Factoring Bootcamp (section 1.3 and 1.4)

GCF

① $12x^2 - 16$

$4(3x^2 - 4)$

Special Cases

$$A^2 - B^2 = (A+B)(A-B)$$

$$A^2 + 2AB + B^2 = (A+B)^2$$

$$A^2 - 2AB + B^2 = (A-B)^2$$

② x^2-9

$(x+3)(x-3)$

④ $16x^2-49$

$(4x+7)(4x-7)$

⑤ $x^2+12x+36$

$(x+6)^2$

$2\cdot 6x$

$12x$

⑥ $25m^2-30m+9$

$(5m-3)^2$

⑦ $9p^2-81$

$9(p^2-9)$

$9(p+3)(p-3)$

Factoring (not special cases)

8. $x^2 - 4x - 12$
$(x-6)(x+2)$

9. $x^2 + 6x - 40$
$(x+10)(x-4)$

10. $x^2 - 11x + 24$
$(x-8)(x-3)$

11. $n^2 + 5n - 12$
cannot be factored

12 $6p^2 + 5p + 1$

F O I L

$(6p + 1)(p + 1)$

$$\begin{array}{r} 6p \\ +1p \\ \hline 7p \end{array}$$

$\boxed{(3p + 1)(2p + 1)}$

$$\begin{array}{r} 3p \\ +2p \\ \hline 5p \end{array}$$

13 $3a^2 + 7a + 4$

$$\boxed{(3a + 4)(a + 1)}$$

$$\begin{array}{r} 3a \\ +\,4a \\ \hline 7a \end{array}$$

14 $3x^2+5x-12$

✗ $(3x+2)(x-6)$

3, 4

$$\begin{array}{r} -18x \\ +2x \\ \hline -16x \end{array}$$

✓ $\boxed{(3x-4)(x+3)}$

$$\begin{array}{r} 9x \\ -4x \\ \hline 5x \end{array}$$

15 $-21x^2+77x+28$

$-7(3x^2-11x-4)$

$\boxed{-7(3x+1)(x-4)}$

$-12x$
$+1x$

$-11x$ ✓

Always factor completely!

Factoring (continued) 1.3 and 1.4

The solutions of a quadratic equation are also called the roots of the equation.

Solve the equation.

1. $x^2 - 8x + 12 = 0$

$(x-6)(x-2) = 0$

$x = 6, 2$

$x - 6 = 0$ $\quad$ $x - 2 = 0$

$x = 6$ $\quad$ $x = 2$

Zero product property

$x \cdot 0 = 0$

② $u^2 = 9\cancel{u}$

$-9u \quad -9u$

$u^2 - 9u = 0$

$u(u-9) = 0$

$u = 0 \quad u - 9 = 0$

$u = 0, 9$

Variable will produce a solution

③ $-3y + 28 = y^2$

$0 = y^2 + 3y - 28$

$0 = (y+7)(y-4)$

$y = -7, 4$

④ $9x^2 - 81 = 0$

$9(x^2 - 9) = 0$

$9(x-3)(x+3) = 0$

$x = 3, -3$

$9x^2 = 81$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

⑤ $x^2 - 10x = -25$

$x^2 - 10x + 25 = 0$

$(x-5)^2 = 0$

$x = 5$

6. $6r^2 - 2r - 4 = 1 + 5r$

$$6r^2 - 7r - 5 = 0$$

$$(2r + 1)(3r - 5)$$

$2r + 1 = 0$ $\quad$ $3r - 5 = 0$

$r = \frac{-1}{2}$ $\quad$ $r = \frac{5}{3}$

The zeros of a function are where the function intercepts the x-axis. (where the function's value is zero.

Find the zeroes of the function by rewriting the function in intercept form.

7 $g(x) = 3x^2 - 8x + 5$

y-value zero

$0 = 3x^2 - 8x + 5$

$0 = (3x - 5)(x - 1)$

$x = \frac{5}{3}, 1$

8 $f(x) = 3x^2 - 12$

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

$2, -2$

9 $y = 3x^2 - 12x$

$0 = 3x(x-4)$

$x = 0, 4$

$3x = 0 \quad x - 4 = 0$

$x = 0 \quad x = 4$

10 $f(x) = 64x^2 + 144x + 81$

$0 = 64x^2 + 144x + 81$

$0 = (8x + 9)(8x + 9)$

$0 = (8x+9)^2$

$x = \frac{-9}{8}$

Simplifying Radicals

$\sqrt{48}$

$\sqrt{16 \cdot 3}$

$4\sqrt{3}$

$$\frac{8}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{8\sqrt{6}}{6}$$

$$= \frac{4\sqrt{6}}{3}$$

$$\sqrt{\frac{35}{36}} = \frac{\sqrt{35}}{6}$$