Illustrative Mathematics

Solutions

Lesson 8 Practice Problems

1. Match each polynomial with its end behavior. Some end behavior options may not have a matching polynomial.

   A. $f(x) = 2x^3 + 3x^4 + x^2 - 1$

   B. $f(x) = 1 - 3x + x^2$

   C. $f(x) = 9 + x^4$

   D. $f(x) = 2x + 5$

   A, C

   B

   D

   1. As x gets larger and larger in either the positive or negative direction, $f(x)$ gets larger and larger in the positive direction.

   2. As x gets larger and larger in the positive direction, $f(x)$ gets larger and larger in the positive direction. As x gets larger and larger in the negative direction, $f(x)$ gets larger and larger in the negative direction.

   3. As x gets larger and larger in the positive direction, $f(x)$ gets larger and larger in the negative direction. As x gets larger and larger in the negative direction, $f(x)$ gets larger and larger in the positive direction.

   4. As x gets larger and larger in either the positive or negative direction, $f(x)$ gets larger and larger in the negative direction.

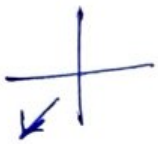
2. Which polynomial function gets larger and larger in the negative direction as x gets larger and larger in the negative direction?

   A. $f(x) = 5x^2 - 2x + 1$

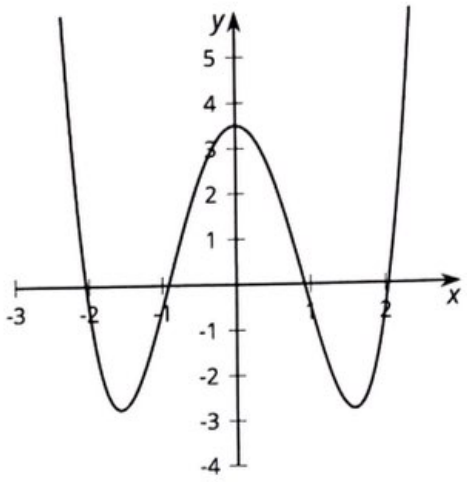
   B. $f(x) = 6x^3 + 4x^2 - 15x + 32$

   C. $f(x) = 7x^4 - 2x^3 + 3x^2 + 8x - 10$

   D. $f(x) = 8x^6 + 1$



3. The graph of a polynomial function f is shown. Which statement about the polynomial is true?



A. The degree of the polynomial is even.

B. The degree of the polynomial is odd.

C. The constant term of the polynomial is even.

D. The constant term of the polynomial is odd.

4. Andre wants to make an open-top box by cutting out corners of a 22 inch by 28 inch piece of poster board and then folding up the sides. The volume $V(x)$ in cubic inches of the open-top box is a function of the side length x in inches of the square cutouts.

a. Write an expression for $V(x)$.

$V(x) = x(22-2x)(28-2x)$

b. What is the volume of the box when $x = 6$?

$V(6) = 6(10)(16) = 960$ in^3

c. What is a reasonable domain for V in this context?

$0 < x < 11$

(From Unit 2, Lesson 1.)

5. For each polynomial function, rewrite the polynomial in standard form. Then state its degree and constant term.

a. $f(x) = (3x + 1)(x + 2)(x - 3)$

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

$= 3x^3 + 7x^2 + 2x - 9x^2 - 21x - 6$ $= 3x^3 - 2x^2 - 19x - 6$

degree 3, constant -6

b. $g(x) = -2(3x + 1)(x + 2)(x - 3)$

$= -2(3x^2 - 14x - 4)(x - 3)$

$= -6x^3 - 14x^2 - 4x + 18x^2 + 42x + 12$ $= -6x^3 + 4x^2 + 38x + 12$

degree 3

constant 12

(From Unit 2, Lesson 6.)

6. Kiran wrote $f(x) = (x - 3)(x - 7)$ as an example of a function whose graph has x-intercepts at $x = 3, 7$. What was his mistake?

reversed signs

$f(x) = (x + 3)(x + 7)$

(From Unit 2, Lesson 7.)

7. A polynomial function, $f(x)$, has x-intercepts at $(-6, 0)$ and $(2, 0)$. What is one possible factor of $f(x)$?

$(x - 2)$

$(x + 6)$

(From Unit 2, Lesson 7.)