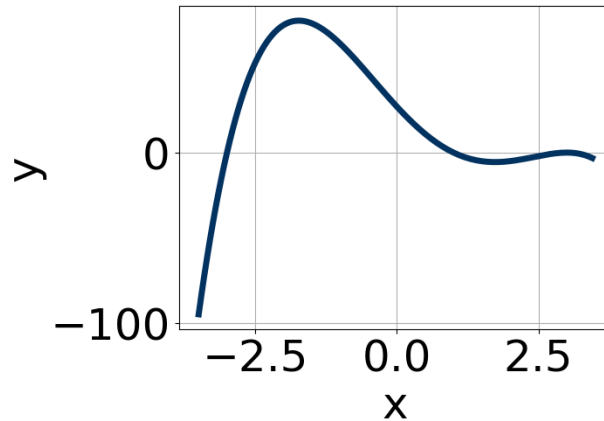1. Which of the following equations *could* be of the graph presented below?
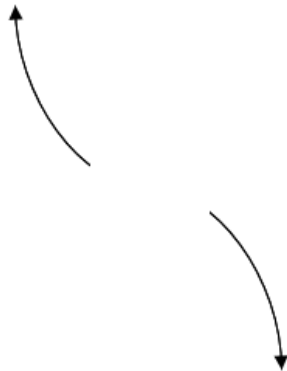

   A. $-18(x-3)^4(x-1)^6(x+3)^9$

   B. $13(x-3)^8(x-1)^9(x+3)^6$

   C. $-8(x-3)^4(x-1)^5(x+3)^7$

   D. $10(x-3)^6(x-1)^9(x+3)^{11}$
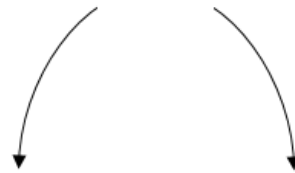
   E. $-19(x-3)^5(x-1)^{10}(x+3)^5$

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2. Describe the end behavior of the polynomial below.

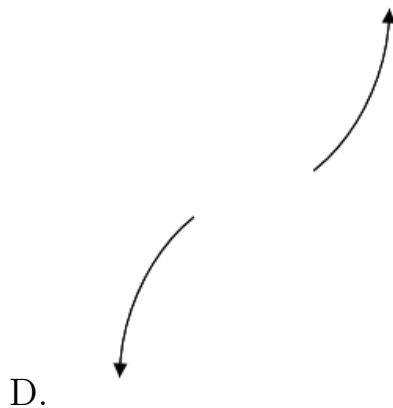$$f(x) = -3(x-3)^5(x+3)^6(x-2)^3(x+2)^5$$

B.
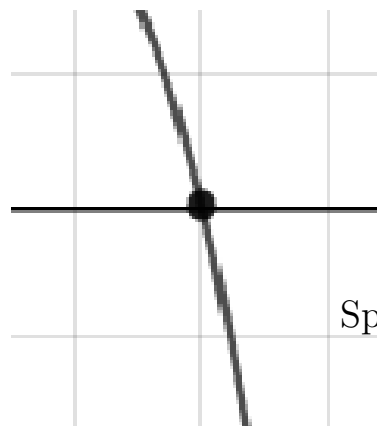
A.

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

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

A. $a \in [4, 10], b \in [53.5, 57.4], c \in [150, 154], \text{ and } d \in [23, 37]$

B. $a \in [4, 10], b \in [14.4, 17.4], c \in [-139, -134], \text{ and } d \in [23, 37]$

C. $a \in [4, 10], b \in [14.4, 17.4], c \in [-139, -134], \text{ and } d \in [-35, -21]$

D. $a \in [4, 10], b \in [-17.7, -14.1], c \in [-139, -134], \text{ and } d \in [23, 37]$

E. $a \in [4, 10], b \in [-14.4, -12.2], c \in [-147, -141], \text{ and } d \in [-35, -21]$

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

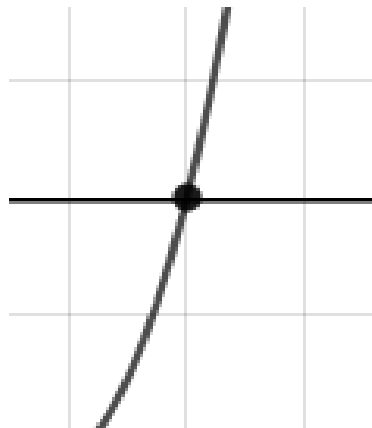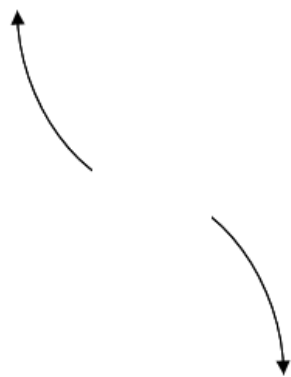$$f(x) = 2(x - 8)^{12}(x + 8)^8(x + 9)^7(x - 9)^4$$

B.

C.

D.

E. None of the above.

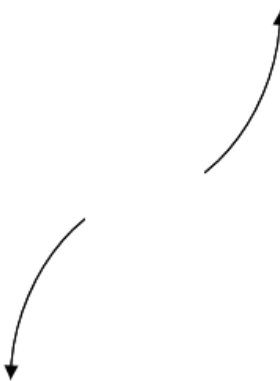5. Describe the end behavior of the polynomial below.
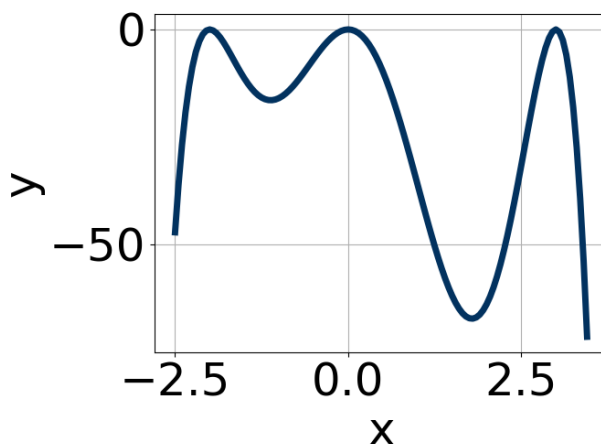
$$f(x) = 8(x+8)^2(x-8)^3(x+7)^5(x-7)^7$$

B.

A.

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

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

A. $b \in [-1.3, 1.7], c \in [5, 12], \text{ and } d \in [4, 6]$

B. $b \in [-1.3, 1.7], c \in [-5, 2], \text{ and } d \in [-4, 0]$

C. $b \in [-5.6, -2.4], c \in [25, 27], \text{ and } d \in [24, 31]$

D. $b \in [2.7, 5.9], c \in [25, 27], \text{ and } d \in [-35, -24]$

E. None of the above.

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

A. $20x^8(x-3)^{10}(x+2)^4$

B. $-11x^4(x-3)^{10}(x+2)^6$

C. $-15x^{10}(x-3)^6(x+2)^9$

D. $-2x^6(x-3)^5(x+2)^{11}$
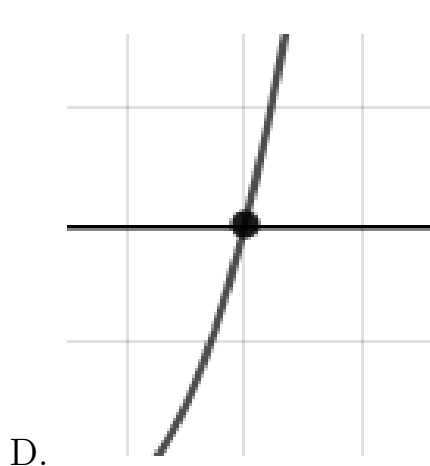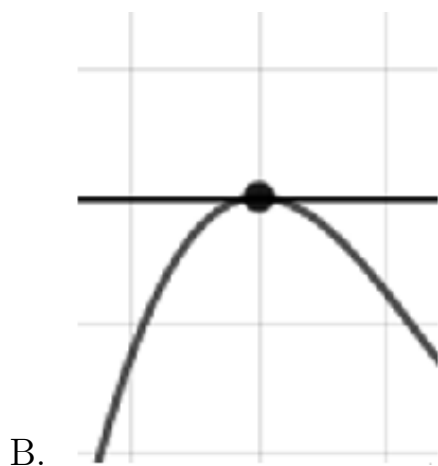
E. $17x^4(x-3)^8(x+2)^7$

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

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

A. $b \in [2, 11], c \in [8, 12], \text{ and } d \in [-53, -49]$

B. $b \in [-2, 4], c \in [-1, 3], \text{ and } d \in [-10, -6]$

C. $b \in [-2, 4], c \in [-5, -3], \text{ and } d \in [6, 8]$

D. $b \in [-10, -5], c \in [8, 12], \text{ and } d \in [46, 54]$

E. None of the above.

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9. Describe the zero behavior of the zero $x = 5$ of the polynomial below.

$$f(x) = 5(x+5)^7(x-5)^{10}(x+3)^5(x-3)^6$$
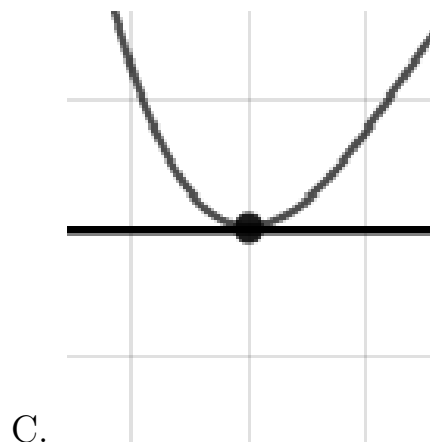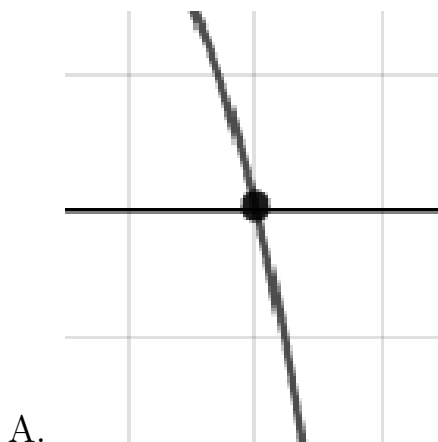
A.

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

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

A. $a \in [2, 12], b \in [-24, -18], c \in [16, 19], \text{ and } d \in [72, 73]$

B. $a \in [2, 12], b \in [-24, -18], c \in [16, 19], \text{ and } d \in [-77, -68]$

C. $a \in [2, 12], b \in [20, 24], c \in [16, 19], \text{ and } d \in [-77, -68]$

D. $a \in [2, 12], b \in [-12, -2], c \in [-67, -60], \text{ and } d \in [-77, -68]$

E. $a \in [2, 12], b \in [27, 34], c \in [90, 95], \text{ and } d \in [72, 73]$