5.2 Part 2 FACTORING USING SPECIAL PRODUCT PATTERNS

Special Factoring Pattern

FACTORING DIFFERENCE OF SQUARES

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

$4x^2 - 9 = (2x - 3)(2x + 3)$

$x^2 - 49 = (x - 7)(x + 7)$

$64x^2 - 25 = (8x - 5)(8x + 5)$

$a^2 - b^2 = (a - b)(a + b)$

What is the pattern?

Examples

Factor completely.

1. $\sqrt{25x^2} - \sqrt{144}$

$(5x - 12)(5x + 12)$

2. $\sqrt{4x^2} - \sqrt{49}$

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

3. $\sqrt{100} - \sqrt{x^2}$

$(10 - x)(10 + x)$

4. $16x^2 + 1$

not a diff.

prime

Practice

Factor completely.

5. $\sqrt{9h^2}\,\sqrt{121}$

$(3h-11)(3h+11)$

6. $\sqrt{144}-\sqrt{9y^2}$

$(12-3y)(12+3y)$

GCF = 9

$9(\sqrt{16}-\sqrt{y^2})$

$9(4-y)(4+y)$

7. $225 \oplus g^2$

prime

8. $\sqrt{36k^2}-\sqrt{81m^2}$

$(6k-9m)(6k+9m)$

Practice

Factor completely.

9. $12x^2-3$ GCF=3

$3(\sqrt{4x^2}-\sqrt{1})$

$3(2x-1)(2x+1)$

10. $45y^2-5y$ GCF=5y

$5y(9y-1)$

11. $36-64c^2$ GCF=4

$4(\sqrt{9}-\sqrt{16c^2})$

$4(3+4c)(3-4c)$

12. $24x^2-54y^2$ GCF=6

$6(\sqrt{4x^2}-\sqrt{9y^2})$

$6(2x+3y)(2x-3y)$

Examples

Solve by factoring. $GCF = 4x$

13. $\sqrt{16y^2} - \sqrt{361} = 0$ 14. $4x^2 - 24x = 0$

$(4y + 19)(4y - 19) = 0$ $4x(1x - 6) = 0$

$4y + 19 = 0$ $4y - 19 = 0$ $\dfrac{4x}{4} = \dfrac{0}{4}$ $1x - 6 = 0$
$\quad -19 \; -19$ $\quad +19 \; +19$ $+6 \; +6$

$\dfrac{4y}{4} = \dfrac{-19}{4}$ $\dfrac{4y}{4} = \dfrac{19}{4}$ $\boxed{x = 0}$ $\dfrac{1x}{1} = \dfrac{6}{1}$

$\boxed{y = -4.75}$ $\boxed{y = 4.75}$ $\boxed{x = 6}$

Practice

Solve by factoring. $GCF = 2$

15. $\sqrt{4} - \sqrt{121c^2} = 0$ 16. $50x^2 - 2 = 0$

$(2 + 11c)(2 - 11c) = 0$ $2(25x^2 - \sqrt{1}) = 0$

$2 + 11c = 0$ $2 - 11c = 0$ $2(5x - 1)(5x + 1) = 0$
$-2 \quad -2$ $-2 \quad -2$ $2 = 0$ $5x - 1 = 0$ $5x + 1 = 0$

$\dfrac{11c = -2}{11 \quad 11}$ $\dfrac{-11c = -2}{-11 \quad -11}$ $+1 \; +1$ $-1 \; -1$

$\boxed{c = -\dfrac{2}{11}}$ $\boxed{c = \dfrac{2}{11}}$ $\dfrac{5x}{5} = \dfrac{1}{5}$ $\dfrac{5x}{5} = \dfrac{-1}{5}$

$\boxed{x = .2}$ $\boxed{x = -.2}$