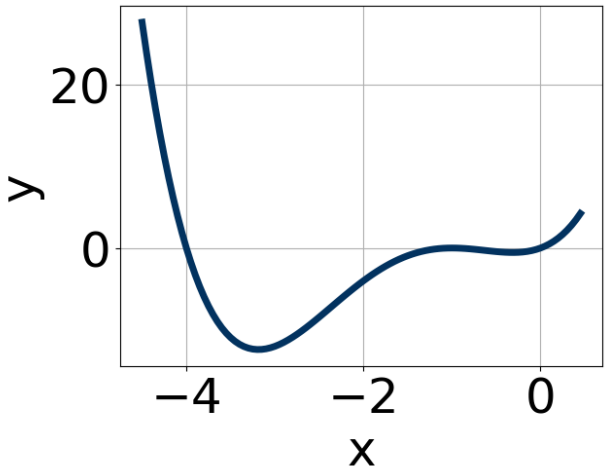
1. Which of the following equations *could* be of the graph presented below?



A. $19x^5(x+1)^{10}(x+4)^9$

B. $-12x^{11}(x+1)^4(x+4)^{11}$

C. $13x^5(x+1)^6(x+4)^4$

D. $5x^7(x+1)^{11}(x+4)^4$

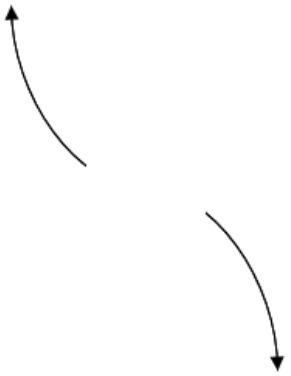
E. $-2x^8(x+1)^{10}(x+4)^{11}$

---

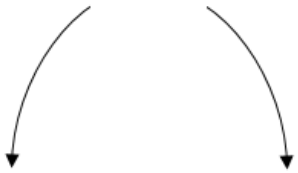
2. Describe the end behavior of the polynomial below.

$$f(x) = -9(x+4)^5(x-4)^6(x+3)^2(x-3)^3$$

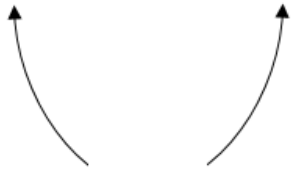
A.

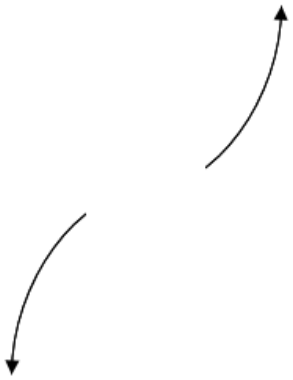


B.



C.



D. 

E. None of the above.

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

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

A. $a \in [9, 22], b \in [42, 48], c \in [-30, -28],$ and $d \in [-76, -66]$

B. $a \in [9, 22], b \in [81, 91], c \in [136, 139],$ and $d \in [-76, -66]$

C. $a \in [9, 22], b \in [81, 91], c \in [136, 139],$ and $d \in [71, 75]$

D. $a \in [9, 22], b \in [-85, -80], c \in [136, 139],$ and $d \in [-76, -66]$

E. $a \in [9, 22], b \in [-51, -46], c \in [-18, -13],$ and $d \in [71, 75]$

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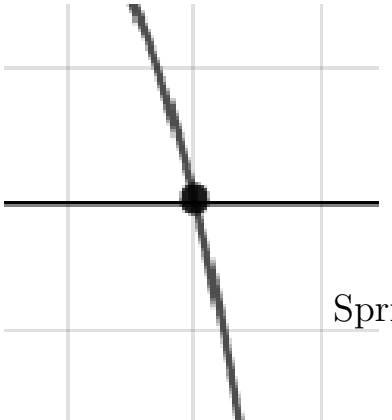
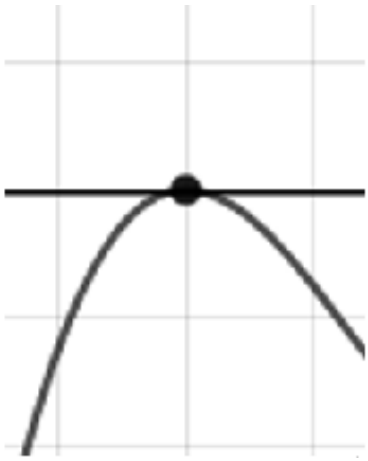
4. Describe the zero behavior of the zero $x = -2$ of the polynomial below.

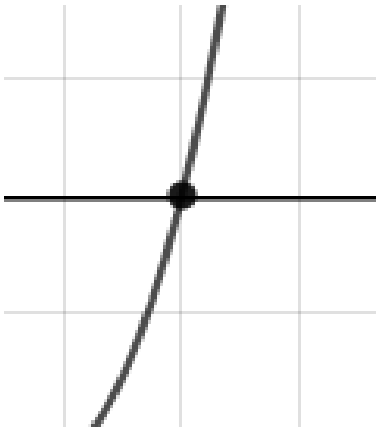
$$f(x) = 5(x-2)^9(x+2)^{14}(x+6)^2(x-6)^3$$



A

B. 

C. 

D. 

E. None of the above.

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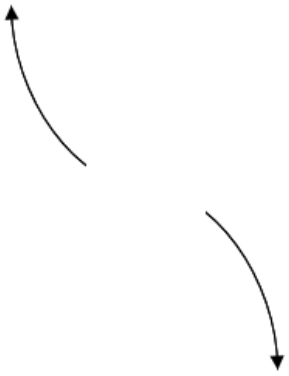
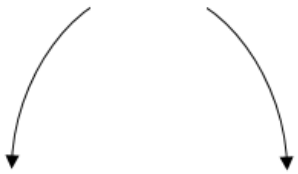
5. Describe the end behavior of the polynomial below.

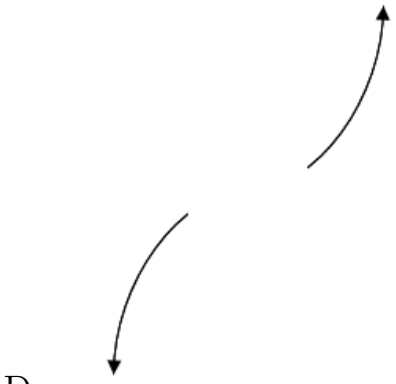
$$f(x) = -6(x-6)^5(x+6)^6(x-8)^2(x+8)^3$$

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

$$-3 - 2i \text{ and } -1$$

A. $b \in [-0.9, 1.1], c \in [3.8, 5.6],$ and $d \in [2.51, 3.71]$

B. $b \in [-0.9, 1.1], c \in [2.8, 3.5],$ and $d \in [1.06, 2.89]$

C. $b \in [5.9, 10.8], c \in [17.6, 19.4],$ and $d \in [12.15, 13.95]$

D. $b \in [-8, -3.3], c \in [17.6, 19.4],$ and $d \in [-13.5, -12.06]$

E. None of the above.

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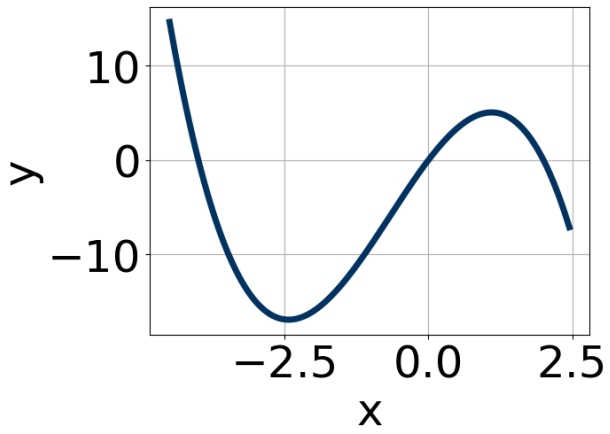
7. Which of the following equations *could* be of the graph presented below?



A. $-12x^4(x+4)^{10}(x-2)^{11}$

B. $15x^8(x+4)^{11}(x-2)^{11}$

C. $-15x^6(x+4)^{11}(x-2)^7$

D. $17x^{11}(x+4)^7(x-2)^7$

E. $-17x^9(x+4)^7(x-2)^{11}$

---

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

$$5 + 2i \text{ and } -3$$

A. $b \in [5, 11], c \in [-1.05, -0.7],$ and $d \in [-96, -81]$

B. $b \in [-13, -2], c \in [-1.05, -0.7],$ and $d \in [87, 93]$

C. $b \in [-2, 5], c \in [-2.32, -1.02],$ and $d \in [-17, -12]$

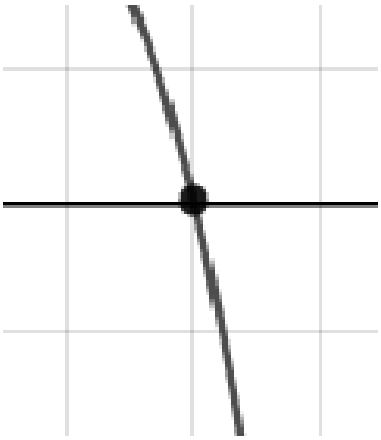
D. $b \in [-2, 5], c \in [0.87, 1.64],$ and $d \in [-6, -1]$

E. None of the above.

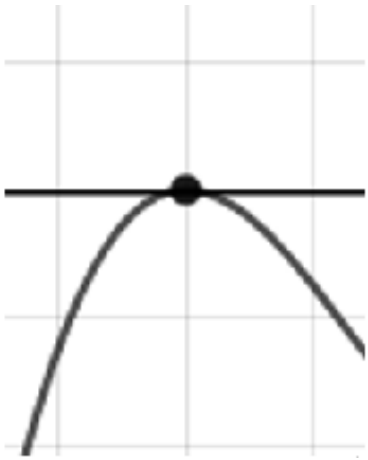
---

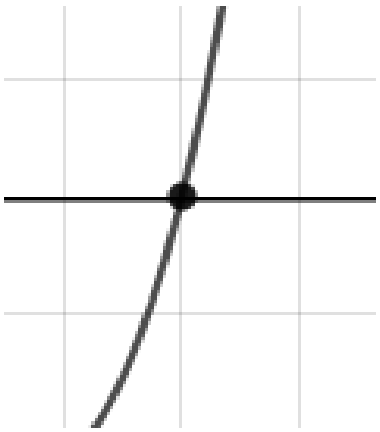
9. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

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

A. 

C. 

B. 

D. 

E. None of the above.

---

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

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

A. $a \in [70, 76], b \in [-125, -119], c \in [32, 39],$ and $d \in [-13, 1]$

B. $a \in [70, 76], b \in [125, 126], c \in [32, 39],$ and $d \in [-13, 1]$

C. $a \in [70, 76], b \in [53, 60], c \in [-59, -48],$ and $d \in [-13, 1]$

D. $a \in [70, 76], b \in [-125, -119], c \in [32, 39],$ and $d \in [11, 16]$

E. $a \in [70, 76], b \in [154, 164], c \in [88, 90],$ and $d \in [11, 16]$
