Completing the Square:

It's baaaack...

If you have an equation that does not have an x term, only an x^2 term, we can take the square root and solve directly.

$2x^2 = 8$

$x^2 = \frac{8}{2}$

$\sqrt{x^2} = \pm\sqrt{4}$

$x = \pm 2$

Here's what you gotta do:

1. Isolate the squared term.
2. Square root both sides
   - ➢ Remember if you add the square root there are two possible answers ± must be taken into account.
3. Solve it.

$18 - 5x^2 = -27$

$-5x^2 = -27 - 18$

$x^2 = \frac{-27 - 18}{-5}$

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

$x = \pm 3$

$(2x + 3)^2 - 25 = 0$

$\sqrt{(2x+3)^2} = \pm\sqrt{25}$

$2x + 3 = \pm 5$

$2x + 3 = 5$ OR $2x + 3 = -5$

$x = \frac{5-3}{2}$ $\quad$ $x = \frac{-5-3}{2}$

$= 1$ $\quad$ $= -4$

Does this look familiar?

$(x + 3)^2 - 9 = 0$

$\sqrt{(x+3)^2} = \pm\sqrt{9}$

$x + 3 = \pm 3$

$x + 3 = 3$ OR $x + 3 = -3$

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

You do these two:

$x^2 + 9 = 0$	$3x^2 = 8$
$x \notin \mathbb{R}$	$x^2 = \frac{8}{3}$ $x = \pm\sqrt{\frac{8}{3}}$ $x = \frac{2\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$ $x = \frac{2\sqrt{6}}{3}$

$$\frac{x^2}{2} - \frac{1}{3} = 0$$

$$\frac{x^2}{2} = \frac{1}{3}$$

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

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

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

$\frac{\sqrt{3}}{\sqrt{3}}$

$$x = \pm\frac{\sqrt{6}}{3}$$

Given the roots, find the equation:

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

$$x^2 = 5$$

$$x^2 - 5 = 0$$

$$x = \frac{2\pm\sqrt{6}}{3}$$

$$(3x - 2)^2 = (\pm\sqrt{6})^2$$

$$(3x-2)^2 = 6$$

$$(3x-2)^2 - 6 = 0$$

$$9x^2 - 12x + 4 - 6 = 0$$
$$9x^2 - 12x - 2 = 0$$

HW: pg240
#4,5ace,13,18