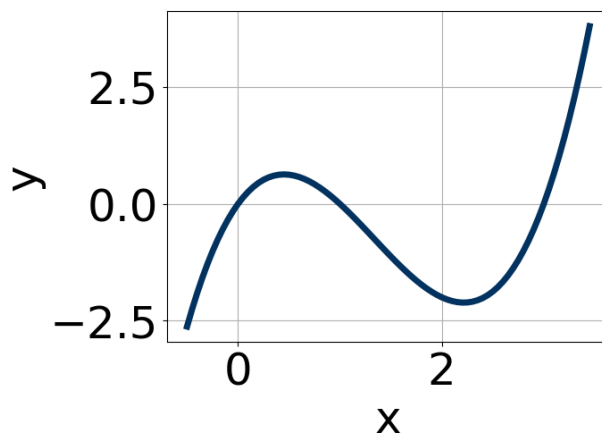1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-7, \frac{7}{2}, \text{ and } \frac{1}{2}$$

A. $a \in [-3, 6], b \in [-47, -42], c \in [117, 124], \text{ and } d \in [-51, -39]$

B. $a \in [-3, 6], b \in [-18, -15], c \in [-100, -89], \text{ and } d \in [48, 54]$

C. $a \in [-3, 6], b \in [-15, -8], c \in [-109, -101], \text{ and } d \in [-51, -39]$

D. $a \in [-3, 6], b \in [12, 17], c \in [-109, -101], \text{ and } d \in [48, 54]$

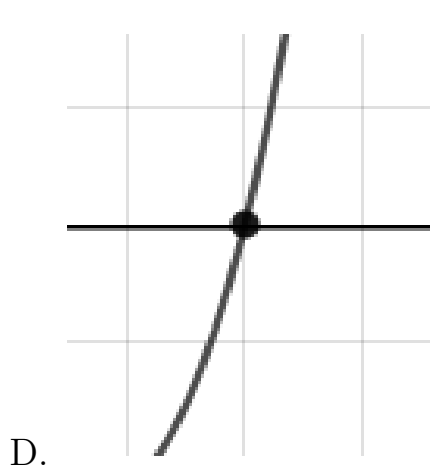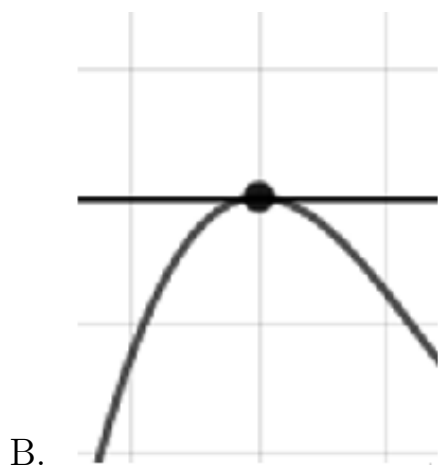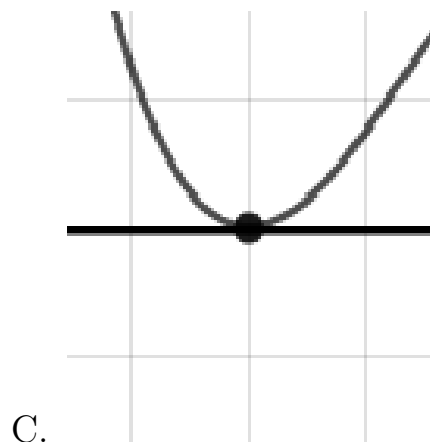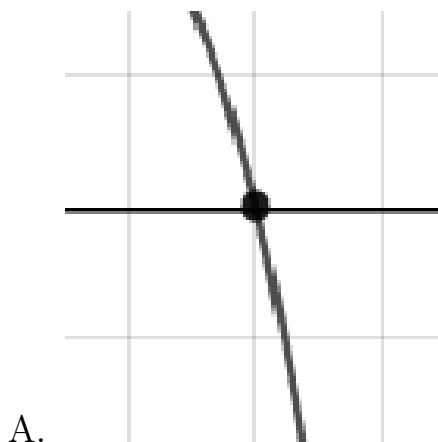E. $a \in [-3, 6], b \in [12, 17], c \in [-109, -101], \text{ and } d \in [-51, -39]$

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

A. $13x^7(x - 1)^7(x - 3)^{11}$

B. $-18x^9(x - 1)^{10}(x - 3)^9$

C. $-15x^5(x - 1)^{11}(x - 3)^{11}$

D. $8x^9(x - 1)^8(x - 3)^5$

E. $3x^7(x - 1)^4(x - 3)^{10}$

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

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

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

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

A. $b \in [1, 4], c \in [5.44, 8.1]$, and $d \in [8.6, 9.7]$

B. $b \in [-13, -5], c \in [23.8, 26.58]$, and $d \in [-41.4, -37.8]$

C. $b \in [1, 4], c \in [3.4, 5.01]$, and $d \in [5.2, 6.9]$

D. $b \in [2, 15], c \in [23.8, 26.58]$, and $d \in [37.2, 41.1]$
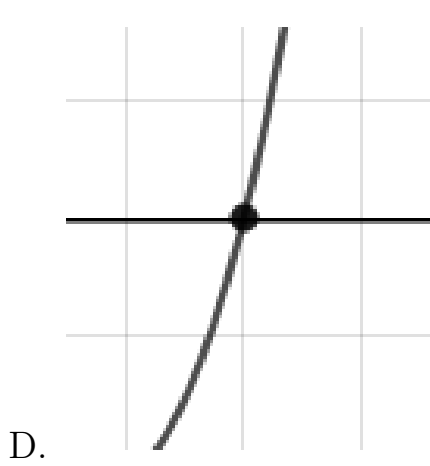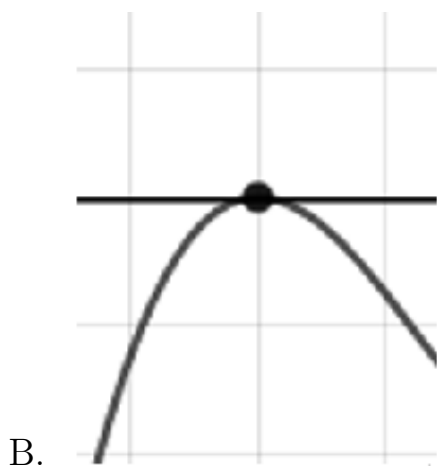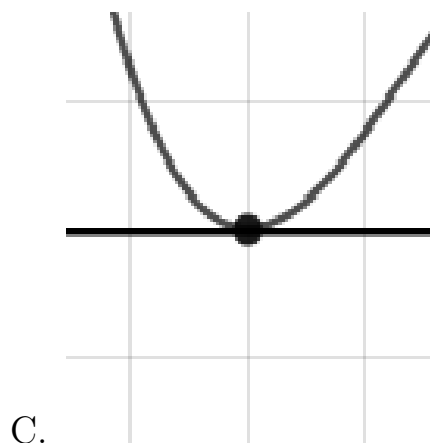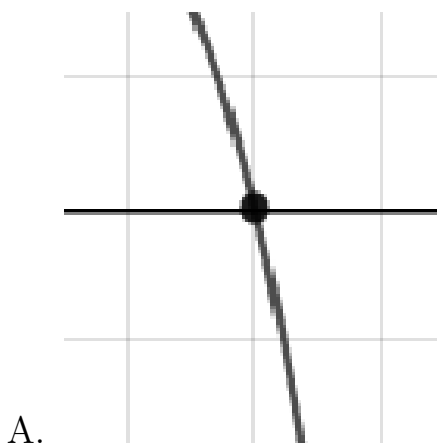
E. None of the above.

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

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

A. $a \in [-5, 6], b \in [-4.3, -3.7], c \in [-13, -6], \text{ and } d \in [25, 37]$

B. $a \in [-5, 6], b \in [1.6, 4.9], c \in [-13, -6], \text{ and } d \in [25, 37]$

C. $a \in [-5, 6], b \in [-6.1, -5.4], c \in [-9, 1], \text{ and } d \in [25, 37]$

D. $a \in [-5, 6], b \in [-10.9, -9.5], c \in [29, 36], \text{ and } d \in [-30, -23]$

E. $a \in [-5, 6], b \in [1.6, 4.9], c \in [-13, -6], \text{ and } d \in [-30, -23]$

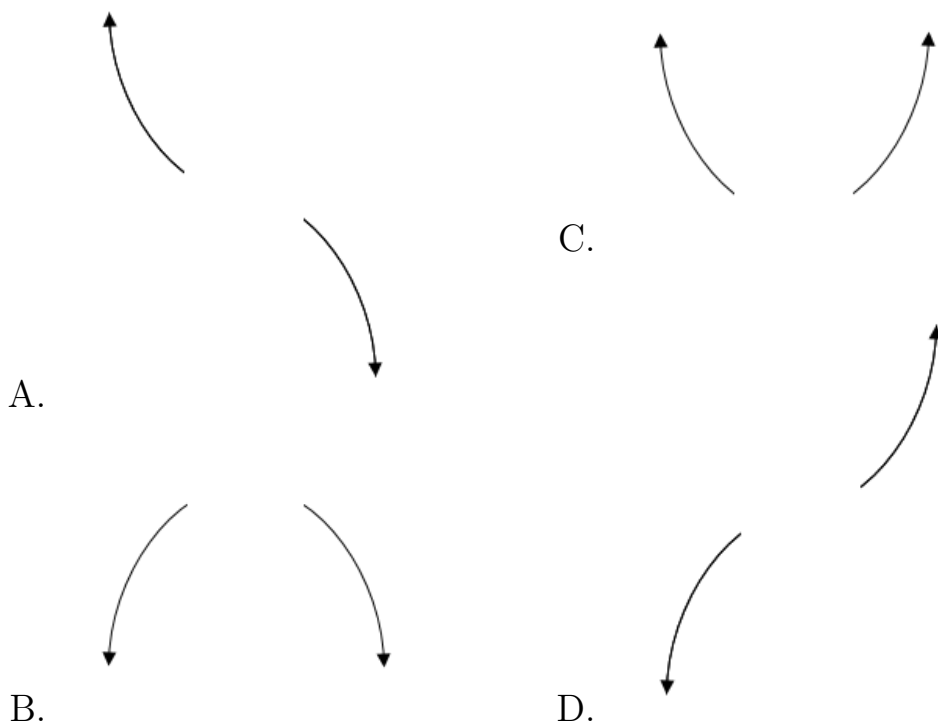6. Describe the zero behavior of the zero $x = 4$ of the polynomial below.

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

A.

C.

B.

D.

E. None of the above.

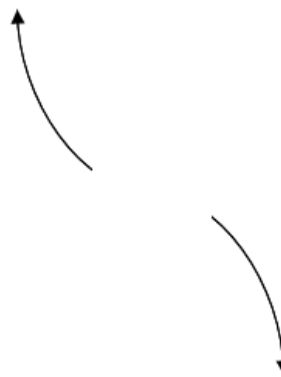7. Describe the end behavior of the polynomial below.
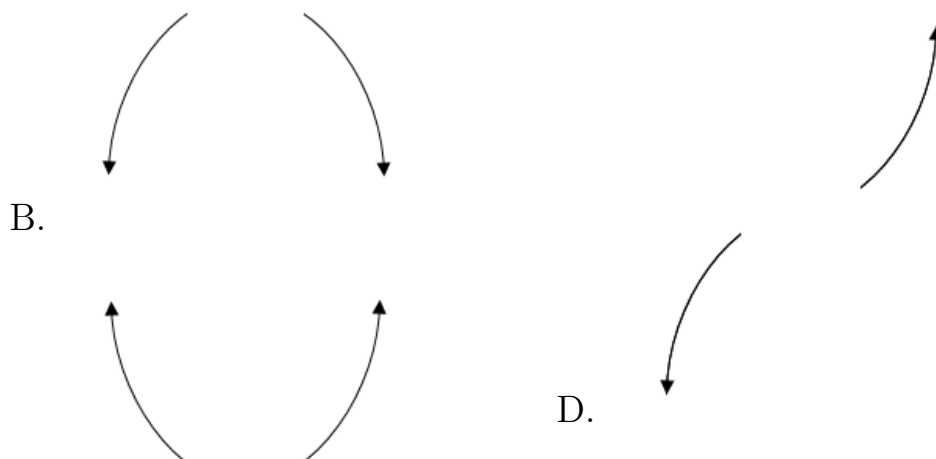
$$f(x) = -7(x+2)^3(x-2)^6(x-3)^5(x+3)^7$$

A.

B.

C.

D.

E. None of the above.

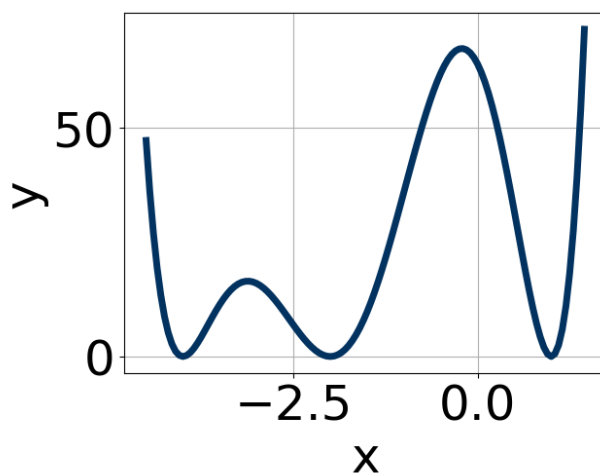8. Describe the end behavior of the polynomial below.

$$f(x) = 9(x-6)^3(x+6)^8(x-7)^3(x+7)^4$$

A.

B.

D.

C.

E. None of the above.

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

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

B. $-15(x+4)^4(x+2)^{10}(x-1)^7$

C. $16(x+4)^{10}(x+2)^8(x-1)^9$

D. $3(x+4)^4(x+2)^5(x-1)^7$

E. $20(x+4)^{10}(x+2)^8(x-1)^8$

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

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

A. $b \in [-0.9, 1.3], c \in [7.04, 8.22],$ and $d \in [-63, -58]$

B. $b \in [-1.3, 0.3], c \in [7.04, 8.22],$ and $d \in [58, 61]$

C. $b \in [-0.9, 1.3], c \in [0.36, 1.21],$ and $d \in [-9, -1]$

D. $b \in [-0.9, 1.3], c \in [6.7, 7.73],$ and $d \in [9, 17]$

E. None of the above.