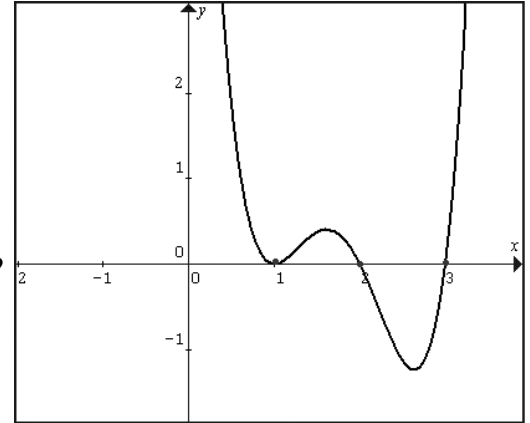


1. What is $[f \circ g](x)$ if $f(x) = 2x + 7$ and $g(x) = -3x + 4$?
 A. $-6x - 17$ B. $-6x + 15$ C. $-6x + 8$ D. $-6x - 10$

Given the graph below answer question 2 and 3.

2. What are the nature of the roots of the given graph?
 A. 3 distinct real roots
 B. 1 distinct real, 2 imaginary roots
 C. 2 distinct real roots, 2 imaginary roots
 D. 1 distinct real root, 3 imaginary roots



3. Which of the following equations below is a representation of the graph?
 A. $f(x) = -a(x - 1)^2(x - 2)(x - 3)$
 B. $f(x) = a(x - 1)^2(x - 2)(x - 3)$
 C. $f(x) = -a(x + 2)^2(x + 1)(x + 3)$
 D. $f(x) = a(x + 1)^2(x + 2)(x + 3)$

4. From the given polynomial, what are the zeros?. $f(x) = (x^2 + 4)(x - 2)$
 A. $x = 2$ with multiplicity of 2 and -2
 B. $x = -2$ with multiplicity of 2 and 2
 C. $x = 2, 2i,$ and $-2i$
 D. $x = 2$ multiplicity of 3

5. Given that a polynomial has a root of $2i$ and 3 , what is the standard form of the polynomial?

- A. $x^2 - 5x + 6$ B. $x^3 - 3x^2 + 4x - 12$ C. $x^3 - 3x^2 - 4x + 12$ D. $x^3 + 3x^2 + 4x - 12$

6. Bill can shovel his driveway in 2 hours. If Bill enlists the help of Jerry, it takes only 1.2 hours to shovel the driveway. How long would it take if Jerry had to shovel the driveway alone?
 a. $\frac{12}{17}$ b. 1 c. $\frac{8}{5}$ d. 3

Use the following scenario for questions 7 and 8. A manufacturer of ski clothing makes snow hats and gloves. The profit on a snow hat is \$1.75 and on a pair of gloves \$2.00. Both snow hats and gloves require the work of sewing operators and cutters. There are 40 minutes of sewing operator time and 44 minutes of cutter time available. It takes 8 minutes to sew one snow hat and 2 minutes to sew a pair of gloves. Cutters take 4 minutes on a snow hat and 4 minutes on a pair of gloves. Let x = the number of snow hats made and y = the number of pairs of gloves made.

7. The manufacturer would like to maximize their profit. What is the objective function?

- A) $P = 4x + 4y$ B) $P = 8x + 2y$ C) $P = 40x + 44y$ D) $P = 1.75x + 2y$

8. In order to maximize their profit, the manufacturer is limited by constraints. Other than $x \geq 0$ and $y \geq 0$, what are the other constraints?

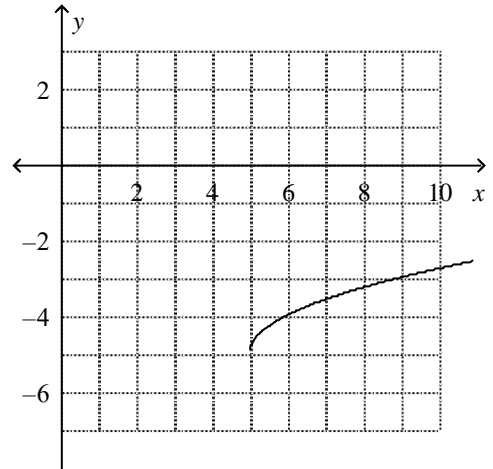
- A) $4x + 4y \leq 40$ B) $8x + 4y \leq 40$ C) $8x + 2y \leq 40$ D) $4x + 2y \leq 40$
 $8x + 2y \leq 44$ $4x + 2y \leq 44$ $4x + 4y \leq 44$ $8x + 4y \leq 44$

17. Edgar is getting better at math. On his first quiz he scored 57 points, then he scores 61 and 65 on his next two quizzes. Find the model that exemplifies his 'nth' quiz grade. If his scores continued to increase at the same rate, what will be his score on his 9th quiz?

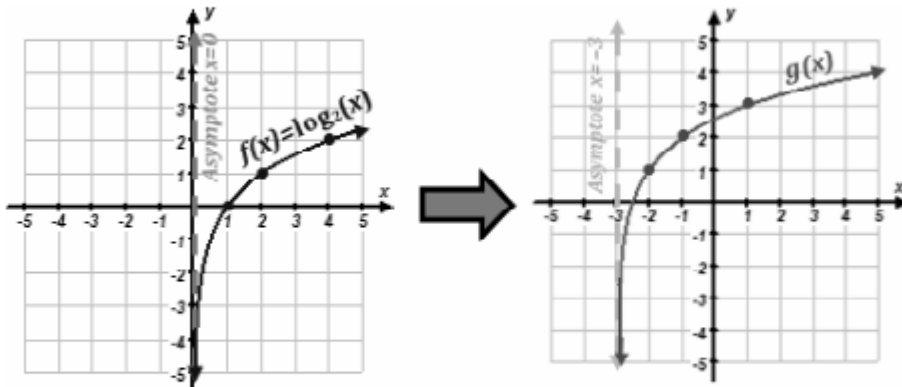
- A. $a_n = 57 + 4(n - 2)$; 85
- B. $a_n = 57 + 4n$; 93
- C. $a_n = 53 + 4n$; 89
- D. $a_n = 57 * 4^{n-1}$; 89

18. Which function matches the graph?

- a. $y = \sqrt{x + 5} + 5$
- b. $y = \sqrt{x - 5} - 5$
- c. $y = \sqrt{x + 5} - 5$
- d. $y = \sqrt{x - 5} + 5$



19. Given $g(x)$ is a transformation of the graph $f(x) = \log_2(x)$, determine which of the below correctly describe $g(x)$?



- a. $g(x) = \log_2(x - 3) + 1$
- b. $g(x) = \log_2(x - 3) - 1$
- c. $g(x) = \log_2(x + 3) + 1$
- d. $g(x) = \log_2(x + 3) - 1$

20. Given the function of $m(x) = -2x^2 + 2x + 4$, which of the statements are true?

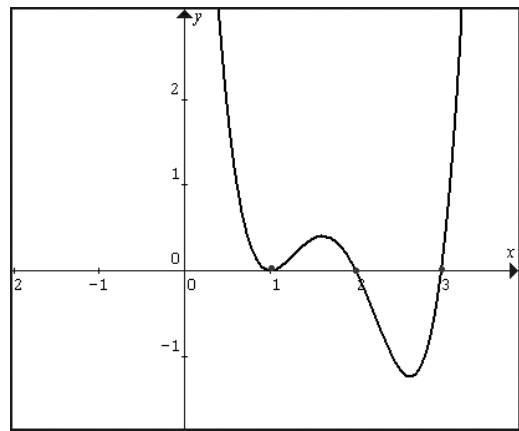
- A) I and II
- B) II only
- C) II and III
- D) All of them

- I. The zeros of the functions are -2 and 1
- II. As $x \rightarrow -\infty, m(x) \rightarrow -\infty$, As $x \rightarrow \infty, m(x) \rightarrow -\infty$
- III. Vertex form is $m(x) = -2(x - 0.5)^2 + 4.5$

21. Given the graph of $h(x) = ax^4 + bx^3 + cx^2 + dx + e$, which statement(s) is/are true?

- A) I, II, and IV
- B) II and III
- C) I and IV
- D) Only I

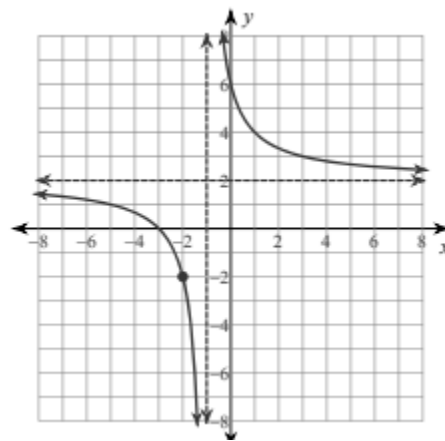
- I. value of $e > 0$
- II. 3 real zeros and 1 imaginary
- III. value of $a < 0$
- IV. multiplicity at $x = 1$ is 2



22. Given that $f(x) = \frac{4(x+1)^2}{2(x+2)(x-2)}$ and $G(x)$ is the graph seen below, which statements are true?

- I. $F(x)$ and $G(x)$ have the same horizontal asymptote
- II. $F(x)$ has two non-removable discontinuity
- III. $G(x)$ has a removable discontinuity

- A) All are true
- B) Only II
- C) I and III
- D) I and II



23. A rational function has a vertical asymptote at $x = 2$, a horizontal asymptote at $y = 0$, and a hole in the graph at the point $(3, -2)$. What are the domain and range of the rational function?

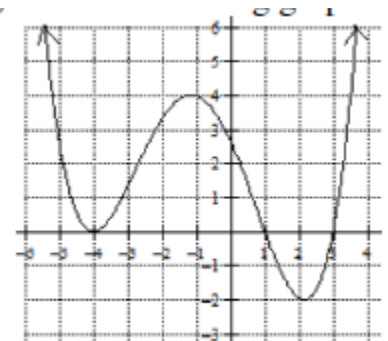
- A. Domain: $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$ Range: $(-\infty, -2) \cup (-2, 0) \cup (0, \infty)$
- B. Domain: $(-\infty, 2) \cup (2, \infty)$ Range: $(-\infty, \infty)$
- C. Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$
- D. Domain: $(-\infty, 2) \cup (2, \infty)$ Range: $(-\infty, 0) \cup (0, \infty)$
- E. Domain: $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$ Range: $(-\infty, 0) \cup (0, \infty)$

For questions 24-27 use the following graph of the function $G(x)$.

24. Which of the following statements regarding $g(x)$ is/are true?

- I. Range of $G(x)$ is $(-2, \infty)$
- II. $(x + 3)$ is a factor of the equation of $g(x)$ one time
- III. The leading coefficient of the equation of $g(x)$ is negative

- a. I only
- b. II only
- c. I and II only
- d. II and III only
- e. I and III only



25. On which of the following intervals of x is $G(x)$ increasing?

- I. $(-\infty, -4)$ II. $(-4, -1)$ III. $(-1, 2)$ IV. $(2, \infty)$

- a. II only b. I and III only c. III only

d. II and III only

e. II and IV only

26. Which of the following statements is/are true about the graph of $G(x)$?

I. The graph is decreasing on the interval $(-1, 2)$.

II. The point $(2, -2)$ is an abs minimum of the graph of $G(x)$.

III. The domain of $G(x)$ is all real numbers

a. I and II only

b. II and III only

c. I and III only

d. III only

e. I, II, and III

27. Which of the following statements is/are true for $G(x)$?

I. as $x \rightarrow -\infty, f(x) \rightarrow \infty$

II. The graph has a relative maximum at $(-4, 0)$

III. If c is the constant term in the equation, then c is a value between 2 and 3.

a. II and III only

b. I and II only

c. III only

d. I and III only

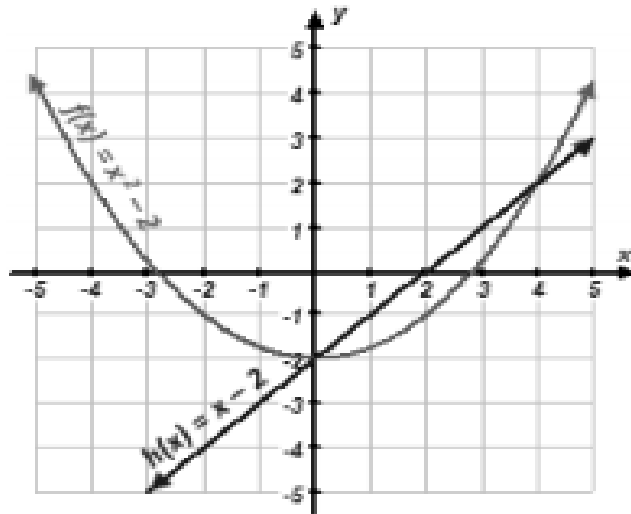
e. I, II, and III

28. Consider the functions below and also graphed at the right.

$$f(x) = x^2 - 2$$

$$h(x) = x - 3$$

Over which interval below would the two graphs have the same average rate of change?



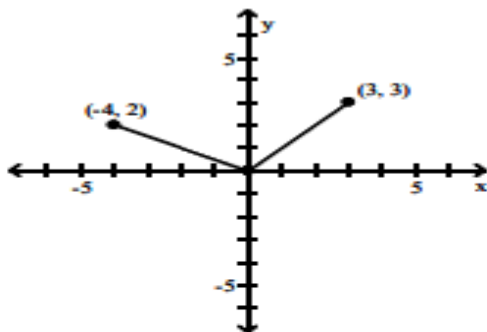
a. $[0, 1]$

b. $[0, 4]$

c. $[-2, 2]$

d. $[-2, 0]$

29. The graph of a piecewise function is given. Write a formula for the function.



A) $f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$

B) $f(x) = \begin{cases} -2x & \text{if } -4 \leq x \leq 0 \\ x & \text{if } 0 < x \leq 3 \end{cases}$

C) $f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 \leq x \leq 0 \\ x & \text{if } 0 < x \leq 3 \end{cases}$

D) $f(x) = \begin{cases} \frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$

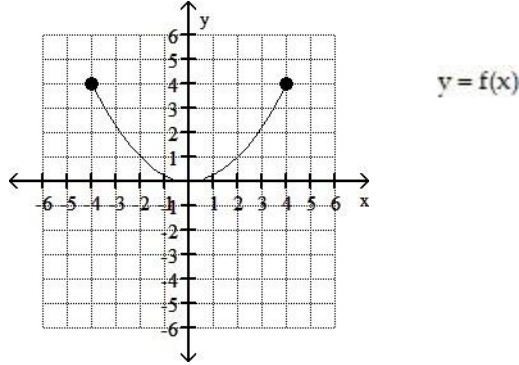
Solve the exponential equation. Express the solution set in terms of natural logarithms.

30. $6^{4x} = 4$

- A) $\left\{ \frac{4 \ln 4}{\ln 6} \right\}$ B) $\left\{ \frac{4 \ln 4}{\ln 6} \right\}$ C) $\left\{ \frac{\ln 4}{4 \ln 6} \right\}$ D) $\left\{ \frac{\ln 4}{6 \ln 4} \right\}$

Use the graph of the function f , plotted with a solid line, to sketch the graph of the given function g .

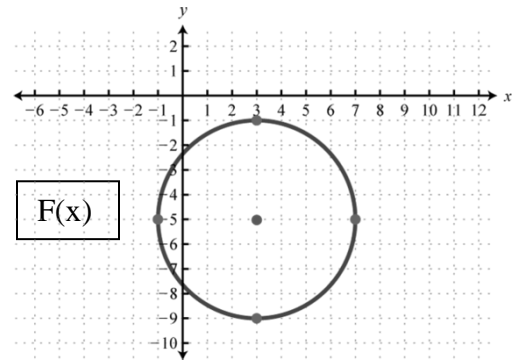
31. $g(x) = -f(x + 1) - 2$



- A)
- B)
- C)
- D)

32. Given the graph of the circle, what is the new center of the circle if you performed the following transformation? $G(x) = f(x - 2) - 4$

- A) $G(x)$ center is $(1, -9)$
 B) $G(x)$ center is $(5, -9)$
 C) $G(x)$ center is $(5, -1)$
 D) $G(x)$ center is $(-3, 7)$



33. Simplify: $\left(m^{-\frac{2}{3}} n^{\frac{3}{4}} \right)^3$

- A) $m^{\frac{7}{3}} n^{\frac{15}{4}}$ B) $m^{\frac{1}{3}} n^{\frac{3}{2}}$
 C) $\frac{9}{m^2}$ D) $\frac{1}{m^6}$

34. Which intervals correctly define the domain of $f(x) = \frac{1}{x+4} - 2$?

- A) $(-\infty, 4)$ and $(4, \infty)$
 B) $(-\infty, -4)$ and $(4, \infty)$
 C) $(-\infty, -4)$ and $(-4, \infty)$
 D) $(-\infty, -4)$ and $(-2, \infty)$

35. Which function is best represented by the data in this table?

X	0	1	2	3	4
Y	1	3	9	27	81

- A $f(x) = x^3$
- B $f(x) = 3^x$
- C $f(x) = 3x$
- D $f(x) = 3x^2$

36.

Simplify: $\frac{x-1}{x^2-1} + \frac{2}{5x+5}$

A $\frac{7x-6}{5(x+1)(x-1)}$

B $\frac{7}{5(x+1)}$

C $\frac{3}{x+1}$

D $\frac{7x^2-3}{(x^2-1)(5x+5)}$

E $\frac{7}{5(x^2-1)}$

37. Identify the type of conic section from the equation:

$$y^2 - 4y - x^2 + 6x = 12.$$

- A) Circle B) Ellipse C) Hyperbola D) Parabola

38. What is the extraneous solution of $(x+4)^{2/3} = (-2x)^{1/3}$?

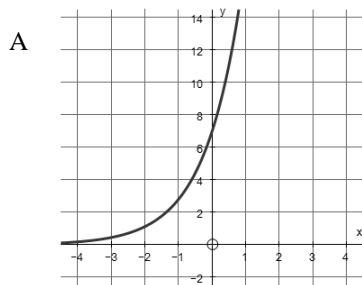
- A) $x = -2$ B) $x = 2$ C) 3 D) $x =$ no extraneous solution

39. Given the function of $m(x) = -2x^2 + 2x + 4$, which of the statements are true?

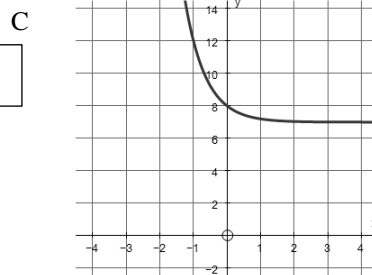
- A) I and II
- B) II only
- C) II and III
- D) All of them

- I. The zeros of the functions are -2 and 1
- II. As $x \rightarrow -\infty, m(x) \rightarrow -\infty$, As $x \rightarrow \infty, m(x) \rightarrow -\infty$
- III. Vertex form is $m(x) = -2(x - 0.5)^2 + 4.5$

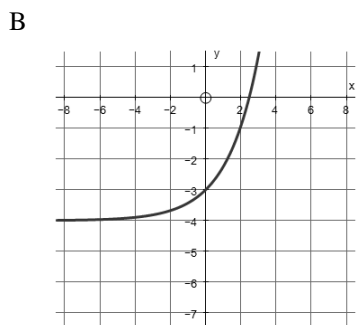
40. Choose the graph of the **inverse** of $g(x) = \log_{\frac{10}{4}} \frac{x}{7}$ and state the asymptote.



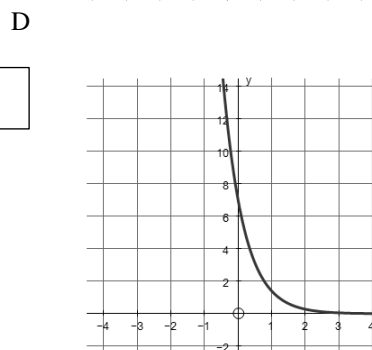
Asymptote: $y = 0$



Asymptote: $y = 7$



Asymptote: $y = -4$



Asymptote: $y = 0$

41. If $3 \log_4(a-2) = \frac{9}{2}$, then $a =$

A. $\frac{7}{2}$

B. $\frac{9}{2}$

C. 6

D. 8

E. 10

42. What is the vertex and solutions of the following quadratic $y = 2x^2 - 8x + 6$?

- a. (2, -1), $x = 3, 1$ b. (-2, 2), $x = -1, -3$
 c. (2, -2), $x = \pm\sqrt{3}$ d. (2, -2), $x = 3, 1$

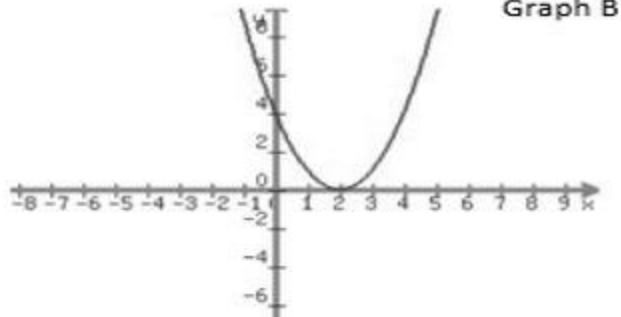
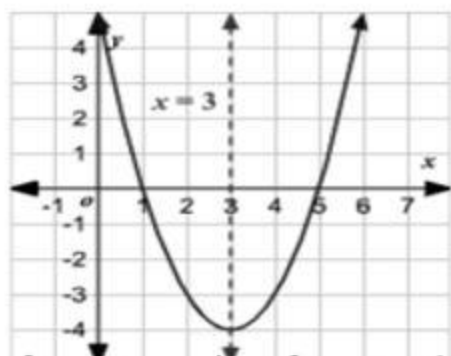
43. Solve $4(x-4)^2 - 108 = 0$.

- A) ± 31 B) $4 \pm 3\sqrt{3}$
 C) $\pm \sqrt{11}$ D) $\pm \sqrt{43}$

44. Factor $2x^3 + 10x^2 - x - 5$.

- A) $(2x-1)(x^2+5)$ B) $(2x^2+1)(x-5)$
 C) $(2x^2+1)(x+5)$ D) $(2x^2-1)(x+5)$

45.



What transformation is done from Graph A to Graph B?

- a) Left 1, down 4 b) Right 1, down 4
 c) Right 1, up 4 d) Left 1, up 4

ALGEBRA 3
PACKET 2 ANSWERS

NAME: _____
PERIOD: _____

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