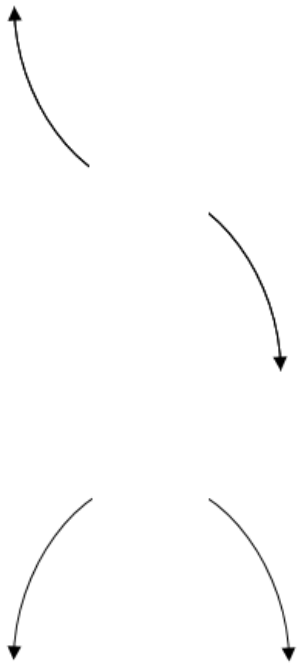
1. Describe the end behavior of the polynomial below.

$$f(x) = 9(x-2)^2(x+2)^7(x+3)^4(x-3)^5$$

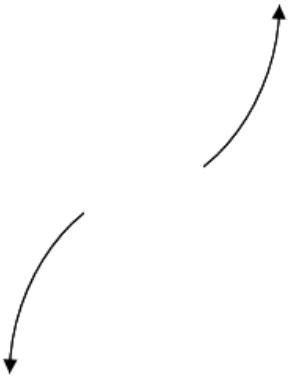
A.



B.

C.

D.



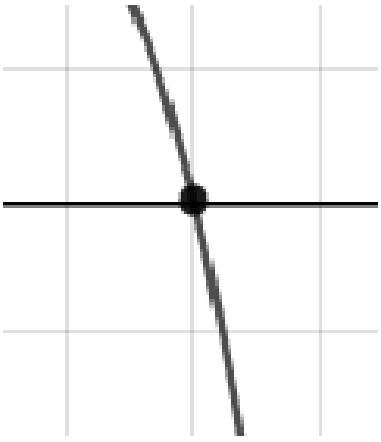
E. None of the above.

---

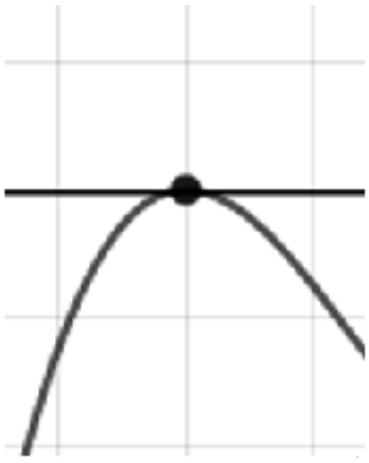
2. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

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

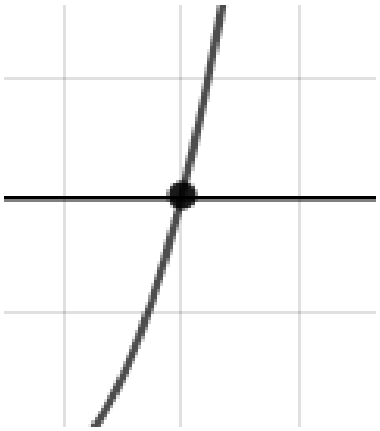
A.



B.



C. 

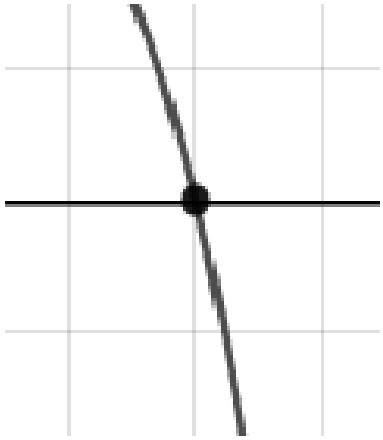
D. 

E. None of the above.

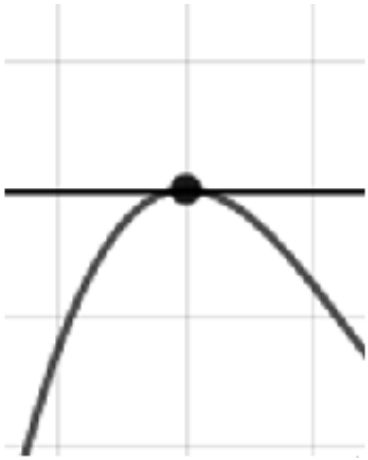
---

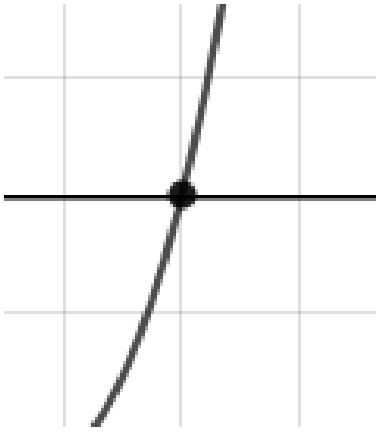
3. Describe the zero behavior of the zero $x = -3$ of the polynomial below.

$$f(x) = 9(x+3)^5(x-3)^{10}(x-6)^8(x+6)^{11}$$

A. 

C. 

B. 

D. 

E. None of the above.

---

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

$$5 - 2i \text{ and } -1$$

A. $b \in [-1, 7], c \in [0, 8],$ and $d \in [2, 6]$

B. $b \in [-1, 7], c \in [-9, -3],$ and $d \in [-5, -2]$

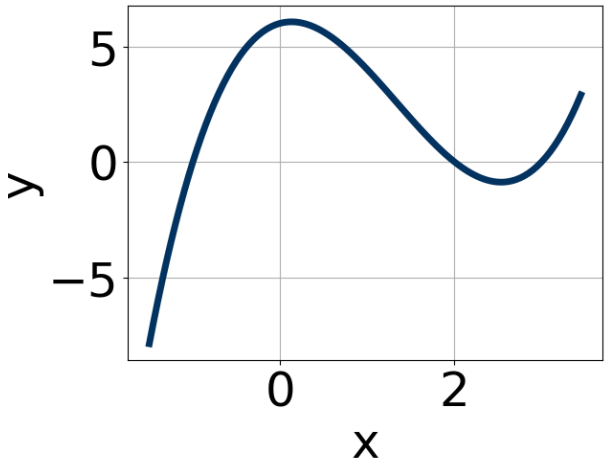
C. $b \in [-9, -6], c \in [15, 20],$ and $d \in [25, 36]$

D. $b \in [6, 16], c \in [15, 20],$ and $d \in [-30, -27]$

E. None of the above.

---

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



A. $-14(x-3)^8(x-2)^9(x+1)^{11}$

B. $18(x-3)^6(x-2)^7(x+1)^7$

C. $4(x-3)^4(x-2)^8(x+1)^7$

D. $-12(x-3)^5(x-2)^7(x+1)^{11}$

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

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

$$\frac{6}{5}, \frac{-7}{4}, \text{ and } \frac{-3}{4}$$

A. $a \in [75, 83], b \in [104, 107], c \in [-137, -125],$ and $d \in [122, 127]$

B. $a \in [75, 83], b \in [13, 24], c \in [-203, -197],$ and $d \in [-128, -119]$

C. $a \in [75, 83], b \in [296, 299], c \in [341, 351],$ and $d \in [122, 127]$

D. $a \in [75, 83], b \in [-104, -99], c \in [-137, -125],$ and $d \in [122, 127]$

E. $a \in [75, 83], b \in [104, 107], c \in [-137, -125],$ and $d \in [-128, -119]$

---

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

$$3 + 5i \text{ and } 4$$

A. $b \in [-4, 4], c \in [-11, -8],$ and $d \in [19, 24]$

B. $b \in [-4, 4], c \in [-7, -4],$ and $d \in [6, 15]$

C. $b \in [-11, -4], c \in [54, 66],$ and $d \in [-137, -132]$

D. $b \in [10, 13], c \in [54, 66],$ and $d \in [135, 138]$

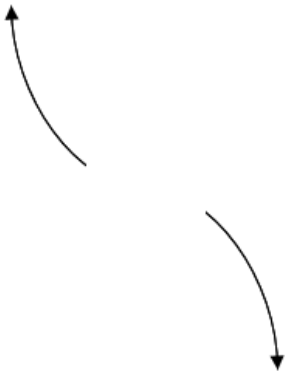
E. None of the above.

---

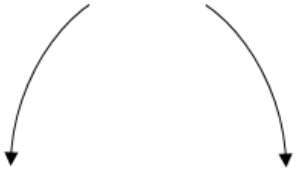
8. Describe the end behavior of the polynomial below.

$$f(x) = 6(x + 9)^2(x - 9)^3(x + 6)^3(x - 6)^3$$

A.

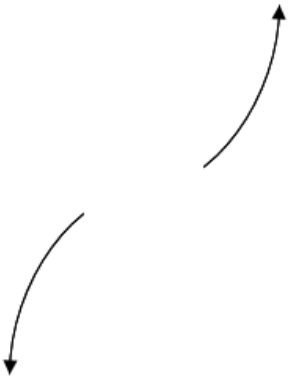


B.



C.

D.



E. None of the above.

---

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

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

A. $a \in [15, 26], b \in [-94, -89], c \in [-48, -42],$ and $d \in [0, 6]$

B. $a \in [15, 26], b \in [-101, -98], c \in [3, 5],$ and $d \in [0, 6]$

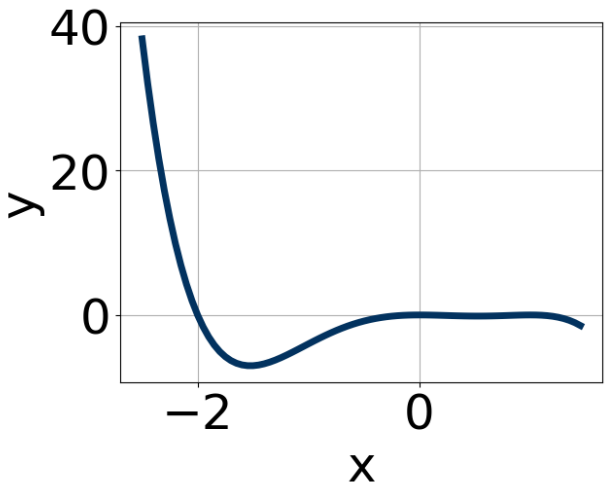
C. $a \in [15, 26], b \in [-94, -89], c \in [-48, -42],$ and $d \in [-6, 2]$

D. $a \in [15, 26], b \in [90, 92], c \in [-48, -42],$ and $d \in [0, 6]$

E. $a \in [15, 26], b \in [-109, -104], c \in [45, 48],$ and $d \in [-6, 2]$

---

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



A. $-5x^{10}(x-1)^8(x+2)^7$

B. $-9x^5(x-1)^4(x+2)^4$

C. $-8x^7(x-1)^{10}(x+2)^{11}$

D. $17x^{10}(x-1)^6(x+2)^6$

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