

SECTION 4.4 - FACTORING BY GREATEST COMMON FACTOR (GCF)

EXAMPLE 1. FACTOR $27x^2 + 18x$

STEP 1: FIND THE GREATEST COMMON FACTOR OF EACH TERM.

STEP 2: WRITE EACH TERM AS THE PRODUCT OF THE GCF AND THE REMAINING FACTORS. FACTOR OUT THE GCF.

EXAMPLE 2. FACTOR $-4a^2b - 8ab^2 + 2ab$

APPLICATION 1, FACTOR:

① $15w - 3v$

② $7u^2 + 21ut - ut$

PRACTICE. FACTOR:

① $21b - 15a$

② $14c^2 + 2c$

③ $10g^2h^2 + 9gh^2 - g^2h$

④ $12jk^2 + 6j^2k + 2j^2k^2$

⑤ $21x^2 - 7x + 14$

⑥ $2x^2 + 4x$

①

EXAMPLE 3. ANOTHER TYPE OF FACTORING IS CALLED FACTOR BY GROUPING. IT IS USED WHEN A POLYNOMIAL HAS 4 OR MORE TERMS AND TERMS HAVE COMMON FACTORS THAT CAN BE GROUPED TOGETHER.

(A) FACTOR: $4qr + 8r + 3q + 6$

(B) FACTOR: $fg + 5g + 4f + 20$

APPLICATION 2. FACTOR:

(1) $6x^2 - 4x + 3x + 2$

(2) $9x^2 - 3xy + 6x - 2y$

(3) $6xy - 8x + 15y - 20$

(4) $-6mp + 4m + 18p - 12$

EXAMPLE 4. (A) FACTOR: $rn + 5n - r - 5$

(B) FACTOR: $3np + 15p - 4n - 20$

(2)

APPLICATION 3. FACTOR:

(1) $12a^2 - 15ab - 16a + 20b$

(2) $-6mp + 4m - 18p - 12$

PRACTICE. FACTOR:

(1) $64 - 4ab$

(2) $4d^2 + 16$

(3) $6r^2t - 3rt^2$

(4) $15ad + 30a^2d^2$

(5) $9a^3d^2 - 6ad^3$

(6) $8p^2r^2 - 24pr^3 + 16pr$

(7) $x^2 + 4x + 2x + 8$

(8) $2a^2 + 3a + 6a + 9$

(9) $9x^2 - 3xy + 6x - 2y$

(10) $2a^2 - 4a + a - 2$

SOLVING EQUATIONS BY FACTORING

CONSIDER: $3(0) = -312(0) = 0(0.25) =$

ZERO PRODUCT PROPERTY: IF THE PRODUCT OF 2 FACTORS EQUALS 0, THEN AT LEAST ONE OF THE FACTORS MUST BE 0.

EXAMPLE 5. SOLVE EACH EQUATION:

(A) $(2d + 6)(3d - 15) = 0$

(B) $c^2 = 3c$

(C) $8b^2 - 40b = 0$

APPLICATION 4. SOLVE + CHECK.

(1) $x^2 - 10x = 0$

(2) $3x(x + 10) = 0$

(3) $20x^2 - 15x = 0$

(4) $r^2 = 14r$

(A)

PRACTICE. SOLVE + CHECK.

$$\textcircled{1} \quad x(x-8) = 0$$

$$\textcircled{2} \quad b(b+12) = 0$$

$$\textcircled{3} \quad (m-3)(m+5) = 0$$

$$\textcircled{4} \quad (a-9)(2a+1) = 0$$

$$\textcircled{5} \quad x^2 - 5x = 0$$

$$\textcircled{6} \quad y^2 + 3y = 0$$

$$\textcircled{7} \quad 3a^2 = 6a$$

$$\textcircled{8} \quad 2x^2 = 3x$$

$$\textcircled{9} \quad 4x(x+4) = 0$$

$$\textcircled{10} \quad 9x^2 = 27x$$

$$\textcircled{11} \quad 8x^2 = -26x$$

$$\textcircled{12} \quad x(x-32) = 0$$

$$\textcircled{13} \quad (a+6)(3a-7) = 0$$

$$\textcircled{14} \quad (4y+8)(3y-4) = 0$$