PreAP PreCalculus Semester 1 Multiple Choice Review

Unit 1

1. C
2. B
3. E
4. A
5. D
6. C
7. A

8. E
9. D
10. C
11. D
12. E
13. A
14. E
15. A
16. B

Unit 2

17. B
18. B
19. A
20. C
21. E
22. B
23. D
24. C
25. A

Unit 3

26. D
27. E
28. B
29. C
30. C
31. D
32. B
33. B
34. A

Unit 4

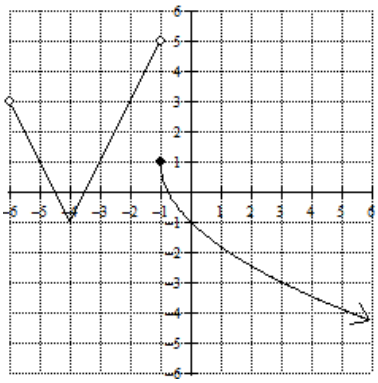
35. C
36. C
37. E
38. **D**
39. A
40. C
41. E
42. B
43. D

Unit 5

44. E
45. B
46. D
47. A
48. B
49. C
50. E
51. C
52. D

Unit 1 MULTIPLE CHOICE No Calculator

1. The graph of a function $h(x)$ is pictured to the right. If $p(x) = -2|x-3|+3$, then for what value(s) of x is the function $p(x) = h(-5)$?



A. $x = 1$ only

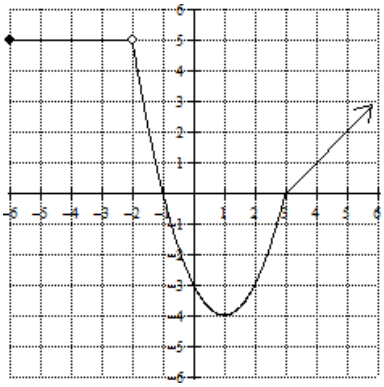
B. $x = -2$ and 2

C. $x = 2$ and 4

D. $x = -5$ and 1

E. $x = 1$ and 5

2. The graph of a function $f(x)$ is pictured to the right. Which of the following statements is/are true about the graph of $f(x)$?



I. The graph of $f(x)$ is decreasing on the interval $(-2, \infty)$.

II. The value of $f(x) = 5$ for all values of x on the interval $[-6, -2]$.

III. The domain of $f(x)$ is $[-6,-2)\cup(-2,\infty)$.

A. I and III only

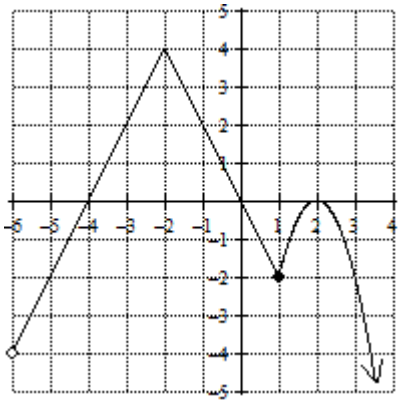
B. III only

C. II only

D. II and III only

E. I, II and III

3. The graph of $f(x)$ is shown to the right. Which of the following intervals correctly identifies all values of x for which $f(x) < 0$?



A. $(-6,-4)\cup(0,\infty)$

B. $[-6,-4]\cup[0,\infty)$

C. $[-6,-4)\cup(0,2)\cup(2,\infty)$

D. $(-6,-4)\cup[0,\infty)$

E. $(-6,-4)\cup(0,2)\cup(2,\infty)$

4. Use the table of values to the right to determine the value of $[f(-2)+2\cdot g(2)]$.

A. 6

B. 10

C. 1

D. 3

E. –2

x	$f(x)$	$g(x)$
–2	–2	3
–1	2	3
2	0	4
3	–1	3

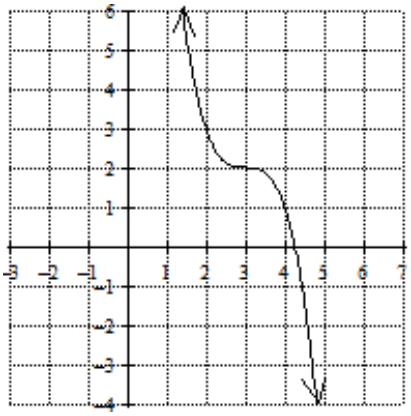
5. If $g(x)=\sqrt{x+3}-2$, for what value(s) of x is $g(x) = 1$?

A. $x = 3$ B. $x = 0$ C. $x = 8$

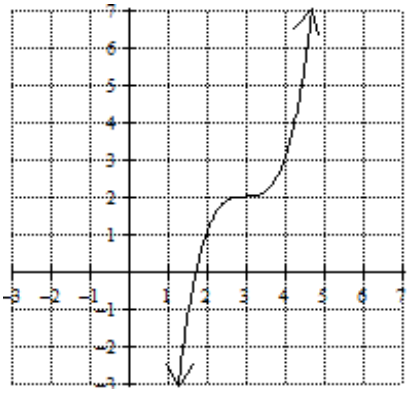
D. $x = 6$ E. No value of x will make $g(x) = 1$.

6. Which of the following graphs is the graph of the function $g(x)=-(x+3)^3+2$?

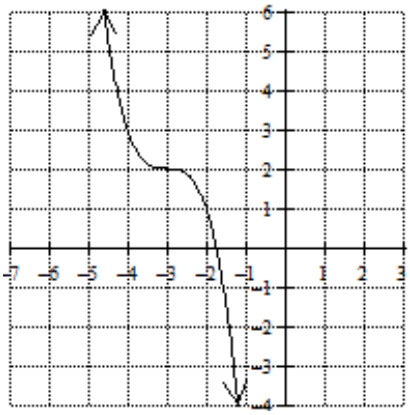
A.



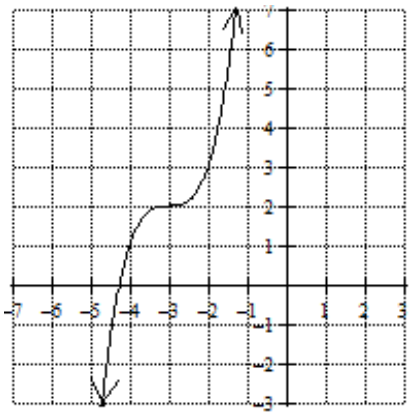
B.



C.



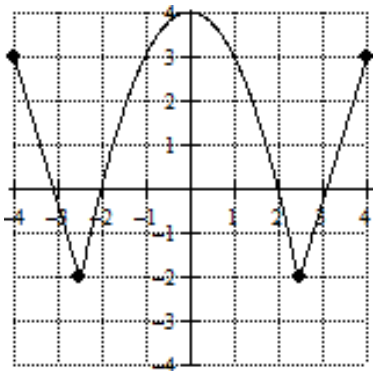
D.



E.

None of these graphs are correct.

7. Suppose that $g(x) = (x - 3)^2 - 5$. Which of the following statements is true if $f(x)$ is the function pictured?



A. $g(2) < f(3.5)$

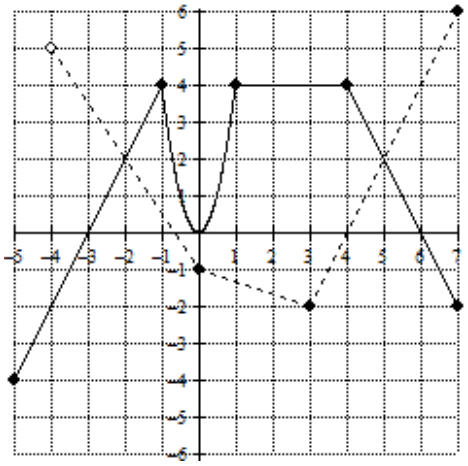
B. $g(2) > f(3.5)$

C. $g(2) = f(3.5)$

D. No comparison can be made because $f(3.5)$ cannot be determined.

E. No comparison can be made because $g(2)$ cannot be determined.

8. The graph of $f(x)$ is the dashed line graph and $g(x)$ is the solid line graph pictured. Which of the following best describes where the graph of $g(x) \leq 0$?



A. $[-5, -3] \cup [6, 7]$

B. $(-3, 0) \cup (0, 6)$

C. $(-5, -3] \cup [6, 7)$

D. $[-3, 6]$

E. $[-5, -3] \cup [6, 7]$ and $x = 0$

9. Consider the functions $f(x) = 2x^2 + 3x - 2$ and $g(x) = x - 2$. Find an equation for $f(g(x))$.

A. $f(g(x)) = x^2 - 8x + 4$

B. $f(g(x)) = 2x^3 - 4x^2 - 5x + 4$

C. $f(g(x)) = 2x^3 - x^2 - 8x + 4$

D. $f(g(x)) = 2x^2 - 5x$

E. None of these

10. Identify the domain of the function $g(x) = \dfrac{3 - x}{x^2 - x - 20}$

A. $(-\infty, -4) \cup (-4, 3) \cup (3, 5) \cup (5, \infty)$

B. $(-\infty, 3) \cup (3, \infty)$

C. $(-\infty, -4) \cup (-4, 5) \cup (5, \infty)$

D. $(-\infty, \infty)$

E. The domain cannot be determined.

11. The graph of $f(x)$ is shown to the right and $g(x) = \sqrt{2x-1}$. What is the value of $f(g(5))$?

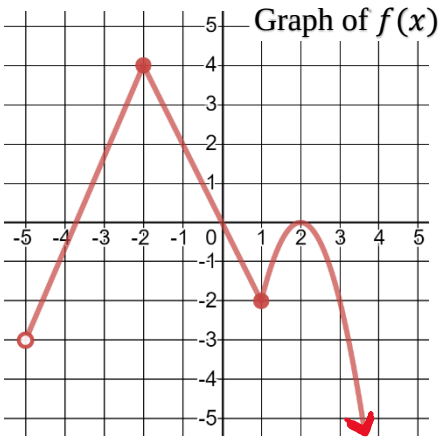
A. 3

B. 7

C. 19

D. –2

E. Undefined



12. What is the domain of the function $f(x) = \sqrt{6-2x}$.

A. $(-\infty, 3) \cup (3, \infty)$

B. $(-\infty, 3)$

C. $[3, \infty)$

D. $(3, \infty)$

E. $(-\infty, 3]$

13. For what value of a would the function $g(x) = \begin{cases} ax - 3, & x < -2 \\ x^2 - 2x, & x > -2 \end{cases}$ have a point discontinuity at $x = -2$.

A. $a = -\frac{11}{2}$

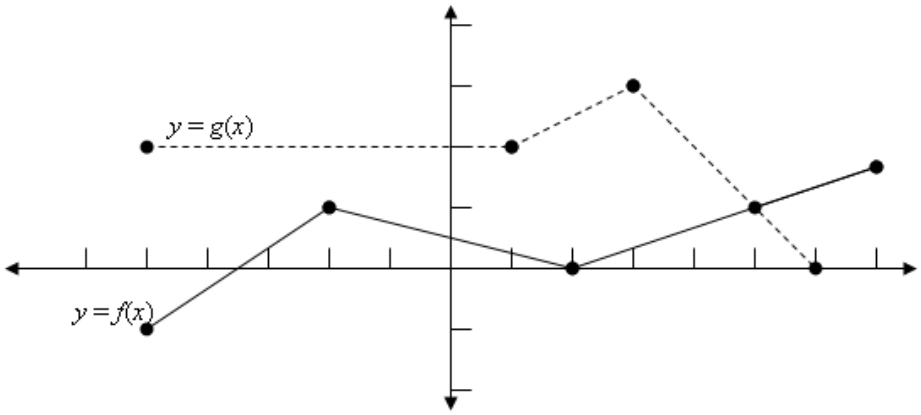
B. $a = -\frac{3}{2}$

C. $a = -\frac{5}{2}$

D. $a = \frac{5}{2}$

E. No value of a will make the function have a point discontinuity at $x = -2$.

Use the graphs of $f(x)$ and $g(x)$ pictured below to answer questions 14 and 15.



14. Which of the following statements is/are true about the graphs of $f(x)$ and $g(x)$, pictured above?

I. $g(x)$ is constant on the interval $(-5, 1)$.

II. $f(x) \geq 0$ only on the interval $(-3.5, 7)$.

III. $g(x) > f(x)$ only on the interval $[-5, 5)$.

A. I, II and III
B. I only
C. II only
D. II and III only
E. I and III only

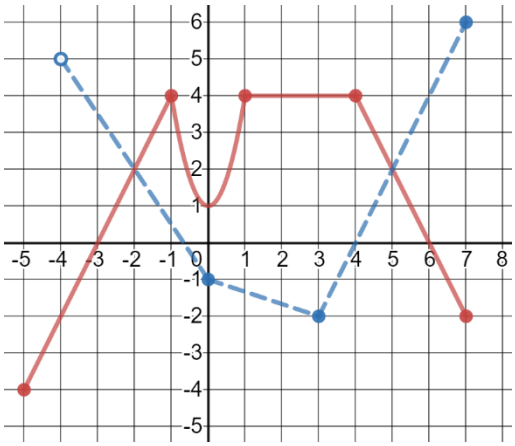
15. If $p(x) = 2mx^2 - 3x$, for what value(s) of m would $p(-1) = g(f(2))$?

A. $m = -\frac{1}{2}$
B. $m = \frac{5}{2}$
C. $m = -2$
D. $m = 2$
E. No value of m would make $p(-1) = g(f(2))$.

16. In the graph to the right, the dashed line graph represents $f(x)$ and the solid line graph is that of $g(x)$. At which of the following values of x is $f(x) > 0$ and $f(x) < g(x)$?

I. $x = -3$ II. $x = -1$ III. $x = 4.3$

A. II only
B. II and III only
C. III only
D. I and II only
E. I, II, and III



Unit 2 MULTIPLE CHOICE Calculator Permitted

17. If the function $f(x) = |x-3| + |3-2x|$ is rewritten without absolute value bars, what is the expression by which the function is defined for x values such that $x \leq \frac{3}{2}$?

A. $3x + 6$

B. $-3x + 6$

C. x

D. $3x - 6$

E. $-x$

18. If it is known that the point $(-2, -5)$ is a point on the graph of $y = f(x)$, then which of the following points must be on the graph of $y = f(x - 1) + 3$?

A. $(-3, -2)$

B. $(-1, -2)$

C. $(-3, -8)$

D. $(0, -2)$

E. $(-1, -8)$

19. If the function $f(x)$ is an odd function and the point $(-3, 2)$ is on the graph, which of the following points must also be on the graph of $f(x)$?

A. $(3, -2)$

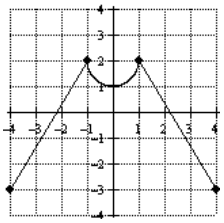
B. $(-3, -2)$

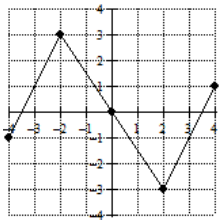
C. $(-3, 3)$

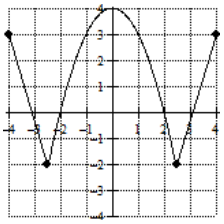
D. $(3, 2)$

E. $(2, -3)$

20. Which of the following functions is an even function?

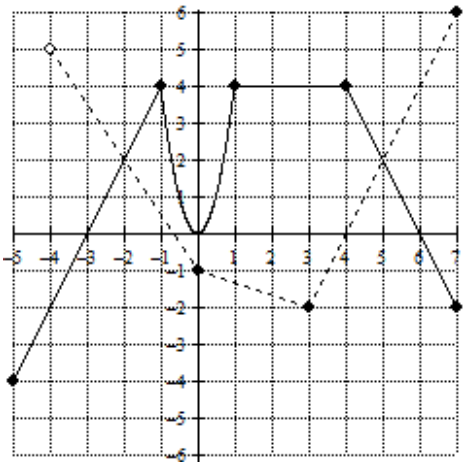
I. 

II. 

III. 

A. I only
B. II only
C. I and III only
D. II and III only
E. III only

21. The graph of $f(x)$ is the solid line graph and $g(x)$ is the dashed line graph pictured to the right. Which of the following statements is/are true?



I. $f(x) > 0$ on the interval $(-3,0) \cup (0,6)$.

II. $g(x) < f(x)$ only on the open interval $(-2, 5)$.

III. $f(g(3)) - g(f(6)) = 3$

A. I and II only
B. III only
C. II only
D. I and III only
E. I, II, and III

22. The table of values to the right includes points that lie on the graph of $f(x)$, a continuous function on the interval $-4 \leq x \leq 4$. Which of the following statements is/are true?

x	$f(x)$
−4	3
−2	−1
−1	2
1	−2
2	1
4	−3

I. $f(x)$ is a one-to-one function.

II. $f(f(f(2)) = -1$.

III. The graph of $f(x)$ exhibits origin, rotational symmetry.

A. I and III only
B. II and III only
C. I, II, and III
D. II only
E. I and II only

23. If $f(x)$ and $g(x)$ are inverse functions of each other and it is known that $f(3) = -5$, then which of the following function values must be true?

A. $f(-3) = -5$

B. $g(-3) = 5$

C. $g(5) = -3$

D. $g(-5) = 3$

E. None of these functions' values must be true.

24. Suppose that $f(x) = 2ax^2 - 3x + 2$. for what value of a is $f(-1) = 3$?

A. $a = 2$

B. $a = 1$

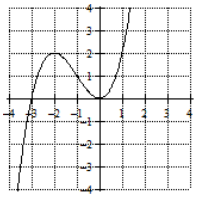
C. $a = -1$

D. $a = 3$

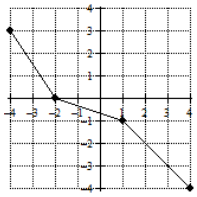
E. $a = 4$

25. For which of the following functions does $F^{-1}(x)$ NOT exist?

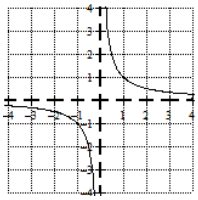
I.



II.



III.



A. I only

B. II only

C. I and II only

D. II and III only

E. III only

26. Which of the following statements is/are true about the function $f(x) = 2x^3 - 5x^2 - 4x + 12$?

I. $(x - 2)$ is a factor of $f(x)$.

II. The graph of $f(x)$ crosses the x – axis at $x = 2$.

III. $x = -\frac{3}{2}$ is a root of $f(x)$.

A. I and II only
B. I only
C. III only
D. I and III only
E. I, II, and III

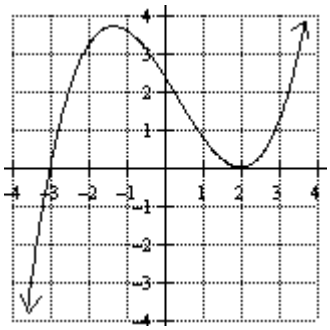
27. What value of k makes the factor $(x - 3)$ a factor of the function $f(x) = 3x^3 - 10x^2 + x + k$?

A. –6
B. 9
C. 174
D. –21
E. 6

28. If $(x + 1)$ is a factor of $f(x) = 3x^3 - 11x^2 - 6x + 8$, what is $f(x)$ written in completely factored form?

A. $f(x) = (x + 1)(3x - 4)(x - 2)$
B. $f(x) = (x + 1)(3x - 2)(x - 4)$
C. $f(x) = (x + 1)(3x - 4)(x + 2)$
D. $f(x) = (x + 1)(3x - 2)(x + 4)$
E. $f(x) = (x + 1)(3x + 2)(x - 4)$

29. Which of the following statements is false about the function to the right?



A. The multiplicity of the root $x = 2$ is even.

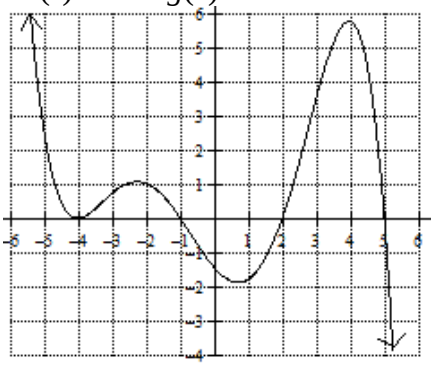
B. The function graphed has odd degree.

C. As $x \to -\infty$, then $f(x) \to \infty$.

D. As $x \to \infty$, then $f(x) \to \infty$.

E. The domain and range of $f(x)$ are $(-\infty, \infty)$.

30. Given the graph of the function $g(x)$ pictured to the right, for what value(s) of x is $g(x) > 0$?



A. $(-\infty,-1)\cup(2,5)$

B. $(-1,2)$

C. $(-\infty,-4)\cup(-4,-1)\cup(2,5)$

D. $(-\infty,-1]\cup[2,5]$

E. $x = -4$ and $[-1,2]$

31. Solve the polynomial inequality: $(x-2)^2(x+1)(x+3) \le 0$

A. $(-\infty,-3)\cup(-1,2)\cup(2,\infty)$

B. $[-3,-1]$

C. $(-\infty,-3]\cup[-1,\infty)$

D. $[-3,-1]$ and $x = 2$

E. $(-\infty,-3)\cup(-1,\infty)$

A table of values for a quartic polynomial function is shown below. Additionally, the function is such that there are only three distinct zeros, all of which are integer values.

x	-4	-2	-1	0	1	2	3	4
$p(x)$	108	-16	0	12	8	0	24	132

32. If c is the constant in the equation of $p(x)$, then which of the following is the value of c?

A. $c = -1$ B. $c = 12$ C. $c = 2$

D. $c = 9$ E. The value of c cannot be determined.

33. Which of the following statements is/are true about $p(x)$?

I. In factored form, $(x + 3)$ is a factor of $p(x)$ one time.

II. $x = 2$ is a zero whose multiplicity is 2.

III. At least one of the zeros of $p(x)$ has a multiplicity of 3.

A. I only B. I and II only C. II and III only

D. II only E. III only

34. How many times is $(x - 1)$ a factor of $g(x) = x^4 - 6x^2 + 8x - 3$?

A. 3

B. 2

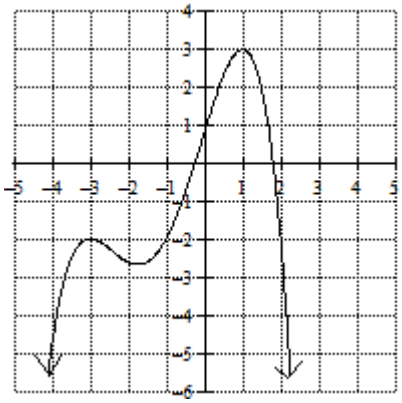
C. 1

D. 0

E. Cannot be determined

Unit 4 MULTIPLE CHOICE – Calculator Permitted

35. Which of the following statements is true about the graph of $P(x)$ pictured to the right?



A. $P(x)$ is a quadratic function whose equation has a negative leading coefficient.

B. $P(x)$ is a quadratic function whose equation has a positive leading coefficient.

C. $P(x)$ is a quartic function whose equation has a negative leading coefficient.

D. $P(x)$ is a quartic function whose equation has a positive leading coefficient.

E. $P(x)$ is a cubic function whose equation has a negative leading coefficient.

36. If $f(x) = -3x^5 - 3x^3 + 2x^2$, which of the following statements is true?

A. $x = 0$ is not a root of $f(x)$.

B. $x = 0$ is a root of $f(x)$ 1 time.

C. $x = 0$ is a root of $f(x)$ 2 times.

D. $x = 0$ is a root of $f(x)$ 3 times.

E. $x = 0$ is a root of $f(x)$ 4 times.

37. Which of the following statements is/are true about the polynomial function, $P(x)$?

$$P(x) = -3x^5 - 2x^4 + 2x^2 - x + 2$$

I. As $x \to \infty$, $P(x) \to -\infty$.

II. All of the possible rational roots of $P(x)$ are $\pm 1,\ \pm 2,\ \pm \frac{1}{3}$.

III. There can be either 3 or 1 positive root(s) of $P(x)$.

A. I only

B. II and III only

C. I and II only

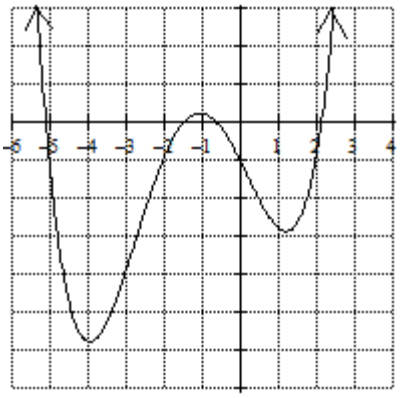
D. I, II, and III

E. I and III only

38. Which of the following is the correct combination of the types of roots for the function $g(x) = x^4 - 4x^3 - 7x^2 - 12$?

	Positive	Negative	Zero	Imaginary
A.	3	1	0	0
B.	1	3	0	0
C.	2	2	0	0
D.	1	1	0	2
E.	0	0	0	4

39. The graph of the function $f(x) = ax^4 + bx^3 + cx^2 + dx + e$ is pictured to the right. Which of the following is true?



A. The value of $a > 0$.

B. The value of $a < 0$.

C. The value of $e = 1$.

D. Both A and C

E. Both B and C.

40. At which of the following values of x does the graph of $h(x) = -2x^4 - 5x^3 + 4x^2 + 12x$ have a point of inflection?

I. $x = 0.063$ II. $x = -1.403$ III. $x = -2$

A. II and III only

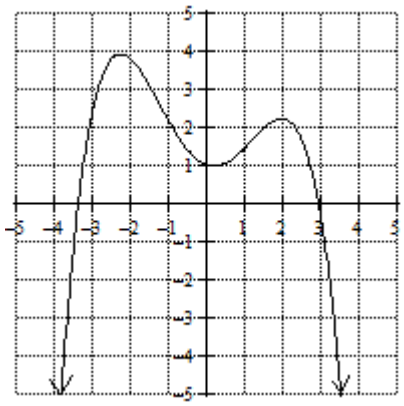
B. I only

C. I and II only

D. I, II, and III only

E. Cannot be determined

The graph of a quartic function, $p(x)$, is pictured. Use the graph for questions 41 and 42.



41. Which of the following conclusions can be made about $p(x)$.

    A. The equation of $p(x)$ has an even number of sign changes.

    B. The equation of $p(-x)$ has an odd number of sign changes.

    C. The constant term, c, of $p(x)$ is such that $c > 0$.

    D. Both A and C are true.

    E. Both B and C are true.

42. Which of the following can be concluded about the roots of $p(x)$?

    A. $p(x)$ has one irrational root, one rational root, and two imaginary roots.

    B. $p(x)$ has two real roots and two imaginary roots.

    C. $p(x)$ has four imaginary roots.

    D. $p(x)$ has four real roots.

    E. None of these conclusions can be reached about $p(x)$.

43. It is known that a polynomial function, $f(x)$, has roots of $x = 2$, which has multiplicity of 3, and $x = 2 - i$. Minimally, what type of polynomial function is $f(x)$?

    A. quadratic

    B. cubic

    C. quartic

    D. quintic

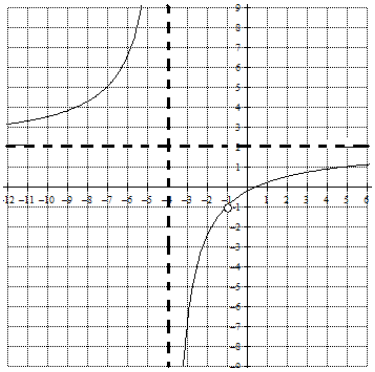
    E. linear

44. If any exist, find the coordinates of the point discontinuities of the rational function $H(x) = \frac{(2x+1)(x-2)(x+3)}{2x^2+7x+3}$

I. (–3, –5) II. $\left(\frac{1}{2}, -\frac{3}{2}\right)$ III. $\left(-\frac{1}{2}, -\frac{5}{2}\right)$

A. I only
B. I and II only
C. II only
D. III only
E. I and III only

45. Which of the following is a non-canceling factor in the denominator of the function graphed to the right?



A. $(x – 4)$ B. $(x + 4)$ C. $(2x + 1)$

D. $(2x – 1)$ E. $(x + 1)$

46. What, if one exists, is the equation of the slant asymptote of $f(x) = \frac{2x^2-3x+5}{x+3}$.

A. $y = 2x – 3$
B. $y = 2x + 1$
C. $y = ½x – 3$
D. $y = 2x – 9$
E. $f(x)$ does not have a slant asymptote.

47. Which of the following is the equation of the horizontal asymptote of $g(x) = \frac{5-2x-6x^2}{3x^2-2x}$?

A. $y = -2$ B. $y = \frac{5}{3}$ C. $y = 3$

D. $y = 0$ E. $g(x)$ does not have a horizontal asymptote.

48. A table of values for a rational function, $F(x)$, is given below. Which of the following statements is/are true about the function $F(x)$?

x	–2.01	–2.001	–2	–1.999	–1.99
$F(x)$	601	6001	Undefined	–5999	–599

I. The factor of $(x + 2)$ is in both the numerator and denominator.

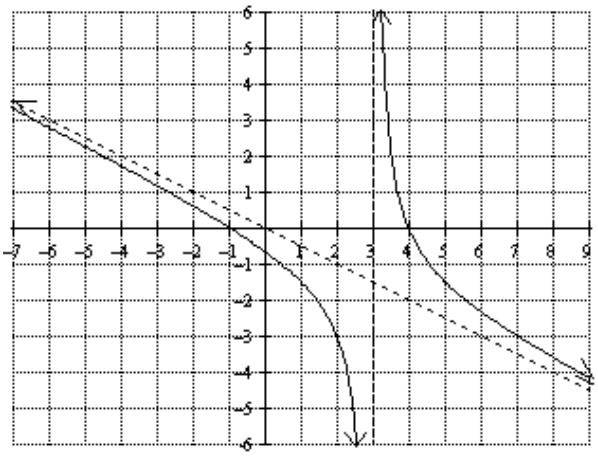
II. The graph of $F(x)$ has a vertical asymptote at $x = –2$.

III. The graph of $F(x)$ has a hole in the graph at $x = –2$.

A. I only B. II only C. I and II only

D. III only E. I and III only

49. Which of the following functions is graphed to the right?



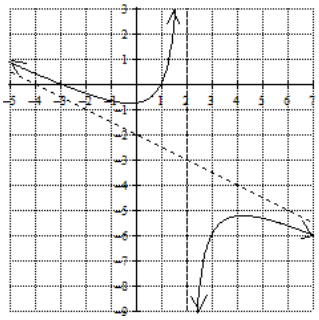
A. $f(x) = \dfrac{(x+1)(x-4)}{x-3}$ B. $f(x) = \dfrac{(x+1)(x-4)}{x+3}$

C. $f(x) = \dfrac{(x+1)(x-4)}{-2x+6}$ D. $f(x) = \dfrac{(x-1)(x+4)}{x-3}$

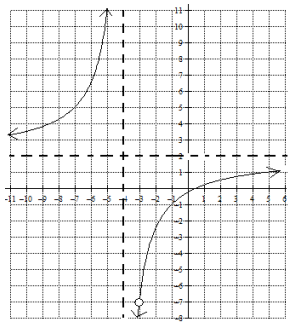
E. $f(x) = \dfrac{(x+1)(x-4)}{2x-6}$

The graphs of two rational functions, $G(x)$ and $H(x)$ are pictured below. Use the graphs to answer questions 50 and 51.

Graph of $G(x)$



Graph of $H(x)$



50. Which of the following statements is/are true?

A. The degree of the numerator of $G(x)$ is less than the degree of the denominator.

B. The degree of the numerator of $H(x)$ is equal to the degree of the denominator.

C. The equation of $H(x)$ has a cancelling factor of $(x + 3)$.

D. Both A and C are true.

E. Both B and C are true.

51. Which of the following equations is the correct equation of the function $G(x)$?

A. $G(x) = \frac{(x+3)(x-1)}{-2(x+2)}$

B. $G(x) = \frac{(x-3)(x+1)}{x-2}$

C. $G(x) = \frac{(x+3)(x-1)}{-2(x-2)}$

D. $G(x) = \frac{(x-3)(x+1)}{-2(x+2)}$

E. $G(x) = \frac{(x+3)(x-1)}{x-2}$

52. Solve the rational inequality $\frac{3}{x-3} \leq \frac{2}{x^2-9}$.

A. $(-\infty, -3) \cup \left(-\frac{7}{3}, 3\right)$

B. $(-\infty, -3] \cup \left[-\frac{7}{3}, 3\right]$

C. $\left(-3, -\frac{7}{3}\right] \cup (3, \infty)$

D. $(-\infty, -3) \cup \left[-\frac{7}{3}, 3\right)$

E. $\left(-3, -\frac{7}{3}\right) \cup (3, \infty)$