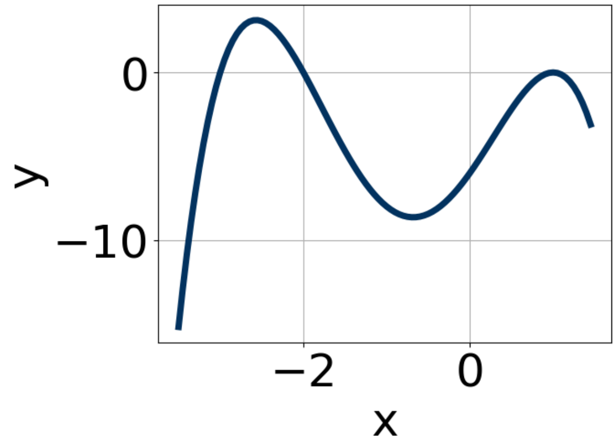
1. Which of the following equations *could* be of the graph presented below?




A. $-10(x-1)^4(x+3)^{10}(x+2)^9$

B. $-7(x-1)^5(x+3)^8(x+2)^5$

C. $3(x-1)^{10}(x+3)^7(x+2)^4$

D. $10(x-1)^{10}(x+3)^7(x+2)^{11}$

E. $-14(x-1)^{10}(x+3)^9(x+2)^9$

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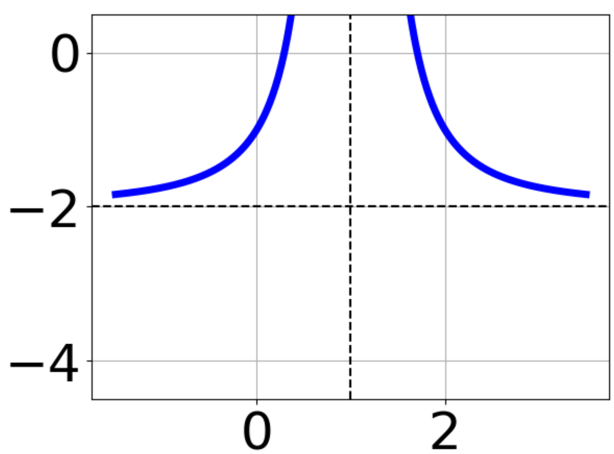
2. Choose the equation of the function graphed below.




A. $f(x) = \dfrac{-1}{(x+1)^2} - 2$

B. $f(x) = \dfrac{1}{x-1} - 2$

C. $f(x) = \dfrac{1}{(x-1)^2} - 2$

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

E. None of the above

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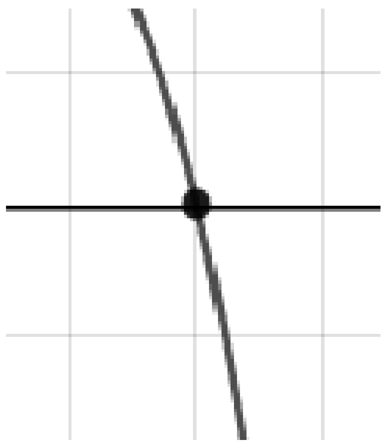
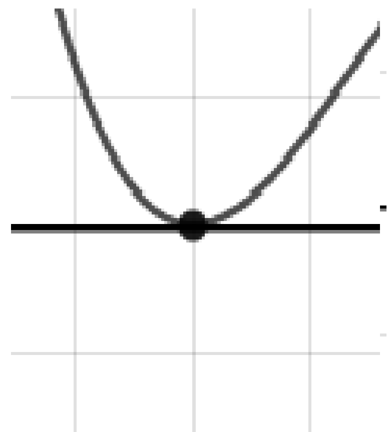
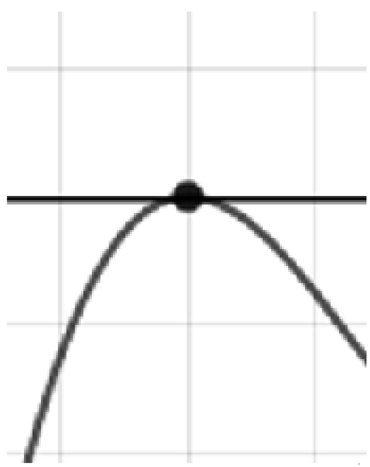
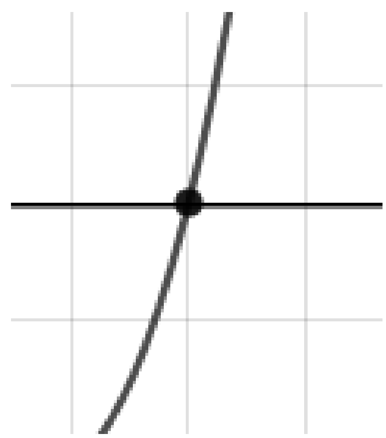
3. Describe the zero behavior of the zero $x = -3$ of the polynomial below.

$$f(x) = 4(x-3)^4(x+3)^5(x+9)^6(x-9)^7$$

A. 

C. 

B. 

D. 

E. None of the above.

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4. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in

the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{2}, \frac{3}{5}, \text{ and } 2$$

A. $a \in [3, 14], b \in [-14, -8], c \in [-33, -21],$ and $d \in [8, 27]$

B. $a \in [3, 14], b \in [8, 20], c \in [-33, -21],$ and $d \in [-20, -13]$

C. $a \in [3, 14], b \in [-44, -39], c \in [48, 54],$ and $d \in [-20, -13]$

D. $a \in [3, 14], b \in [-30, -27], c \in [3, 11],$ and $d \in [8, 27]$

E. $a \in [3, 14], b \in [-14, -8], c \in [-33, -21],$ and $d \in [-20, -13]$

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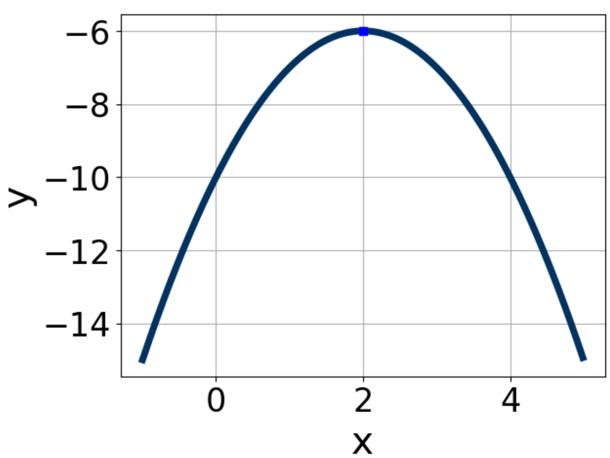
5. Write the equation of the graph presented below in the form $f(x) = ax^2 + bx + c$, assuming $a = 1$ or $a = -1$. Then, choose the intervals that $a, b,$ and $c$ belong to.




A. $a \in [-3.2, -0.6], \quad b \in [-7, -2],$ and $\quad c \in [1.6, 3.9]$

B. $a \in [0.3, 2.6], \quad b \in [2, 7],$ and $\quad c \in [-3.3, -1.3]$

C. $a \in [-3.2, -0.6], \quad b \in [2, 7],$ and $\quad c \in [-10.1, -7.6]$

D. $a \in [-3.2, -0.6], \quad b \in [-7, -2],$ and $\quad c \in [-10.1, -7.6]$

E. $a \in [0.3, 2.6], \quad b \in [-7, -2],$ and $\quad c \in [-3.3, -1.3]$

6. Solve the radical equation below. Then, choose the interval(s) that the solution(s) belongs to.

$$\sqrt{7x-9} - \sqrt{9x+8} = 0$$

A. $x_1 \in [-1.09, -0.85]$ and $x_2 \in [-5, 5]$

B. $x \in [-0.52, -0.08]$

C. All solutions lead to invalid or complex values in the equation.

D. $x \in [-8.66, -8.35]$

E. $x_1 \in [-8.66, -8.35]$ and $x_2 \in [-5, 5]$

---

7. Choose the **smallest** set of Real numbers that the number below belongs to.

$$-\sqrt{\frac{16900}{169}}$$

A. Integer

B. Not a Real number

C. Rational

D. Whole

E. Irrational

---

8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$5 + 4x < \frac{61x - 9}{7} \leq 6 + 8x$$

A. $(a, b]$, where $a \in [1.2, 1.8]$ and $b \in [9, 14]$

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [1, 2]$ and $b \in [8, 12]$

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [-1, 5]$ and $b \in [6, 13]$

D. $[a, b)$, where $a \in [0, 2]$ and $b \in [5, 12]$

E. None of the above.

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9. Solve the linear equation below. Then, choose the interval that contains the solution.

$$\frac{-4x-4}{5} - \frac{4x-3}{8} = \frac{-5x+7}{4}$$

A. $x \in [-44, -40]$

B. $x \in [-61, -57]$

C. $x \in [-163, -158]$

D. $x \in [-3, 0]$

E. There are no real solutions.

---

10. Solve the linear equation below. Then, choose the interval that contains the solution.

$$\frac{8x-5}{8} - \frac{3x-5}{3} = \frac{-3x-7}{6}$$

A. $x \in [1.5, 2.5]$

B. $x \in [-5.2, -3.2]$

C. $x \in [-1.2, 0.8]$

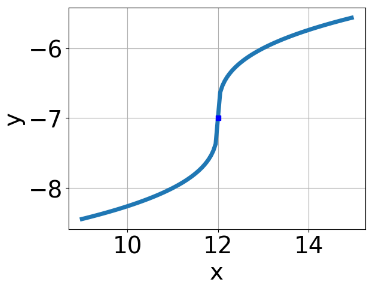
D. $x \in [-15.9, -12.9]$

E. There are no real solutions.

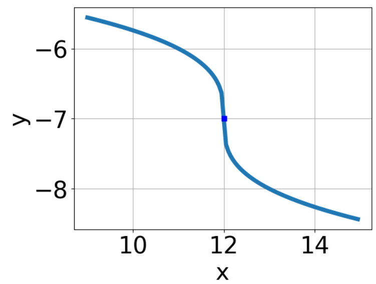
---

11. Choose the graph of the equation below.

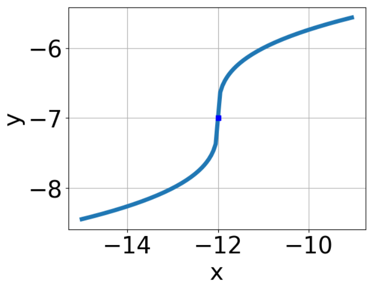
$$f(x) = \sqrt[3]{x+12} - 7$$



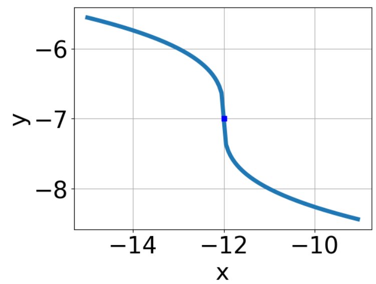

A.




C.




B.




D.

E. None of the above.

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12. Find the equation of the line described below. Write the linear equation as $y = mx + b$ and choose the intervals that contain $m$ and $b$.

Parallel to $7x + 4y = 15$ and passing through the point $(-8, 10)$.

A. $m \in [1.03, 2.72] \quad b \in [19, 25]$

B. $m \in [-1.94, -1.57] \quad b \in [2, 5]$

C. $m \in [-1.94, -1.57] \quad b \in [-8, 0]$

D. $m \in [-0.83, -0.37] \quad b \in [-8, 0]$

E. $m \in [-1.94, -1.57] \quad b \in [17, 20]$

---

13. First, find the equation of the line containing the two points below. Then, write the equation as $y = mx + b$ and choose the intervals that contain $m$ and $b$.

$$(10, -11) \text{ and } (-3, 2)$$

A. $m \in [-2.4, -0.3] \quad b \in [0.1, 2.4]$

B. $m \in [-2.4, -0.3] \quad b \in [-21.4, -18.5]$

C. $m \in [0.5, 1.6] \quad b \in [4.3, 6]$

D. $m \in [-2.4, -0.3] \quad b \in [-2.2, -0.5]$

E. $m \in [-2.4, -0.3] \quad b \in [4.3, 6]$

---

14. Simplify the expression below and choose the interval the simplification is contained within.

$$14 - 12 \div 7 * 6 - (17 * 13)$$

A. $[233, 242]$

B. $[-214, -207]$

C. $[-176, -172]$

D. $[-220, -214]$

E. None of the above

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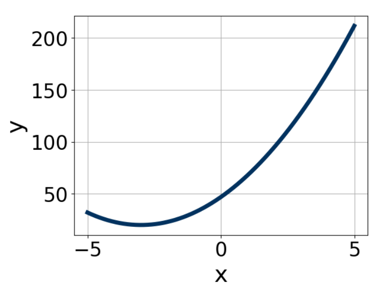
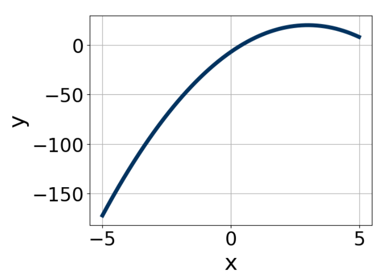
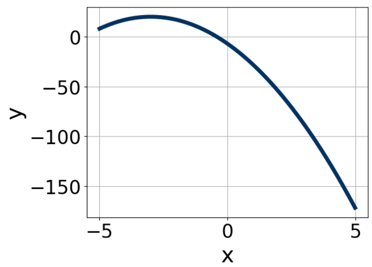
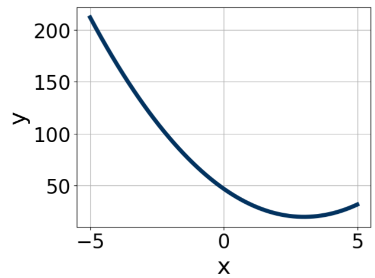
15. Graph the equation below.

$$f(x) = (x - 3)^2 + 20$$

A. 


B. 

C. 


D. 


E. None of the above.

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16. What is the domain of the function below?

$$f(x) = \sqrt[3]{3x+5}$$

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

B. The domain is $[a, \infty)$, where $a \in [-1.29, 0.21]$

C. The domain is $(-\infty, a]$, where $a \in [-0.75, -0.46]$

D. The domain is $(-\infty, a]$, where $a \in [-2.02, -1.25]$

E. The domain is $[a, \infty)$, where $a \in [-2.28, -0.76]$

---

17. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-10}{7} - \frac{4}{3}x > \frac{8}{6}x + \frac{10}{5}$$

A. $(a, \infty)$, where $a \in [0, 2]$

B. $(-\infty, a)$, where $a \in [0, 2]$

C. $(-\infty, a)$, where $a \in [-3, 1]$

D. $(a, \infty)$, where $a \in [-5, 1]$

E. None of the above.

---

18. Solve the quadratic equation below. Then, choose the intervals that the solutions belong to, with $x_1 \leq x_2$ (if they exist).

$$20x^2 - 13x - 5 = 0$$

A. $x_1 \in [-24.13, -23.01]$ and $x_2 \in [23.8, 24.39]$

B. $x_1 \in [-1.03, -0.33]$ and $x_2 \in [-0.12, 0.28]$

C. $x_1 \in [-6.14, -5.41]$ and $x_2 \in [18.21, 18.53]$

D. $x_1 \in [-0.81, 1.12]$ and $x_2 \in [0.58, 1.18]$

E. There are no Real solutions.

---

19. Simplify the expression below into the form $a + bi$. Then, choose the intervals that $a$ and $b$ belong to.

$$\frac{-54 + 55i}{1 + 3i}$$

A. $a \in [-55.5, -53]$ and $b \in [17.5, 19.5]$

B. $a \in [109.5, 111.5]$ and $b \in [21, 23]$

C. $a \in [10.5, 11.5]$ and $b \in [216, 217.5]$

D. $a \in [10.5, 11.5]$ and $b \in [21, 23]$

E. $a \in [-23, -21]$ and $b \in [-12, -9.5]$

---

20. Which of the following intervals describes the Domain of the function below?

$$f(x) = e^{x+3} - 5$$

A. $(-\infty, a), a \in [-7, 4]$

B. $(a, \infty), a \in [4, 7]$

C. $(-\infty, a], a \in [-7, 4]$

D. $[a, \infty), a \in [4, 7]$

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

---

21. Solve the rational equation below. Then, choose the interval(s) that the solution(s) belongs to.

$$\frac{4x}{6x+5} + \frac{-6x^2}{-18x^2-39x-20} = \frac{-7}{-3x-4}$$

A. All solutions lead to invalid or complex values in the equation.

B. $x_1 \in [-1.01, -0.78]$ and $x_2 \in [1.4, 6.7]$

C. $x \in [-2.29, -0.97]$

D. $x \in [1.75, 2.62]$

E. $x_1 \in [-1.01, -0.78]$ and $x_2 \in [-3.7, 1.3]$

---

22. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9x - 8 > -6x - 7$$

A. $(a, \infty)$, where $a \in [-1.48, 0.26]$

B. $(a, \infty)$, where $a \in [-0.04, 0.4]$

C. $(-\infty, a)$, where $a \in [0.28, 0.42]$

D. $(-\infty, a)$, where $a \in [-0.54, 0.17]$

E. None of the above.

---

23. Which of the following intervals describes the Domain of the function below?

$$f(x) = -\log_2(x-5) + 2$$

A. $(-\infty, a), a \in [-5.5, -4.7]$

B. $(a, \infty), a \in [4.2, 5.6]$

C. $[a, \infty), a \in [1.4, 2.2]$

D. $(-\infty, a], a \in [-3.1, -0.7]$

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

---

24. Solve the equation for $x$ and choose the interval that contains the solution (if it exists).

$$2^{5x-2} = 27^{4x-4}$$

A. $x \in [0.9, 3.4]$

B. $x \in [-12.9, -10.2]$

C. $x \in [-3.6, -0.2]$

D. $x \in [-1.6, 0.5]$

E. There is no Real solution to the equation.

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