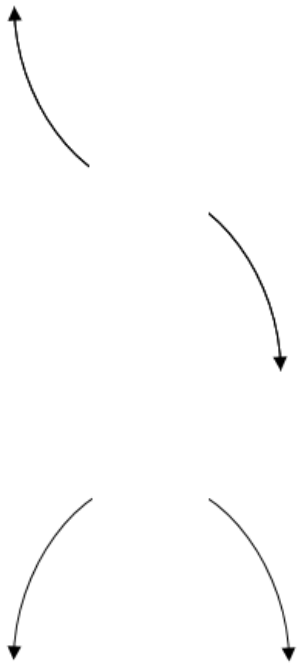
1. Describe the end behavior of the polynomial below.

$$f(x) = -8(x+9)^4(x-9)^5(x-2)^5(x+2)^6$$

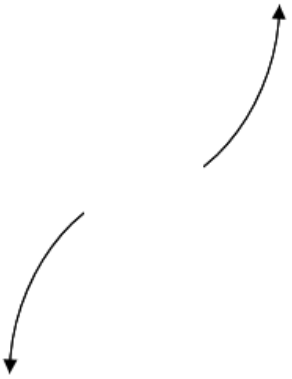
A.



C.

B.

D.



E. None of the above.

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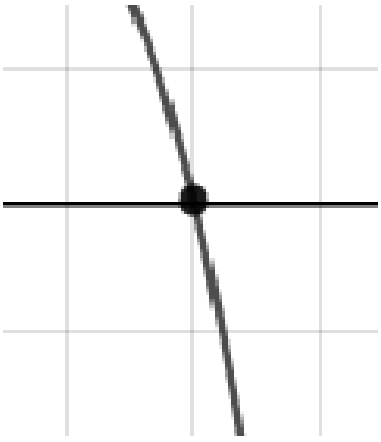
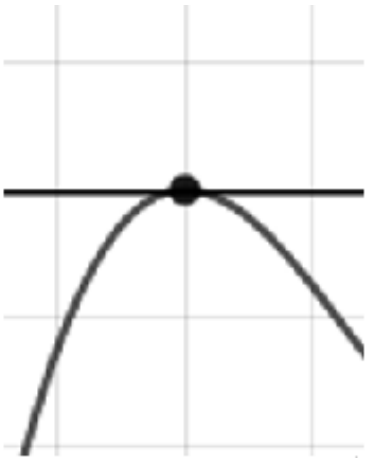
2. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

$$f(x) = -5(x+8)^9(x-8)^5(x-2)^6(x+2)^5$$

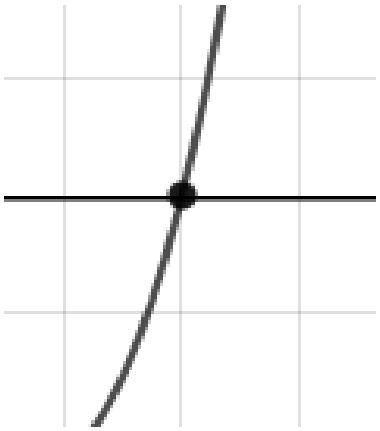
A.



B.



C. 

D. 

E. None of the above.

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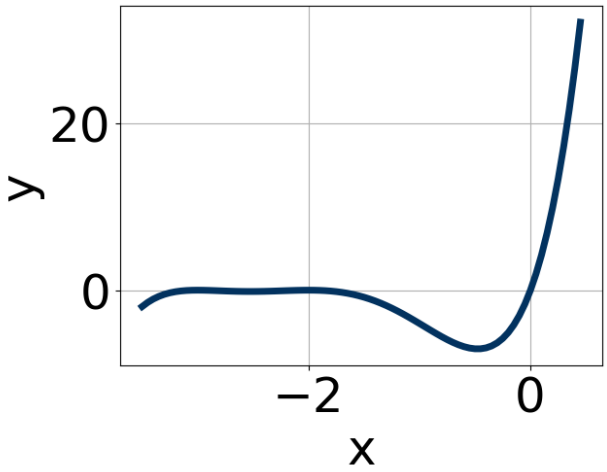
3. Which of the following equations *could* be of the graph presented below?



A. $12x^7(x+3)^{10}(x+2)^4$

B. $14x^8(x+3)^6(x+2)^5$

C. $-5x^6(x+3)^4(x+2)^6$

D. $15x^5(x+3)^6(x+2)^7$

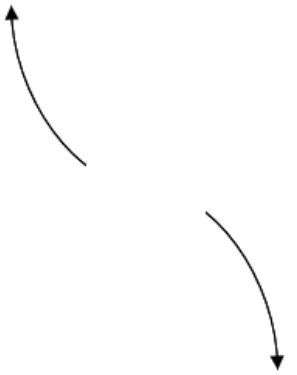
E. $-17x^5(x+3)^6(x+2)^6$

---

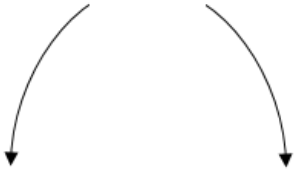
4. Describe the end behavior of the polynomial below.

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

A.

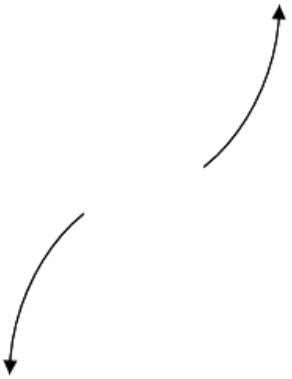


B.



C.

D.



E. None of the above.

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

$$-5 + 2i \text{ and } -2$$

A. $b \in [0, 3], c \in [-4, 3],$ and $d \in [-7, -1]$

B. $b \in [11, 17], c \in [48, 50],$ and $d \in [57, 61]$

C. $b \in [0, 3], c \in [4, 10],$ and $d \in [3, 13]$

D. $b \in [-13, -10], c \in [48, 50],$ and $d \in [-61, -53]$

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

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

A. $a \in [29, 32], b \in [36, 40], c \in [10, 16],$ and $d \in [0.7, 3.2]$

B. $a \in [29, 32], b \in [1, 12], c \in [-11, -6],$ and $d \in [-2.2, -0.1]$

C. $a \in [29, 32], b \in [-40, -33], c \in [10, 16],$ and $d \in [0.7, 3.2]$

D. $a \in [29, 32], b \in [-21, -15], c \in [-3, 0],$ and $d \in [0.7, 3.2]$

E. $a \in [29, 32], b \in [-40, -33], c \in [10, 16],$ and $d \in [-2.2, -0.1]$

---

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

$$\frac{2}{5}, \frac{-7}{5}, \text{ and } 3$$

A. $a \in [22, 30], b \in [-53, -44], c \in [-89, -85],$ and $d \in [32, 48]$

B. $a \in [22, 30], b \in [-53, -44], c \in [-89, -85],$ and $d \in [-44, -39]$

C. $a \in [22, 30], b \in [-30, -29], c \in [-128, -119],$ and $d \in [-44, -39]$

D. $a \in [22, 30], b \in [50, 51], c \in [-89, -85],$ and $d \in [-44, -39]$

E. $a \in [22, 30], b \in [-108, -96], c \in [60, 64],$ and $d \in [32, 48]$

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

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

A. $b \in [-2, 6], c \in [2, 11],$ and $d \in [7, 14]$

B. $b \in [-2, 6], c \in [1, 2],$ and $d \in [-12, 2]$

C. $b \in [5, 21], c \in [23, 38],$ and $d \in [39, 45]$

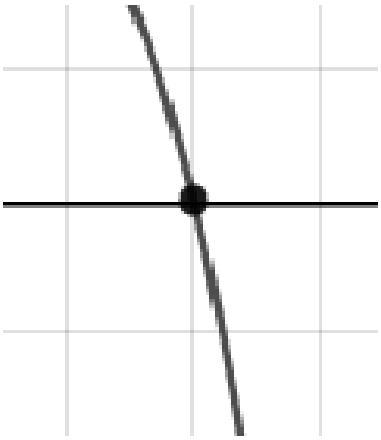
D. $b \in [-10, -8], c \in [23, 38],$ and $d \in [-40, -33]$

E. None of the above.

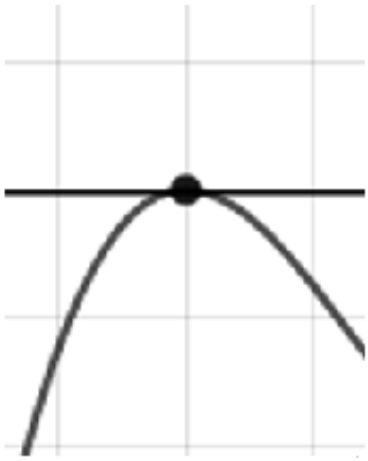
---

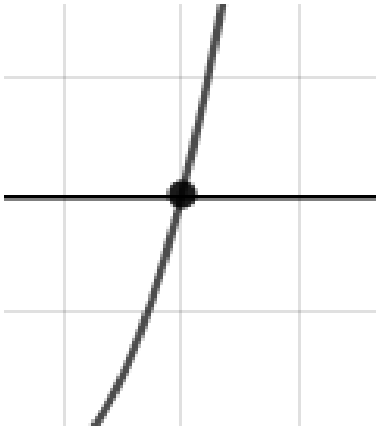
9. Describe the zero behavior of the zero $x = 8$ of the polynomial below.

$$f(x) = 2(x+3)^{13}(x-3)^{9}(x+8)^{12}(x-8)^{7}$$

A. 

C. 

B. 

D. 

E. None of the above.

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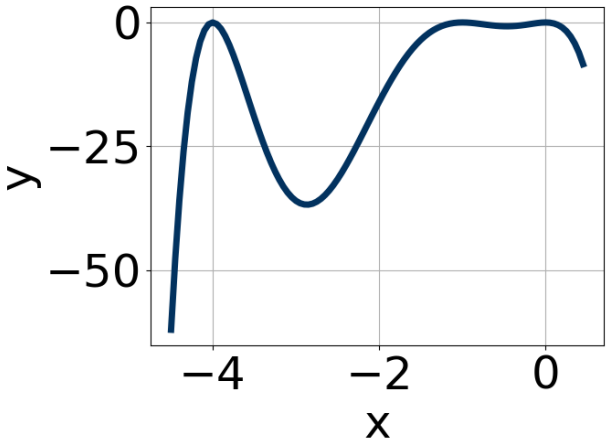
10. Which of the following equations *could* be of the graph presented below?



A. $19x^{10}(x+4)^4(x+1)^5$

B. $-19x^4(x+4)^6(x+1)^4$

C. $-18x^8(x+4)^{10}(x+1)^{11}$

D. $-11x^7(x+4)^6(x+1)^5$

E. $4x^4(x+4)^8(x+1)^{10}$
