Illustrative Mathematics

SOLUTIONS

Lesson 4 Practice Problems

1. Here are two expressions whose product is a new expression, A.

$$(5x^4 + \square x^3)(4x^{\square} - 6) = A$$

Andre says that any real number can go in either of the boxes and A will be a polynomial. Is he correct? Explain your reasoning.

The first box, the coefficient, can have any real number, but the exponent must be a non-negative integer.

2. Lin divides the polynomial $2x^2 - 4x + 1$ by 4 and gets $0.5x^2 - x + 0.25$. Is $0.5x^2 - x + 0.25$ a polynomial? Explain your thinking.

yes. It is the sum of ~~pow~~ non-negative integer powers of a single variable, x.

3. What is the result when any 2 integers are multiplied?

A. a positive integer

B. a negative integer

C. an integer

D. an even number

4. Clare wants to make an open-top box by cutting out corners of a 30 inch by 25 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 $V(x)$. $V(x) = x(30-2x)(25-2x)$

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

$0 < x < 25/2$

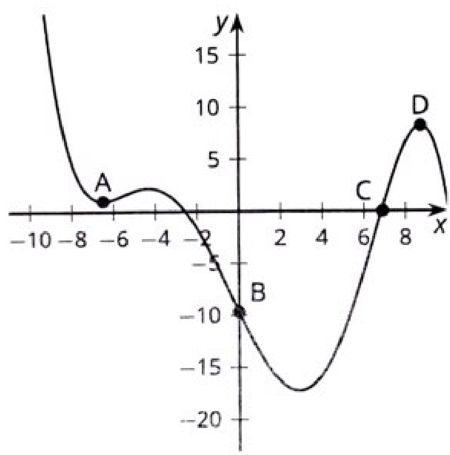
(From Unit 2, Lesson 1.)

5. Identify the degree, leading coefficient, and constant value of each of the following polynomials.

	degree	leading Coef.	Constant
a. $f(x) = 2x^5 - 8x^2 - x - 6$	5	2	−6
b. $h(x) = x^3 - 7x^2 - x + 2$	3	1	2
c. $g(x) = 5x^2 - 4x^3 + 2x + 5.4$	2	5	5.4

(From Unit 2, Lesson 3.)

6. Which point is a relative minimum?



A. A

B. B

C. C

D. D

(From Unit 2, Lesson 3.)

Lesson 5 Practice Problems

1. What is the value of

$$4(x-2)(x-3)+7(x-2)(x-5)-6(x-3)(x-5)$$

when $x=5$?

0

2. Which polynomial function has zeros when $x = \text{-}2, \frac{3}{4}, 5$?

A. $f(x)=(x-2)(3x+4)(x+5)$

B. $f(x)=(x-2)(4x+3)(x+5)$

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

D. $f(x)=(x+2)(4x-3)(x-5)$

3. The graph of a polynomial $f(x)=(2x-3)(x-4)(x+3)$ has x-intercepts at 3 x values. What are they?

$\frac{3}{2}$, 4 , -3

4. Match each sequence with one of the recursive definitions. Note that only the part of the definition showing the relationship between the current term and the previous term is given so as not to give away the solutions. One of the sequences matches two recursive definitions.

A. $a(n)=a(n-1)-4$

B. $b(n)=b(n-1)+0$

C. $c(n)=\text{-}\frac{1}{2}\cdot c(n-1)$

D. $d(n)=1\cdot d(n-1)$

1. 7, 3, -1, -5

2. $1, \text{-}\frac{1}{2}, \frac{1}{4}, \text{-}\frac{1}{8}$

3. 8, 8, 8, 8

(From Unit 1, Lesson 5.)

5. Han is multiplying $10x^4$ by $0.5x^3$ and gets $5x^7$. He says that $0.5x^3$ is not a polynomial because 0.5 is not an integer. What is the error in Han's thinking? Explain your reasoning.

He thinks the coefficient must be an integer, but only the exponent has that limitation, not the coefficient

(From Unit 2, Lesson 4.)

6. Here are two expressions whose sum is a new expression, A.

$(2x^2 + 5) + (6x^{\square} - 7) = A$

Select **all** the values that we can put in the box so that A is a polynomial.

A. -2

B. -1

C. -0.5

D. 0

E. 0.5

F. 1

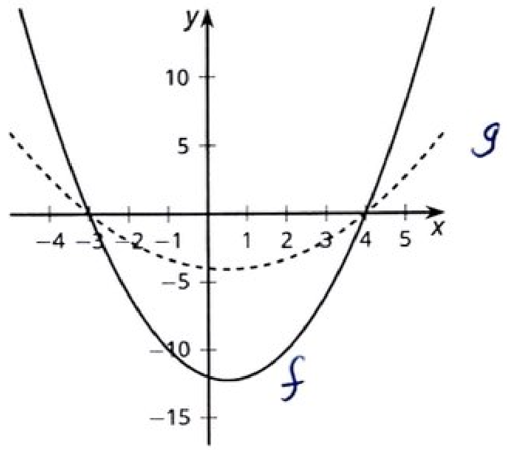
G. 2

(From Unit 2, Lesson 4.)

Illustrative Mathematics

Lesson 6 Practice Problems

1. $f(x) = (x + 3)(x - 4)$ and $g(x) = \frac{1}{3}(x + 3)(x - 4)$. The graphs of each are shown here.



a. Which graph represents which polynomial function? Explain how you know.

g has a coefficient of $\frac{1}{3}$, so it is the curve with less amplitude, as labeled.

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

a. $f(x) = (x + 1)(x + 3)(x - 4)$

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

$= x^3 + 4x^2 + 3x - 4x^2 - 16x - 12 = x^3 - 13x - 12$

degree 3, constant -12

b. $g(x) = 3(x + 1)(x + 3)(x - 4)$

$= \cancel{3x^2 + 1}$

$= 3\,f(x)$

$= 3x^3 - 39x - 36$

degree 3, constant 36

3. Tyler incorrectly says that the constant term of $(x+4)(x-4)$ is zero.

   a. What is the correct constant term?

   -16

   b. What is Tyler's mistake? Explain your reasoning.

   He added $(4)+(-4)$ istead of multiplying.

4. Which of these standard form equations is equivalent to $(x+1)(x-2)(x+4)(3x+7)$?

   $3x^4 \ldots -56$

   A. $x^4 + 10x^3 + 15x^2 - 50x - 56$

   B. $x^4 + 10x^3 + 15x^2 - 50x + 56$

   C. $3x^4 + 16x^3 + 3x^2 - 66x - 56$

   D. $3x^4 + 16x^3 + 3x^2 - 66x + 56$

5. Select **all** polynomial expressions that are equivalent to $5x^3 + 7x - 4x^2 + 5$.

   A. $13x^5$

   B. $5x^3 - 4x^2 + 7x + 5$

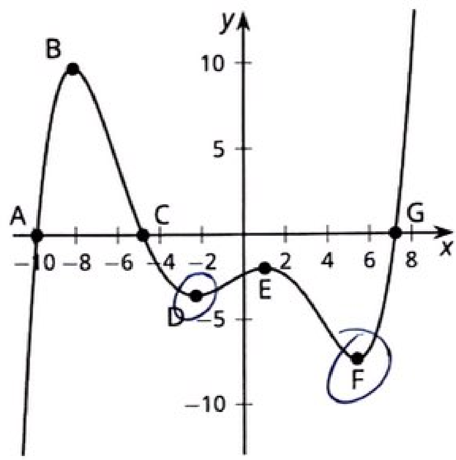
   C. $5x^3 + 4x \cdot 2 + 7x + 5$

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

   E. $5 + 7x - 4x^2 + 5x^3$

(From Unit 2, Lesson 2.)

6. Select **all** the points which are relative minimums of this graph of a polynomial function.



A. Point A

B. Point B

C. Point C

D. Point D

E. Point E

F. Point F

G. Point G

(From Unit 2, Lesson 3.)

7. What are the x-intercepts of the graph of $y = (3x + 8)(5x - 3)(x - 1)$?

$-\frac{8}{3}$, $\frac{3}{5}$, 1

(From Unit 2, Lesson 5.)