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

$$\frac{5}{4}, \frac{-1}{4}, \text{ and } \frac{-5}{2}$$

A. $a \in [31, 39], b \in [125, 129], c \in [125, 134],$ and $d \in [25, 29]$

B. $a \in [31, 39], b \in [44, 51], c \in [-91, -83],$ and $d \in [-30, -22]$

C. $a \in [31, 39], b \in [-57, -45], c \in [-91, -83],$ and $d \in [25, 29]$

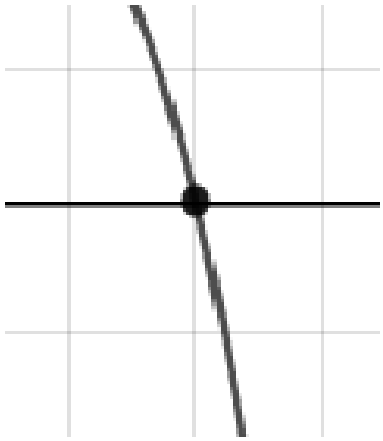
D. $a \in [31, 39], b \in [111, 113], c \in [70, 76],$ and $d \in [-30, -22]$

E. $a \in [31, 39], b \in [44, 51], c \in [-91, -83],$ and $d \in [25, 29]$

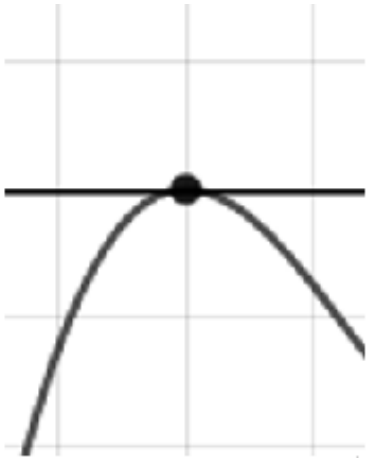
---

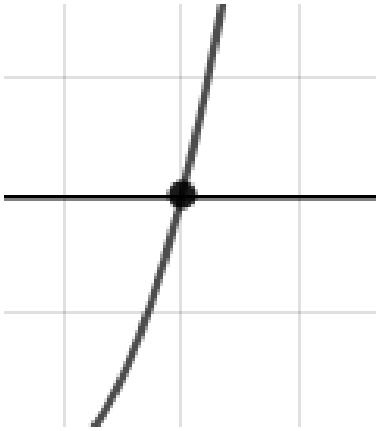
2. Describe the zero behavior of the zero $x = -3$ of the polynomial below.

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

A. 

C. 

B. 

D. 

E. None of the above.

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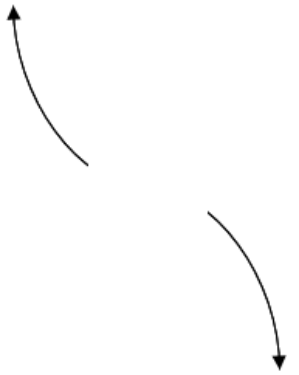
3. Describe the end behavior of the polynomial below.

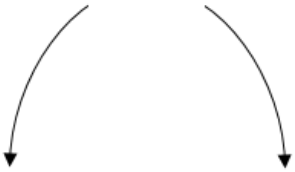
$$f(x) = -4(x-9)^3(x+9)^8(x+3)^5(x-3)^7$$

A.

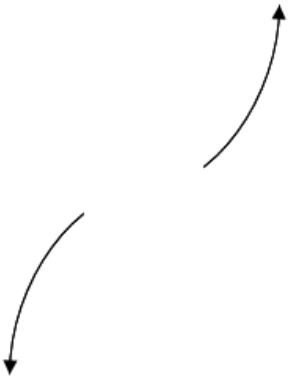


C.

B.



D.



E. None of the above.

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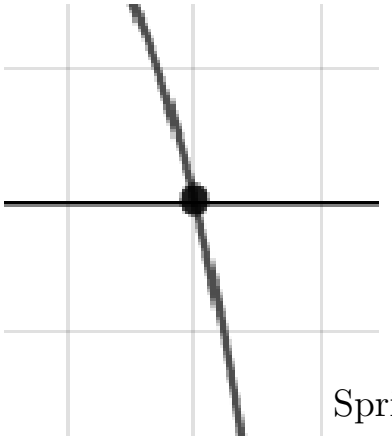
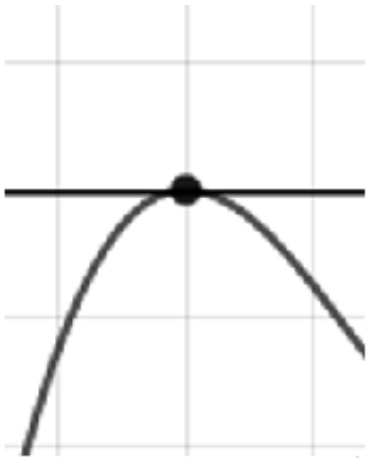
4. Describe the zero behavior of the zero $x = -3$ of the polynomial below.

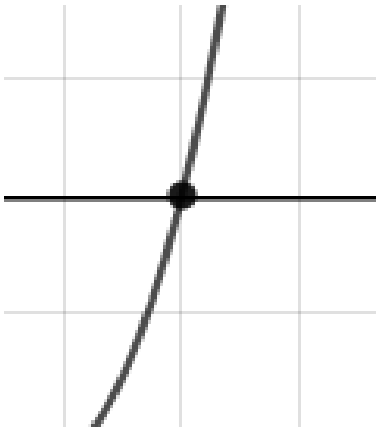
$$f(x) = 7(x+2)^8(x-2)^7(x-3)^{11}(x+3)^8$$

A.



B. 

C. 

D. 

E. None of the above.

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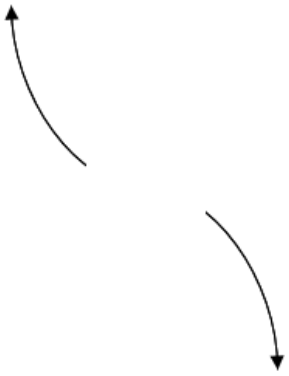
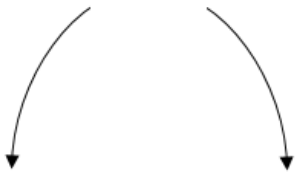
5. Describe the end behavior of the polynomial below.

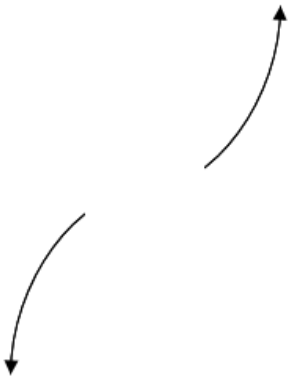
$$f(x) = 4(x+6)^2(x-6)^7(x-8)^5(x+8)^7$$

A. 

B. 

C.

D.



E. None of the above.

---

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

$$-3 + 2i \text{ and } 4$$

A. $b \in [1.3, 4.5], c \in [-12.6, -8.5],$ and $d \in [-54, -46]$

B. $b \in [-0.4, 1.2], c \in [-6.2, -5.7],$ and $d \in [-1, 10]$

C. $b \in [-0.4, 1.2], c \in [-2.3, -0.7],$ and $d \in [-14, -8]$

D. $b \in [-2.6, -1.3], c \in [-12.6, -8.5],$ and $d \in [48, 58]$

E. None of the above.

---

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

$$-4 + 2i \text{ and } 1$$

A. $b \in [-1, 5], c \in [3, 4],$ and $d \in [-6, -3]$

B. $b \in [-12, -5], c \in [6, 24],$ and $d \in [20, 27]$

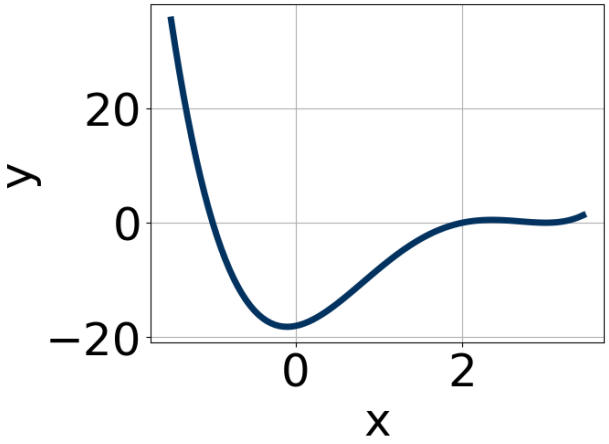
C. $b \in [-1, 5], c \in [-3, 1],$ and $d \in [1, 6]$

D. $b \in [5, 11], c \in [6, 24],$ and $d \in [-23, -18]$

E. None of the above.

---

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



A. $-14(x-3)^6(x-2)^{11}(x+1)^{10}$

B. $7(x-3)^9(x-2)^6(x+1)^{11}$

C. $-7(x-3)^8(x-2)^7(x+1)^9$

D. $9(x-3)^6(x-2)^4(x+1)^{11}$

E. $8(x-3)^4(x-2)^5(x+1)^5$

---

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

$$-1, \frac{-1}{2}, \text{ and } \frac{4}{3}$$

A. $a \in [4, 11], b \in [-0.8, 1.7], c \in [-20, -8],$ and $d \in [-6, -2]$

B. $a \in [4, 11], b \in [-0.8, 1.7], c \in [-20, -8],$ and $d \in [3, 5]$

C. $a \in [4, 11], b \in [-3, -0.3], c \in [-20, -8],$ and $d \in [3, 5]$

D. $a \in [4, 11], b \in [-18.5, -15.8], c \in [12, 20],$ and $d \in [-6, -2]$

E. $a \in [4, 11], b \in [-12.4, -10.2], c \in [-2, 7],$ and $d \in [3, 5]$

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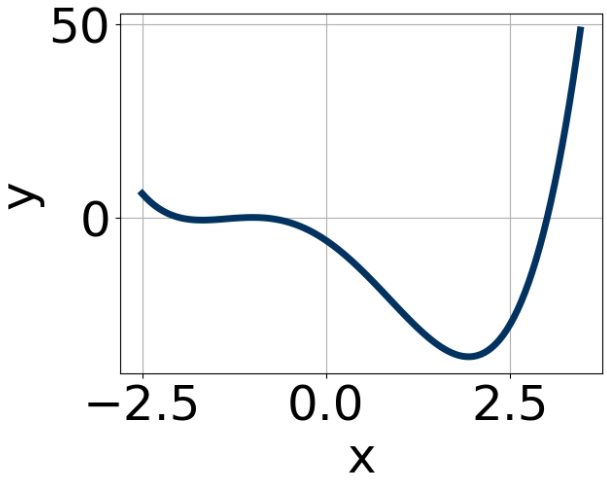
10. Which of the following equations *could* be of the graph presented below?



A. $-20(x+1)^8(x+2)^9(x-3)^{11}$

B. $20(x+1)^4(x+2)^9(x-3)^{11}$

C. $11(x+1)^9(x+2)^{10}(x-3)^9$

D. $-3(x+1)^{10}(x+2)^5(x-3)^4$

E. $4(x+1)^4(x+2)^{10}(x-3)^5$
