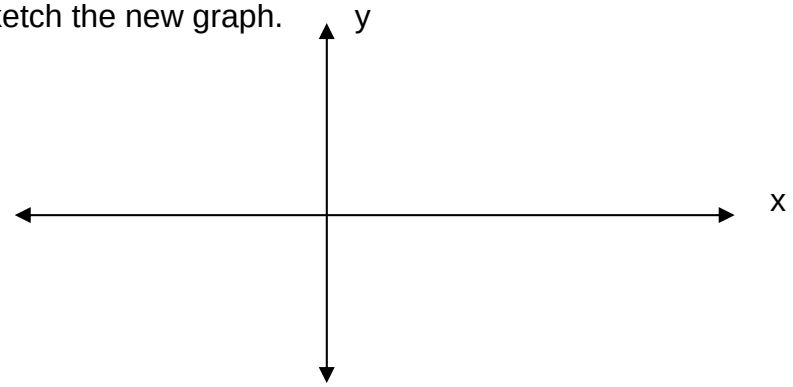
c. $x = \frac{\ln 15}{\ln 2}$

d. x = ln (7.5)

27. The graph of $y = \log_2 x + 7$ is shown below. Suppose the graph is translated 5 units down.



A. Sketch the new graph.



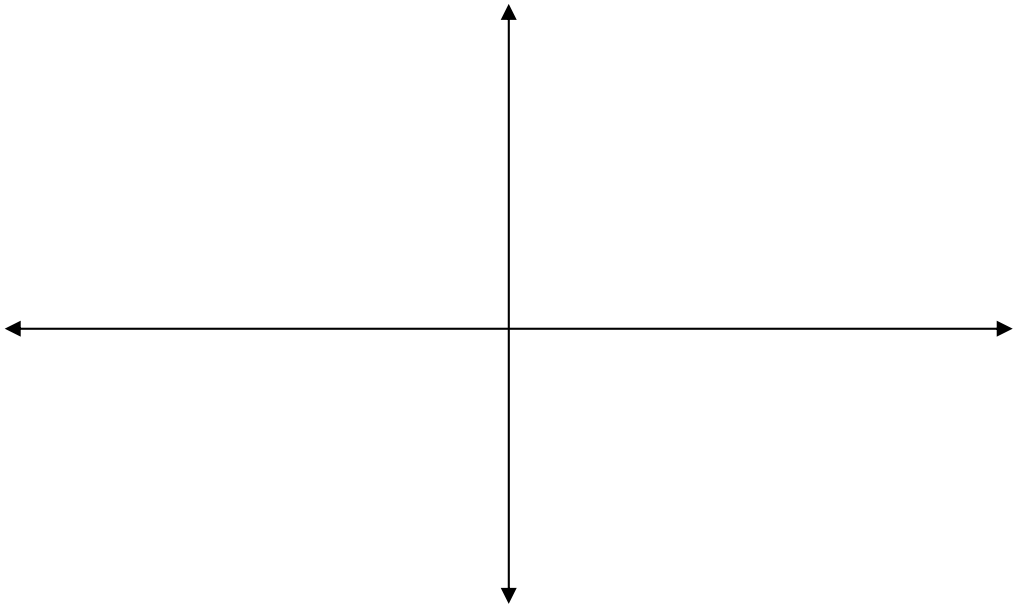
B. What is the equation of the new graph?

28. Your company produces gas. The average cost per gallon of gas is approximated by $C(x) = \frac{27{,}000}{x + 50}$, where x is the number of gallons produced.

A. Evaluate C(5), C(1,000), and C(10,000). Express answers as fractions.

B. As the number of gallons produced increases, does cost per gallon produced increase or decrease?

C. Sketch the graph of cost per gallon of gas, C(x) as a function of gallons produced x.



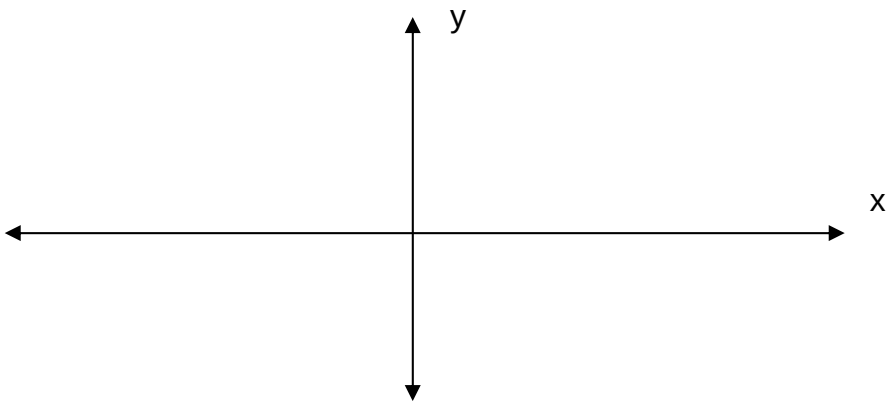
D. How many gallons must be produced to have the cost of gas per gallon be $2.45?

E. The x-axis is a horizontal asymptote. What does this say about the cost of producing gas?

29. Explain how you would change a, b, or c to lower the graph of a quadratic equation of the form $y = ax^2 + bx + c$ vertically without changing the axis of symmetry.

30. Given the equations $y = x^2$ and $y = 4x^2$.

A. Sketch a graph for each equation on the same set of axes. **Label** your graphs.



B. Use the equations to explain why the graphs are different.

C. In the equation $y = 4x^2$ how would replacing the 4 to a -4 change the graph?

31. The graph of a quadratic equation goes through the points (0, 1), (1, 0), and (2, 7). Set up the system of equations you would need to determine the quadratic equation. SET UP ONLY.

32. Margaret deposits $1,600 in a savings account. Her savings earn 4% interest compounded annually.

A. How much interest will she earn the first year?

B. Determine the amount in her account after three years.