1. Describe the end behavior of the polynomial below.

$$f(x) = -9(x + 8)^3(x - 8)^8(x + 7)^5(x - 7)^6$$
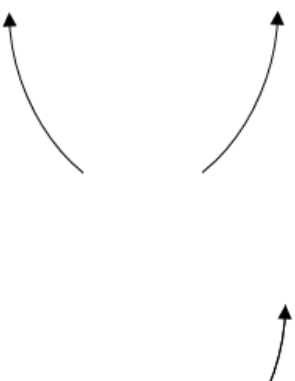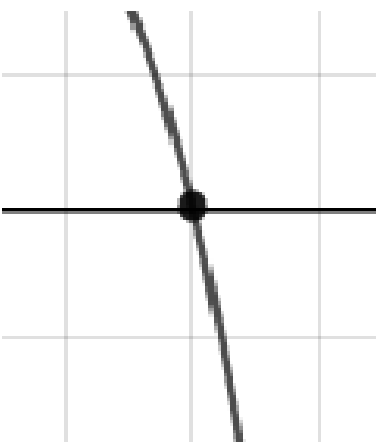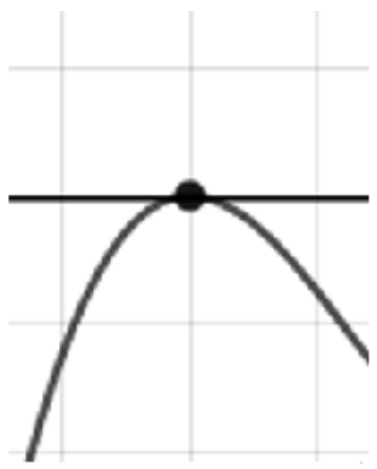
A.

B.

C.

D.

E. None of the above.

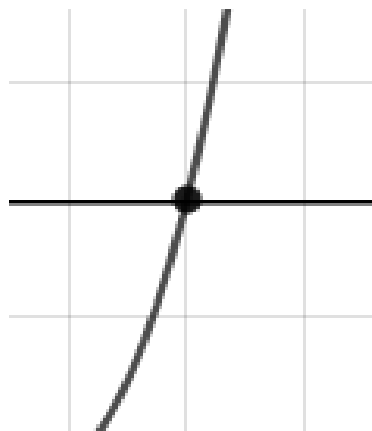2. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

$$f(x) = 2(x + 4)^7(x - 4)^6(x - 2)^{10}(x + 2)^7$$

A.

B.

C.   D.
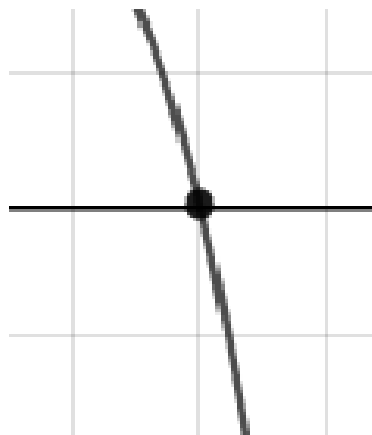
E. None of the above.

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

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

   A. $b \in [-3, 5], c \in [5, 16], \text{ and } d \in [-2, 9]$

   B. $b \in [10, 15], c \in [39, 51], \text{ and } d \in [33, 40]$

   C. $b \in [-3, 5], c \in [-2, 1], \text{ and } d \in [-11, -2]$

   D. $b \in [-16, -7], c \in [39, 51], \text{ and } d \in [-42, -25]$

   E. None of the above.

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

$$f(x) = 6(x + 2)^9(x - 2)^8(x + 8)^7(x - 8)^4$$

A.

B.

C.

D.
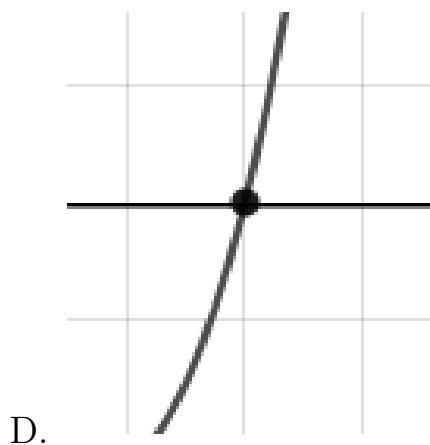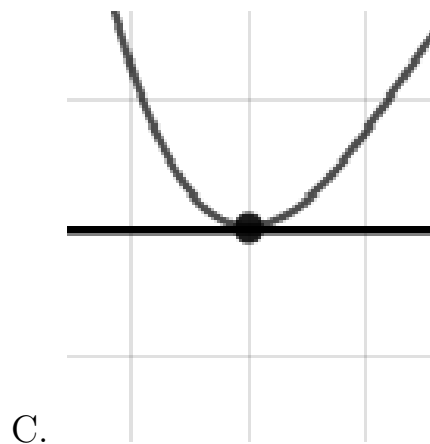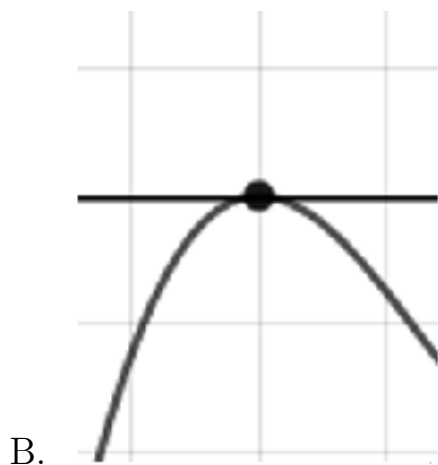
E. None of the above.

5. Which of the following equations *could* be of the graph presented below?
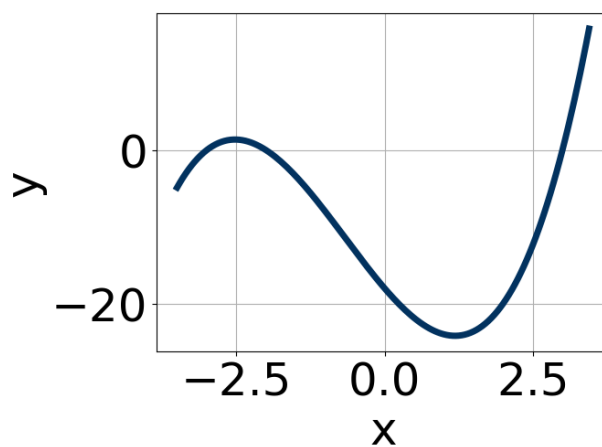
A. $-20(x-3)^{11}(x+3)^7(x+2)^7$

B. $15(x-3)^4(x+3)^{11}(x+2)^7$

C. $-4(x-3)^4(x+3)^5(x+2)^9$

D. $19(x-3)^{10}(x+3)^8(x+2)^5$

E. $13(x-3)^{11}(x+3)^9(x+2)^5$

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6. Which of the following equations *could* be of the graph presented below?
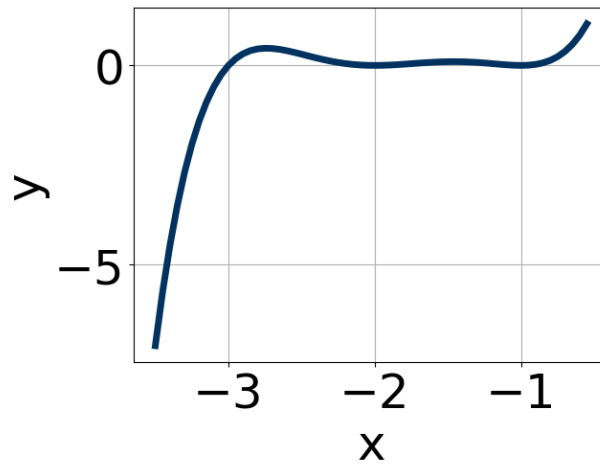
A. $16(x+1)^{10}(x+2)^8(x+3)^9$

B. $11(x+1)^4(x+2)^{11}(x+3)^7$

C. $-3(x+1)^{10}(x+2)^4(x+3)^4$

D. $-16(x+1)^6(x+2)^6(x+3)^{11}$

E. $12(x+1)^8(x+2)^{11}(x+3)^4$

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7. Describe the end behavior of the polynomial below.

$$f(x) = 9(x+4)^2(x-4)^5(x+8)^3(x-8)^4$$

A.

B.

D.

C.

E. None of the above.

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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 $ax^3 + bx^2 + cx + d$.
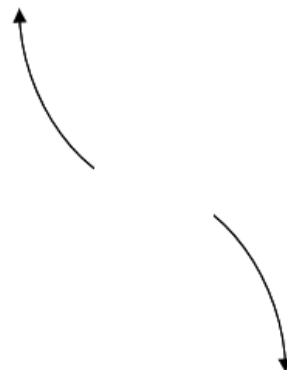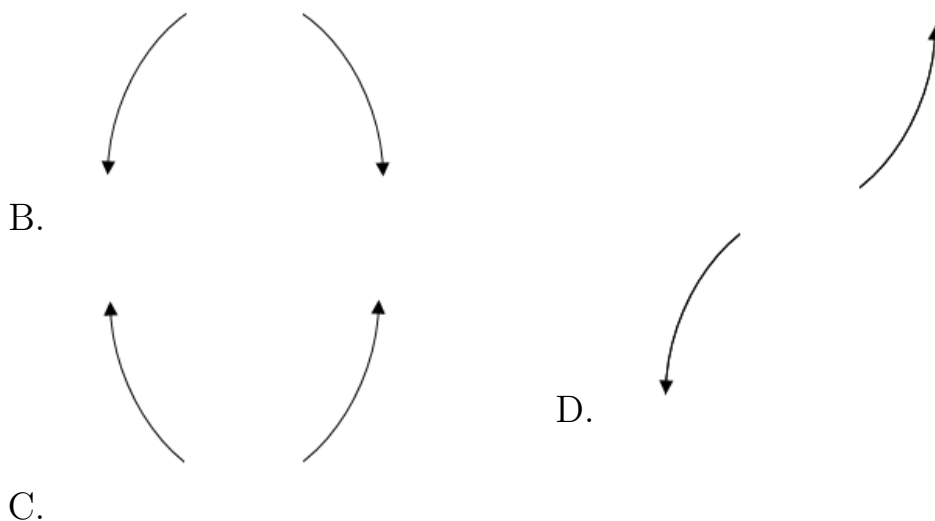
$$\frac{1}{2}, -5, \text{ and } \frac{-3}{4}$$

A. $a \in [1, 9], b \in [50, 52], c \in [46, 55], \text{ and } d \in [12, 18]$

B. $a \in [1, 9], b \in [35, 44], c \in [6, 12], \text{ and } d \in [12, 18]$

C. $a \in [1, 9], b \in [-32, -28], c \in [-48, -38], \text{ and } d \in [-16, -13]$

D. $a \in [1, 9], b \in [35, 44], c \in [6, 12], \text{ and } d \in [-16, -13]$

E. $a \in [1, 9], b \in [-50, -37], c \in [6, 12], \text{ and } d \in [12, 18]$

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

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

A. $b \in [8, 14], c \in [39, 42.7], \text{ and } d \in [66, 81]$

B. $b \in [-11, -7], c \in [39, 42.7]$, and $d \in [-75, -67]$

C. $b \in [-8, 2], c \in [-7.7, -5.8]$, and $d \in [12, 17]$

D. $b \in [-8, 2], c \in [-2.9, 0.2]$, and $d \in [-19, -11]$

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

$$5, \frac{6}{5}, \text{ and } 1$$

A. $a \in [-2, 6], b \in [-37, -32], c \in [56, 63]$, and $d \in [-34, -28]$

B. $a \in [-2, 6], b \in [-37, -32], c \in [56, 63]$, and $d \in [29, 33]$

C. $a \in [-2, 6], b \in [8, 19], c \in [-51, -45]$, and $d \in [29, 33]$

D. $a \in [-2, 6], b \in [35, 40], c \in [56, 63]$, and $d \in [29, 33]$

E. $a \in [-2, 6], b \in [22, 27], c \in [-9, 0]$, and $d \in [-34, -28]$