

Factor the following.

$8x^2 + 34x - 9$

-72
 \uparrow
 $36 - 2$

	$2x$	9
$4x$	$8x^2$	$36x$
-1	$-2x$	-9

$(2x+9)(4x-1)$

$\frac{3x^2 - 300}{3} = \frac{300}{3}$

$3(x^2 - 100)$

$x \quad x \quad 10 \quad -10$

$3(x+10)(x-10)$

$4x^2 - 169 = 0$

$2x \quad 2x \quad -13 \quad 13$

$(2x-13)(2x+13) = 0$

$2x-13=0 \quad 2x+13=0$

$+13 \quad +13 \quad -13 \quad -13$

$\frac{2x}{2} = \frac{13}{2} \quad \frac{2x}{2} = -\frac{13}{2}$

$x = \frac{13}{2} \quad x = -\frac{13}{2}$

Complete the square to solve for x.

1) $x^2 + 20x - 36 = 0$

$+36 \quad +36$

$x^2 + 20x + 100 = 36 + 100$

$\frac{10}{2} \quad \frac{10}{2}$
 $(10)^2 = 100$

$(x+10)(x+10) = 136$

$\sqrt{(x+10)^2} = \sqrt{136}$

$x+10 = \pm 2\sqrt{34}$

$-10 \quad -10$

$x = -10 \pm 2\sqrt{34}$

2) $x^2 - 20x + 100 = 0$

$-10 \quad -10$

$x^2 - 20x + 100 = -6 + 100$

$\frac{-10}{2} \quad \frac{-10}{2}$
 $(-10)^2 = 100$

$(x-10)(x-10) = 94$

$\sqrt{(x-10)^2} = \sqrt{94}$

$x-10 = \pm \sqrt{94}$

$+10 \quad +10$

$x = 10 \pm \sqrt{94}$

3) $x^2 + 6x = -5$

$\frac{3}{2}$

$(3)^2 = 9$

$x^2 + 6x + 9 = -5 + 9$

$\frac{3}{2} \quad \frac{3}{2}$

$(x+3)(x+3) = 4$

$\sqrt{(x+3)^2} = \sqrt{4}$

$x+3 = \pm 2$

$-3 \quad -3$

$x = -3 \pm 2$

$x = -3 + 2 \quad x = -3 - 2$

$-3 + 2 \quad -3 - 2$

$(-1) \quad (-5)$

Now let's complete the square when $a \neq 1$.

<p>4) $3x^2 - 6x - \cancel{x} = 0$ $\quad \quad \quad +\cancel{2} +2$</p> <p>$\frac{3x^2 - 6x}{3} = \frac{2}{3}$</p> <p>$3(x^2 - 2x + \frac{1}{3}) = 2 + 3(\frac{1}{3})$</p> <p>$\sqrt{\quad} \quad \quad \quad \sqrt{\quad}$ $x \quad x \quad \quad \quad 2 \quad -1 \quad -1$</p> <p>$(-1)^2 = 1$</p> <p>$3(x-1)(x-1) = 5$</p> <p>$\frac{3(x-1)^2}{3} = \frac{5}{3}$</p> <p>$(x-1)^2 = \frac{5}{3}$</p> <p>$x-1 = \pm \sqrt{\frac{5}{3}}$</p> <p>$x = 1 \pm \sqrt{\frac{5}{3}}$</p>	<p>5) $4x^2 + 12x - \cancel{x} = 0$ $\quad \quad \quad +\cancel{3} +3$</p> <p>$\frac{4x^2 + 12x}{4} = \frac{1}{4}$</p> <p>$4(x^2 + 3x + \frac{2.25}{4}) = \frac{1}{4} + 4(\frac{2.25}{4})$</p> <p>$\sqrt{\quad} \quad \quad \quad \sqrt{\quad}$ $x \quad x \quad \quad \quad 2 \quad 1.5 \quad 1.5$</p> <p>$(1.5)^2 = 2.25$</p> <p>$4(x+1.5)(x+1.5) = 10$</p> <p>$\frac{4(x+1.5)^2}{4} = \frac{10}{4}$</p> <p>$(x+1.5)^2 = 2.5$</p> <p>$x+1.5 = \pm \sqrt{2.5}$</p> <p>$x = -1.5 \pm \sqrt{2.5}$ or $\pm \sqrt{5/2}$</p>	<p>6) $2x^2 - 20x - \cancel{62} = 0$ $\quad \quad \quad +\cancel{62} +62$</p> <p>$\frac{2x^2 - 20x}{2} = \frac{62}{2}$</p> <p>$2(x^2 - 10x + \frac{25}{2}) = 62 + 2(\frac{25}{2})$</p> <p>$\sqrt{\quad} \quad \quad \quad \sqrt{\quad}$ $x \quad x \quad \quad \quad 2 \quad -5 \quad -5$</p> <p>$(-5)^2 = 25$</p> <p>$2(x-5)(x-5) = 112$</p> <p>$\frac{2(x-5)^2}{2} = \frac{112}{2}$</p> <p>$(x-5)^2 = 56$</p> <p>$x-5 = \pm 2\sqrt{14}$</p> <p>$x = 5 \pm 2\sqrt{14}$</p>
<p>7) $5x^2 - 10x - \cancel{21} = 0$ $\quad \quad \quad +\cancel{21} +21$</p> <p>$\frac{5x^2 - 10x}{5} = \frac{21}{5}$</p> <p>$5(x^2 - 2x + \frac{1}{5}) = 21 + 5(\frac{1}{5})$</p> <p>$\sqrt{\quad} \quad \quad \quad \sqrt{\quad}$ $x \quad x \quad \quad \quad 2 \quad -1 \quad -1$</p> <p>$(-1)^2 = 1$</p> <p>$5(x-1)(x-1) = 26$</p> <p>$\frac{5(x-1)^2}{5} = \frac{26}{5}$</p> <p>$(x-1)^2 = \frac{26}{5}$</p> <p>$x-1 = \pm \sqrt{\frac{26}{5}}$</p> <p>$x = 1 \pm \sqrt{\frac{26}{5}}$</p>	<p>8) $\frac{7x^2 - 14x}{7} = \frac{56}{7} + \frac{1}{7}$</p> <p>$7(x^2 - 2x + \frac{1}{7}) = 56 + \frac{1}{7}$</p> <p>$\sqrt{\quad} \quad \quad \quad \sqrt{\quad}$ $x \quad x \quad \quad \quad 2 \quad -1 \quad -1$</p> <p>$(-1)^2 = 1$</p> <p>$7(x-1)(x-1) = 63$</p> <p>$\frac{7(x-1)^2}{7} = \frac{63}{7}$</p> <p>$(x-1)^2 = 9$</p> <p>$x-1 = \pm 3$</p> <p>$x = 1 \pm 3$</p> <p>$1+3 = 4$</p> <p>$1-3 = -2$</p>	<p>9) $3x^2 - 9x - 1 = 0$</p>

