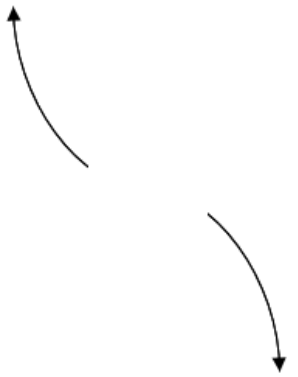
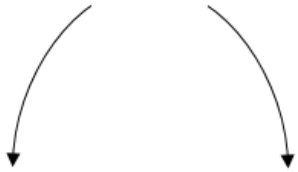
1. Describe the end behavior of the polynomial below.

$$f(x) = 9(x-8)^3(x+8)^4(x-3)^5(x+3)^7$$

A.

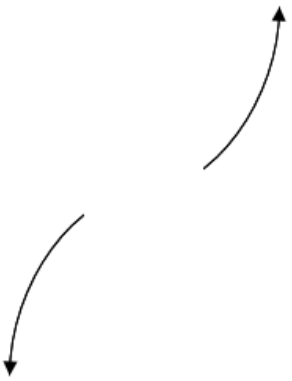


B.



C.

D.



E. None of the above.

---

2. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-2 + 3i \text{ and } 2$$

A. $b \in [0.54, 1.25], c \in [-9, -2],$ and $d \in [1, 8]$

B. $b \in [0.54, 1.25], c \in [-2, 1],$ and $d \in [-4, 0]$

C. $b \in [1.7, 2.1], c \in [4, 7],$ and $d \in [-29, -22]$

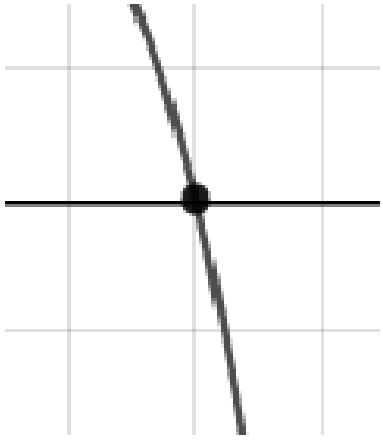
D. $b \in [-2.25, -0.75], c \in [4, 7],$ and $d \in [25, 29]$

E. None of the above.

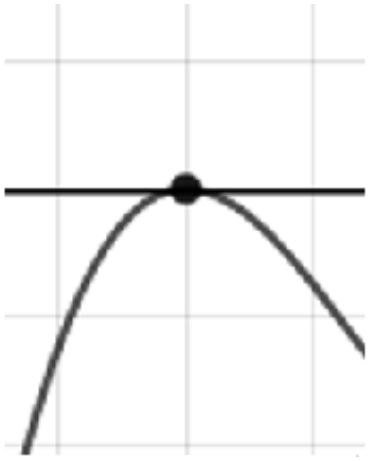
---

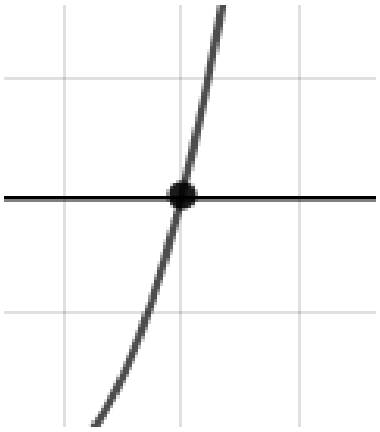
3. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

$$f(x) = -8(x-2)^9(x+2)^{12}(x+6)^7(x-6)^9$$

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

$$\frac{6}{5}, \frac{-1}{3}, \text{ and } \frac{2}{5}$$

A. $a \in [70, 82], b \in [34, 42], c \in [-60, -51],$ and $d \in [10, 14]$

B. $a \in [70, 82], b \in [-103, -90], c \in [-5, -2],$ and $d \in [10, 14]$

C. $a \in [70, 82], b \in [91, 96], c \in [-5, -2],$ and $d \in [-15, -9]$

D. $a \in [70, 82], b \in [-103, -90], c \in [-5, -2],$ and $d \in [-15, -9]$

E. $a \in [70, 82], b \in [78, 91], c \in [-17, -13],$ and $d \in [-15, -9]$

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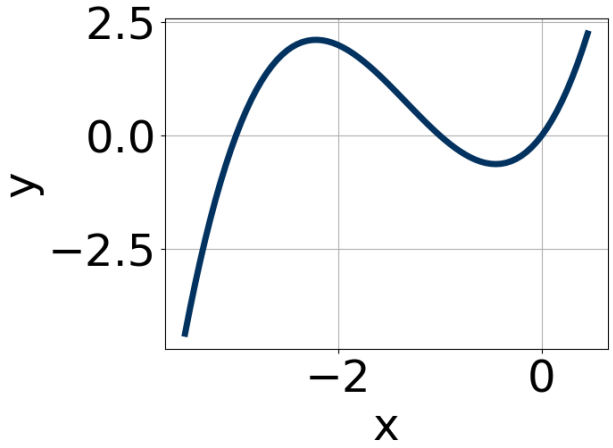
5. Which of the following equations *could* be of the graph presented below?



A. $15x^5(x+3)^5(x+1)^5$

B. $11x^9(x+3)^4(x+1)^9$

C. $12x^7(x+3)^4(x+1)^6$

D. $-19x^5(x+3)^{10}(x+1)^9$

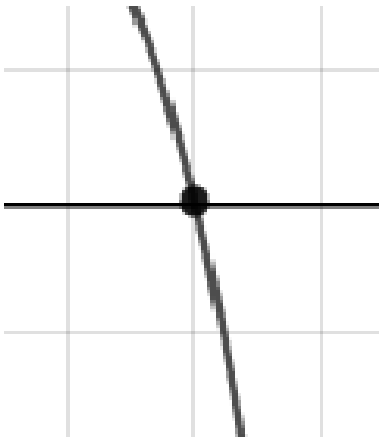
E. $-9x^7(x+3)^{11}(x+1)^7$

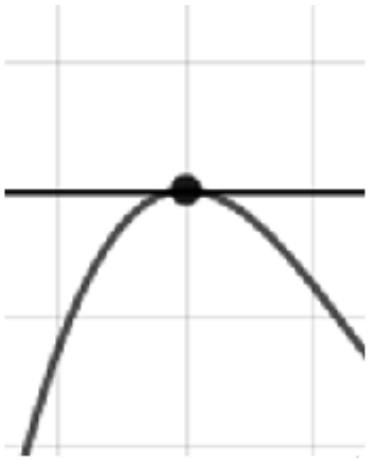
---

6. Describe the zero behavior of the zero $x = -4$ of the polynomial below.

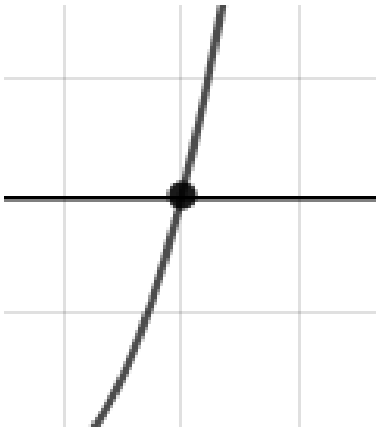
$$f(x) = 4(x+4)^8(x-4)^{13}(x+9)^7(x-9)^8$$

A.



B. 

C. 

D. 

E. None of the above.

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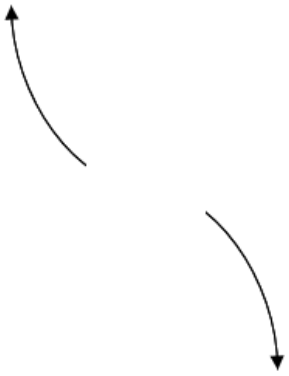
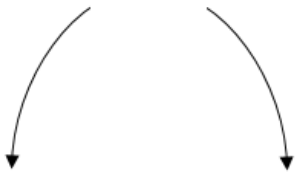
7. Describe the end behavior of the polynomial below.

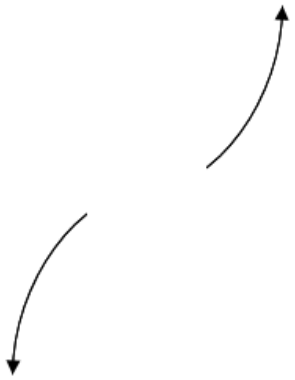
$$f(x) = -7(x+2)^4(x-2)^7(x+9)^4(x-9)^6$$

A. 

B. 

C.

D.



E. None of the above.

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8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$3 + 5i \text{ and } -3$$

A. $b \in [2.51, 4.34], c \in [15.82, 16.89],$ and $d \in [-103.2, -101.1]$

B. $b \in [-1.5, 2.17], c \in [-1.04, 0.81],$ and $d \in [-9.6, -7.5]$

C. $b \in [-4.81, -1.83], c \in [15.82, 16.89],$ and $d \in [99.1, 105]$

D. $b \in [-1.5, 2.17], c \in [-2.18, -1.34],$ and $d \in [-19.2, -13.9]$

E. None of the above.

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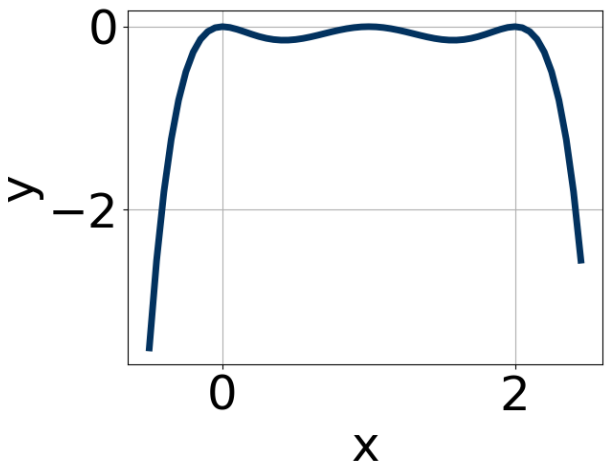
9. Which of the following equations *could* be of the graph presented below?



A. $-17x^6(x-2)^8(x-1)^4$

B. $-16x^8(x-2)^4(x-1)^{11}$

C. $13x^8(x-2)^8(x-1)^{11}$

D. $18x^8(x-2)^6(x-1)^4$

E. $-2x^8(x-2)^5(x-1)^7$

---

10. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-4, \frac{3}{5}, \text{ and } \frac{5}{3}$$

A. $a \in [14, 16], b \in [-94, -92], c \in [149, 155],$ and $d \in [-66, -56]$

B. $a \in [14, 16], b \in [20, 30], c \in [-121, -118],$ and $d \in [53, 62]$

C. $a \in [14, 16], b \in [20, 30], c \in [-121, -118],$ and $d \in [-66, -56]$

D. $a \in [14, 16], b \in [-83, -73], c \in [46, 50],$ and $d \in [53, 62]$

E. $a \in [14, 16], b \in [-29, -22], c \in [-121, -118],$ and $d \in [-66, -56]$
