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Which of the following is an example of a function whose graph in the xy -plane has no x -intercepts?

- A) A linear function whose rate of change is not zero
- B) A quadratic function with real zeros
- C) A quadratic function with no real zeros
- D) A cubic polynomial with at least one real zero

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Which of the following equivalent forms of the function $f(x) = 4x^2 + 4x - 24$ is the most suitable to indicate the x -coordinates of the x -intercepts of the graph of $y = f(x)$ in the xy -plane?

- A) $f(x) = 4(x^2 + x - 6)$
- B) $f(x) = 4(x - 2)(x + 3)$
- C) $f(x) = 2(x - 2)(2x + 6)$
- D) $f(x) = (2x - 4)(2x + 6)$

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$$y = x^2 - 6x + 8$$

The equation above represents a parabola in the xy -plane. Which of the following equivalent forms of the equation displays the x -intercepts of the parabola as constants or coefficients?

- A) $y - 8 = x^2 - 6x$
- B) $y + 1 = (x - 3)^2$
- C) $y = x(x - 6) + 8$
- D) $y = (x - 2)(x - 4)$

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x	$f(x)$
0	3
2	1
4	0
5	-2

- A) $x - 2$
- B) $x - 3$
- C) $x - 4$
- D) $x - 5$

The function f is defined by a polynomial. Some values of x and $f(x)$ are shown in the table above. Which of the following must be a factor of $f(x)$?

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$$ax^3 + bx^2 + cx + d = 0$$

In the equation above, a , b , c , and d are constants. If the equation has roots -1 , -3 , and 5 , which of the following is a factor of $ax^3 + bx^2 + cx + d$?

- A) $x - 1$
- B) $x + 1$
- C) $x - 3$
- D) $x + 5$

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Which of the following is(are) an x -intercept of the graph of $y = \frac{(x + 3)(x - 2)}{x}$ in the xy -plane?

- I. $(-3, 0)$
 - II. $(2, 0)$
 - III. $(0, 0)$
- A) I only
 - B) III only
 - C) I and II only
 - D) I, II and III

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$$y = (x - 1)(x + 1)(x + 2)$$

The graph in the xy -plane of the equation above contains the point (a, b) . If $-1 \leq a \leq 1$, which of the following is NOT a possible value of b ?

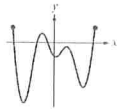
- A) -2
- B) -1
- C) 0
- D) 1

8

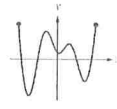
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If the function f has five distinct zeros, which of the following could represent the complete graph of f in the xy -plane?

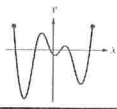
A:



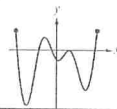
B:



C:



D:



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In the xy -plane, the graph of function f has x -intercepts at -3 , -1 , and 1 . Which of the following could define f ?

- A) $f(x) = (x - 3)(x - 1)(x + 1)$
- B) $f(x) = (x - 3)(x - 1)^2$
- C) $f(x) = (x - 1)(x + 1)(x + 3)$
- D) $f(x) = (x + 1)^2(x + 3)$

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$$(x - 4)(x + 2)(x - 1) = 0$$

What is the product of the solutions to the given equation?

- A. 8
- B. 3
- C. -3
- D. -8

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$$(x - 4)(x - 5)(x + 3) = 0$$

What is one possible positive value of x that satisfies the given equation?

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If $x - 2$ is a factor of $x^2 - bx + b$, where b is a constant, what is the value of b ?

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$$5(x-3)(x+1) = 0$$

What positive value of x satisfies the equation above?

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$$x^2 + 2x - 3 = 0$$

If x satisfies the given equation, which of the following could be a value of $x+3$?

- A) -4
- B) -2
- C) 0
- D) 2

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What is the sum of the solutions to $(x-6)(x+0.7) = 0$?

- A) -6.7
- B) -5.3
- C) 5.3
- D) 6.7

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$$x(x-12) - 12(x-12) = 0$$

How many distinct real solutions does the given equation have?

- A) Zero
- B) Exactly one
- C) Exactly two
- D) Infinitely many

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The polynomial $p^4 + 4p^3 + 3p^2 - 4p - 4$ can be written as $(p^2 - 1)(p + 2)^2$. What are all of the roots of the polynomial?

- A) -2 and 1
- B) -2, 1, and 4
- C) -2, -1, and 1
- D) -1, 1, and 2

18

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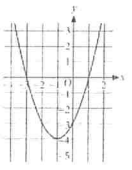
$$(x-5)^2 + 10(x-5) + 25 = 0$$

How many distinct real solutions does the given equation have?

- A) Zero
- B) Exactly one
- C) Exactly two
- D) Infinitely many

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An equation for the graph shown is $y = 4x^2 - 8x + b$, where b is a constant. What is the value of b ?

A) 3
B) 1
C) -3
D) 4

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In the xy -plane, the graph of the polynomial function f crosses the x -axis at exactly two points, $(a, 0)$ and $(b, 0)$, where a and b are both positive. Which of the following could define f ?

A) $f(x) = (x - a)(x - b)$
B) $f(x) = (x + a)(x + b)$
C) $f(x) = (x - a)(x + b)$
D) $f(x) = x(x - a)(x - b)$

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$$y = bx(x - a)(x - a)(x + b)(x - b)$$

In the equation above, a and b are positive constants and $a \neq b$. How many distinct x -intercepts does the graph of the equation in the xy -plane have?

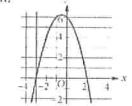
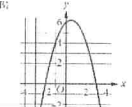
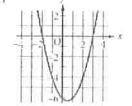
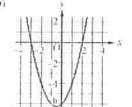
A) Two
B) Three
C) Four
D) Five

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$$f(x) = 1x + 3(x - k)$$

The function f is defined above. If k is a positive integer, which of the following could represent the graph of $y = f(x)$ in the xy -plane?

A)  B)  C)  D) 

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$$(x - 4)(2x - 1)(3x - 2) = 0$$

What is the product of all values of x that satisfy the equation above?

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In the xy -plane, the graph of $y = x^2 + bx + c$, where b and c are constants, has x -intercepts at $x = -2$ and $x = -6$. What is the value of b ?

ANSWERS

1 C

4 C

7 D

10 D

13 3

16 B

19 A

22 D

2 B

5 B

8 D

11 4 or 5

14 C

17 C

20 A

23 4/3 or 1.33

3 D

6 C

9 C

12 4

15 C

18 B

21 C

24 8