Warm Up

Factor the expression *completely.*

1. $25z^2 - y^2$

$(5z-y)(5z+y)$

2. $25x^2 - 1$

$(5x+1)(5x-1)$

3. $49x^2 + 28xy + 4y^2$

$(7x+2y)^2$

4. $\frac{1}{x^2} - 1$

$(\frac{1}{x}+1)(\frac{1}{x}-1)$

5. $8y^2 - 2$

$2(4y^2-1)$

$2(2y-1)(2y+1)$

6. $4rs^2 - 4rs + r$

$r(4s^2-4s+1)$

$r(2s-1)^2$

$r(2s-1)(2s-1)$

( ) + ( )

16. $(4+6i)(9-2i)$

50

5 · 10

2 · 5

2 · 5 · 5

Review

Solve the equation using square roots. Check your solution(s).

1. $x^2 + 4x + 4 = 36$ $(x+2)(x+2)$

$\sqrt{(x+2)^2} = \pm\sqrt{36}$

$x + 2 = \pm 6$

$x = -2 \pm 6$

$x = -8, 4$

2. $x^2 - 6x + 9 = 1$

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

$x - 3 = \pm 1$

$x = 3 \pm 1$

$x = 2, 4$

3. $x^2 - 22x + 121 = 81$

$\sqrt{(x-11)^2} = \pm\sqrt{81}$

$x - 11 = \pm 9$

$x = 11 \pm 9$

$x = 2, 20$

Completing the Square

to complete the square, leading coefficient must = 1

Words To complete the square for the expression $x^2 + bx$, add $\left(\frac{b}{2}\right)^2$.

Algebra $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)\left(x + \frac{b}{2}\right) = \left(x + \frac{b}{2}\right)^2$

Find the value of c that makes $x^2 + 14x + c$ a perfect square trinomial. Then write the expression as the square of a binomial.

$x^2 + 14x + c$

$c = \left(\frac{14}{2}\right)^2 = 49$

$x^2 + 14x + 49$

$(x + 7)^2$

Find the value of *c* that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

(a) $x^2 + 8x + c$

$c = \left(\frac{8}{2}\right)^2 = 16$

$x^2 + 8x + 16$

$(x+4)^2$

(b) $x^2 - 2x + c$

$c = \left(\frac{-2}{2}\right)^2 = 1$

$x^2 - 2x + 1$

$(x-1)^2$

(c) $x^2 - 9x + c$

$c = \left(\frac{-9}{2}\right)^2 = \frac{81}{4}$

$x^2 - 9x + \frac{81}{4}$

$\left(x - \frac{9}{2}\right)^2$

Solve $x^2 - 10x + 7 = 0$ by completing the square.

$x^2 - 10x + 25 = -7 + 25$

① isolating the constant

② complete the square
add "c" to both sides $c = \left(\frac{-10}{2}\right)^2$

$\sqrt{(x-5)^2} = \pm\sqrt{18}$

$\sqrt{9}\sqrt{2}$

$x - 5 = \pm 3\sqrt{2}$

$x = 5 \pm 3\sqrt{2}$

③ Solve using square roots

Solve $3x^2 + 12x + 15 = 0$ by completing the square.

$\frac{3}{3}$

$x^2 + 4x + 5 = 0$

$x^2 + 4x + 4 = -5 + 4$

$\sqrt{(x+2)^2} = \pm\sqrt{-1}$

$x + 2 = \pm i$

$x = -2 \pm i$

* make sure leading coefficient = 1

$\left(\frac{4}{2}\right)^2$

Solve the equation by completing the square.

(a) $x^2 - 4x + 8 = 0$ (b) $x^2 + 8x - 5 = 0$ (c) $-3x^2 - 18x - 6 = 0$

$x = 2 \pm 2i$ $x = -4 \pm \sqrt{21}$ $x = -3 \pm \sqrt{7}$

(d) $4x^2 + 32x = -68$ **(e)** $6x(x + 2) = -42$ **(f)** $2x(x - 2) = 200$

$x = -4 \pm i$ $x = -1 \pm i\sqrt{6}$ $x = 1 \pm \sqrt{101}$