Factoring polynomials is the distributive property done in reverse! To check your answers, use the distributive property to multiply our your final answer.

Questions

1. Remove the largest possible common factor from $3a^2 + 3a$.

2. Remove the largest possible common factor from $12xy - 18yz - 36xz$.

3. Remove the largest possible common factor from $16x^5 + 24x^3 - 32x^2$.

4. Remove the largest possible common factor from $36x^6 + 45x^4 - 18x^2$.

5. Factor $7a(x + 2y) - b(x + 2y)$.

6. Factor $3b(y^2 - x) - 4a(y^2 - x) + 6c(y^2 - x)$.

7. Factor $3c(bc - 3a) - 2(bc - 3a) - 6b(bc - 3a)$.

8. Find a formula for the total cost of all purchases by four people. Each person went to the local wholesale warehouse and spent $29.95 per item. Harry bought a items, Tim bought b items, Larry bought c items and Dougie bought d items. Write the formula in factored form.

Solutions

1. Largest numerical factor is 3. Largest variable factor is a. Write each term with the factor 3a.

$$3a^2 + 3a = 3a(a) + 3a(1) \text{ preparing to factor}$$
$$= 3a(a + 1) \text{ factor}$$

2. Largest numerical factor is 6. There is no variable factor. Write each term with the factor 6.

$$12xy - 18yz - 36xz = 6(2xy) - 6(3yz) - 6(6xz) \text{ preparing to factor}$$
$$= 6(2xy - 3yz - 6xz) \text{ factor}$$

3. Largest numerical factor is 8. Largest variable factor is x^2. Write each term with the factor $8x^2$.

$$16x^5 + 24x^3 - 32x^2 = 8x^2(2x^3) + 8x^2(3x) - 8x^2(4)$$
$$= 8x^2(2x^3 + 3x - 4)$$

4. Largest numerical factor is 9. Largest variable factor is x^2. Write each term with the factor $9x^2$.

$$36x^6 + 45x^4 - 18x^2 = 9x^2(4x^4) + 9x^2(5x^2) - 9x^2(2)$$
$$= 9x^2(4x^4 + 5x^2 - 2)$$

5. Identify common factor in each term. Each term has a common factor of $x + 2y$.

$$7a(x + 2y) - b(x + 2y) = 7a(x + 2y) - b(x + 2y)$$
$$= (7a - b)(x + 2y)$$

6. Identify common factor in each term. Each term has a common factor of $y^2 - x$.

$$3b(y^2 - x) - 4a(y^2 - x) + 6c(y^2 - x) = 3b(y^2 - x) - 4a(y^2 - x) + 6c(y^2 - x)$$
$$= (3b - 4a + 6c)(y^2 - x)$$

7. Identify common factor in each term. Each term has a common factor of $bc - 3a$.

$$3c(bc - 3a) - 2(bc - 3a) - 6b(bc - 3a) = 3c(bc - 3a) - 2(bc - 3a) - 6b(bc - 3a)$$
$$= (3c - 2 - 6b)(bc - 3a)$$

8. cost $= \$29.95(a + b + c + d)$.