Multiplying Polynomials by Monomials

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9:12 AM

Mathematics 9
Polynomials
Multiplying Polynomials by Monomials

A. Definitions

1. **expression:** algebra terms that are joined by addition or subtraction.

$$3x - 5y \quad , \quad x^3 + 4x^2 - 5x + 9$$

2. **polynomial:** an algebra expression made up of many terms.

B. Multiplying Using Distributive Principle

Distributive Principle (Distributive Property) is a mathematical method for multiplying a single term by multiple terms.

$$3x \cdot 2x = 6x^2$$
$$3x \cdot -5 = -15x$$

$$3x(2x - 5)$$

$$\boxed{6x^2 - 15x}$$

1. Expand the following using distributive property.

a) $2(4m + 3)$

$$\boxed{8m + 6}$$

b) $(-5x)(-2x + 7)$

$$\boxed{10x^2 - 35x}$$

c) $(4 + 3y + 2x)6$

$$24 + 18y + 12x$$

$$\boxed{12x + 18y + 24}$$

d) $3a(5a^2 - 4a - 1)$
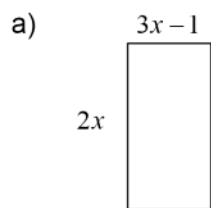
$$\boxed{15a^3 - 12a^2 - 3a}$$

e) $4x^2(5x^2 - xy)$

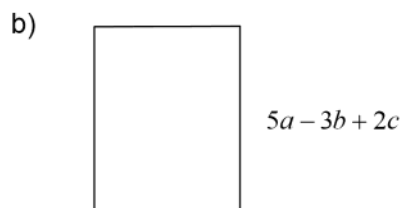$$\boxed{20x^4 - 4x^3y}$$

f) $\frac{1}{2}a^2(4ab + 10b^2)$

$$\boxed{2a^3b + 5a^2b^2}$$

2. Write an expression to represent the area of the following shapes.

a)

$3x - 1$

$2x$

$A = lw$
$A = 2x(3x - 1)$
$= \boxed{6x^2 - 2x}$

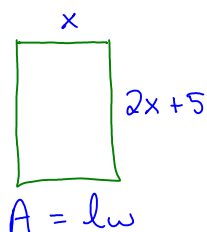b)

$5a - 3b + 2c$

$4a$

$A = lw$
$A = (5a - 3b + 2c)4a$
$= \boxed{20a^2 - 12ab + 8ac}$

4. The length of a volleyball court is 5 m longer than twice the width of the court.

a) Write an expression to represent the area of the volleyball court.

$x = $ width
$2x + 5 = $ Length

x

$2x + 5$

$A = lw$

$A = (2x + 5)x$
$= \boxed{2x^2 + 5x}$

b) If the width of the court is 3 m, calculate the area of the volleyball court.

$x = $ width $= 3m$.

$2x^2 + 5x.$
$2(3)^2 + 5(3)$
$2(9) + 5(3)$
$18 + 15$
$= \boxed{33m^2}$

Assignment: Multiplying Polynomials by Monomials Assignment

Multiplying Polynomials by Monomials Assignment

1. Multiply the following.

a) $2(4n + 3)$

b) $5(5x - 2)$

c) $-4(8p + 1)$

d) $7(4x^2 - 3x + 2)$

e) $3y(2x - 4y)$

f) $4mn(-3m^2 - 6mn)$

g) $3n(8n - 9)$

h) $2(3a^2 + 6a + 7)$

i) $4x(2x^2 - 3x + 5)$

j) $2m(3m^2 + 2mn - 5)$

k) $x^2(x^2 + 3x - 5)$

l) $-4m(-3m^2 + 2m)$

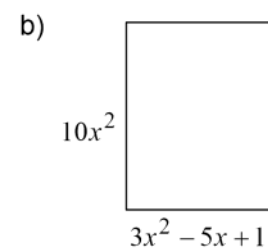m) $3ab(5a + 4)$
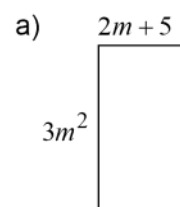
n) $\frac{1}{2}xy(2xy - 6x)$

o) $-2a^2b(7ab - b)$

p) $8mn^2(2mn - 5)$

q) $6x^2y^2(3x^2y^2 - 1)$

r) $7abc(3a^2 - 5c^2)$

2. Write and expression to represent the area of the following shapes.

a) $2m + 5$

$3m^2$

b)

$10x^2$

$3x^2 - 5x + 1$

Answers

1. a) $8n + 6$ b) $25x - 10$

    c) $-32p - 4$ d) $28x^2 - 21x + 14$

    e) $6xy - 12y^2$ f) $-12m^3n - 24m^2n^2$

    g) $24n^2 - 27n$ h) $6a^2 + 12a + 14$

    i) $8x^3 - 12x^2 + 20x$ j) $6m^3 + 4m^2n - 10$

    k) $x^4 + 3x^3 - 5x^2$ l) $12m^3 - 8m^2$

    m) $15a^2b + 12ab$ n) $x^2y^2 - 3x^2y$

    o) $-14a^3b^2 + 2a^2b^2$ p) $16m^2n^3 - 40mn^2$

    q) $18x^4y^4 - 6x^2y^2$ r) $21a^3bc - 35abc^3$

2. a) $6m^3 + 15m^2$ b) $30x^4 - 50x^3 + 10x^2$