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

$$\frac{5}{2},\ 4,\ \text{and}\ \frac{7}{2}$$

A. $a \in [-1, 6], b \in [36, 45], c \in [129, 132],$ and $d \in [133, 144]$

B. $a \in [-1, 6], b \in [7, 14], c \in [-52, -45],$ and $d \in [-143, -137]$

C. $a \in [-1, 6], b \in [-48, -32], c \in [129, 132],$ and $d \in [133, 144]$

D. $a \in [-1, 6], b \in [-26, -19], c \in [-27, -17],$ and $d \in [133, 144]$

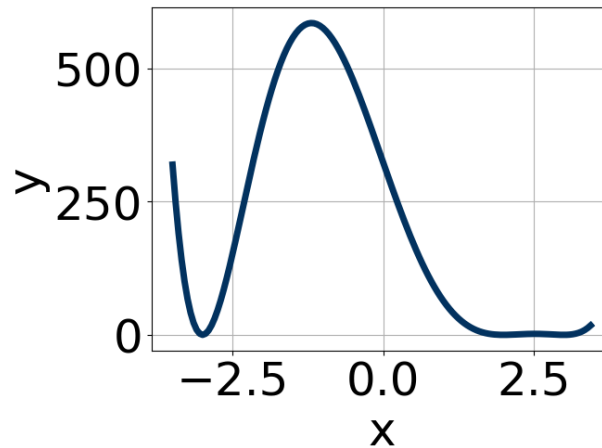E. $a \in [-1, 6], b \in [-48, -32], c \in [129, 132],$ and $d \in [-143, -137]$

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

$$f(x) = 7(x + 8)^8(x - 8)^7(x + 9)^{12}(x - 9)^7$$
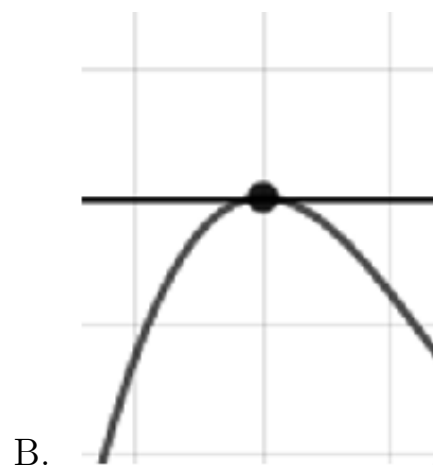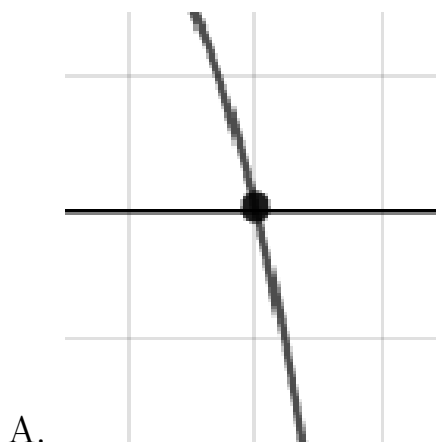
A.

C.

B.

D.
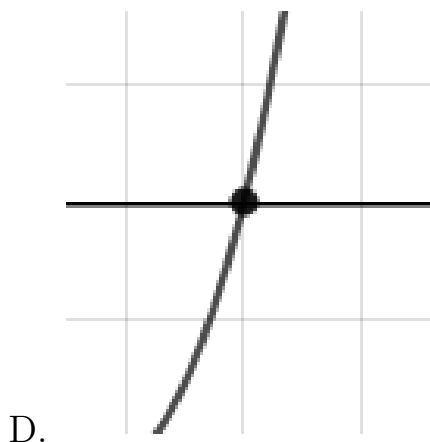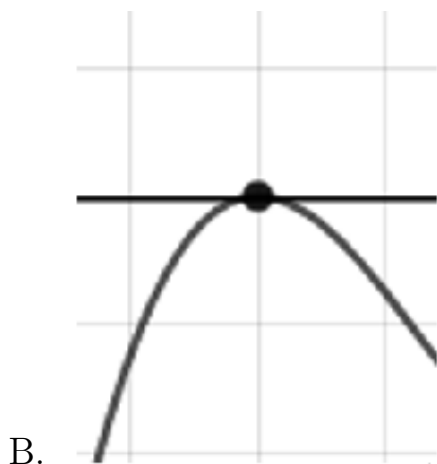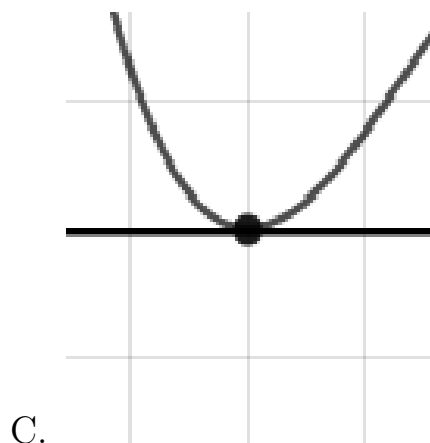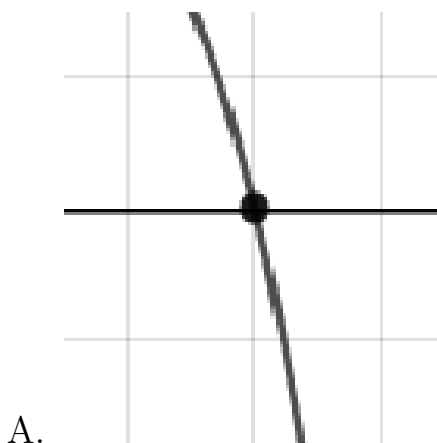
    E. None of the above.

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

    A. $-4(x-3)^6(x+3)^8(x-2)^7$

    B. $-11(x-3)^4(x+3)^{10}(x-2)^8$

    C. $6(x-3)^4(x+3)^9(x-2)^9$

    D. $6(x-3)^6(x+3)^8(x-2)^8$

    E. $19(x-3)^8(x+3)^{10}(x-2)^7$

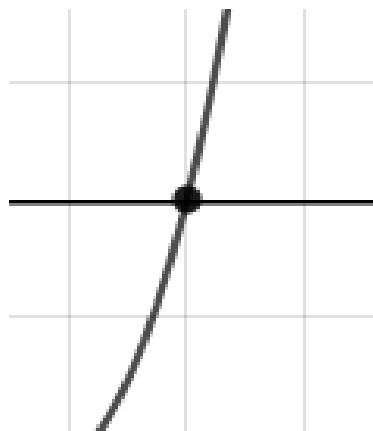
4. Describe the zero behavior of the zero $x = 9$ of the polynomial below.

$$f(x) = -4(x+9)^9(x-9)^{10}(x-2)^7(x+2)^{10}$$

A.   B.

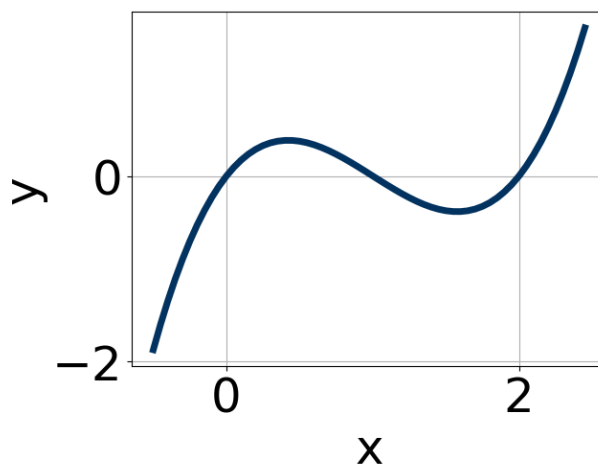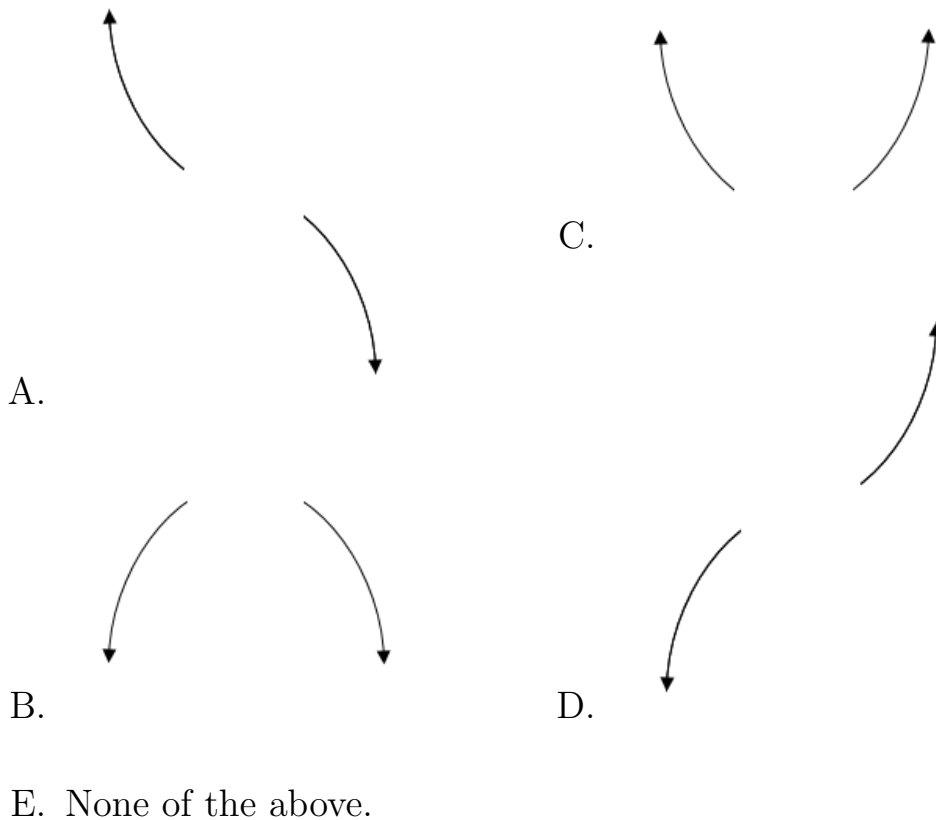C.   D.

E. None of the above.

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

  A. $-12x^9(x-2)^5(x-1)^{11}$

  B. $18x^4(x-2)^6(x-1)^{11}$

  C. $10x^{10}(x-2)^5(x-1)^{11}$

  D. $-10x^6(x-2)^{11}(x-1)^9$

  E. $12x^{11}(x-2)^{11}(x-1)^{11}$

---

6. Describe the end behavior of the polynomial below.

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

C.

A.

B.   D.

E. None of the above.

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

$$-3 - 5i \text{ and } 1$$

A. $b \in [-6.1, -3.5], c \in [26.18, 29.01],$ and $d \in [32.07, 34.51]$

B. $b \in [0.1, 4.8], c \in [0.84, 2.43],$ and $d \in [-3.52, -2.55]$

C. $b \in [3.2, 10.8], c \in [26.18, 29.01],$ and $d \in [-35.08, -33.01]$

D. $b \in [0.1, 4.8], c \in [3.67, 5.55],$ and $d \in [-5.68, -3.99]$

E. None of the above.

---

8. Describe the end behavior of the polynomial below.

$$f(x) = 3(x - 6)^4(x + 6)^7(x - 5)^2(x + 5)^2$$
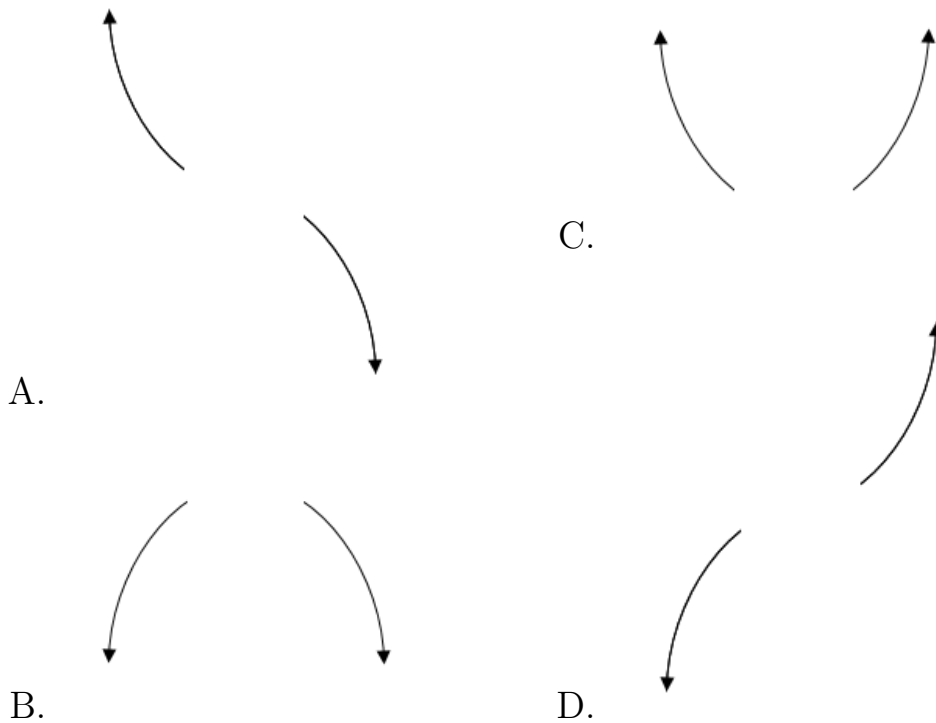
C.

A.

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

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

A. $b \in [5, 10], c \in [31, 46],$ and $d \in [24, 34]$

B. $b \in [1, 2], c \in [-10, -1],$ and $d \in [3, 12]$

C. $b \in [-14, -8], c \in [31, 46],$ and $d \in [-34, -30]$

D. $b \in [1, 2], c \in [3, 4],$ and $d \in [-5, 0]$

E. None of the above.

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10. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in

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

$$\frac{1}{4}, -5, \text{ and } \frac{-7}{5}$$

A. $a \in [17, 24], b \in [-128, -121], c \in [108, 114], \text{ and } d \in [32, 38]$

B. $a \in [17, 24], b \in [132, 140], c \in [166, 173], \text{ and } d \in [32, 38]$

C. $a \in [17, 24], b \in [118, 125], c \in [108, 114], \text{ and } d \in [32, 38]$

D. $a \in [17, 24], b \in [118, 125], c \in [108, 114], \text{ and } d \in [-42, -31]$

E. $a \in [17, 24], b \in [-70, -65], c \in [-163, -155], \text{ and } d \in [-42, -31]$