2D #4 $\frac{4x^2}{4}+\frac{6}{4}x-\frac{5}{4}=\frac{0}{4}$

Solve by CTS

$\frac{4}{4}\left(x^2+\frac{3}{2}x-\frac{5}{4}\right)=\frac{0}{4}$

$x^2+\frac{3}{2}x-\frac{5}{4}=0$

$\left(\frac{3}{2}\cdot\frac{1}{2}\right)^2$

$\left(\frac{3}{4}\right)^2=\frac{9}{16}$

$x^2+\frac{3}{2}x+\frac{9}{16}=\frac{5}{4}+\frac{9}{16}$

$\sqrt{\left(x+\frac{3}{4}\right)^2}=\sqrt{\frac{29}{16}}$

$x+\frac{3}{4}=\frac{\pm\sqrt{29}}{4}$

$x=-\frac{3}{4}\pm\frac{\sqrt{29}}{4}$

2-2 The Quadratic Formula

$ax^2+bx+c=0$; say $a=1$

complete the square:

$x^2+\frac{b}{a}x+\frac{c}{a}=0$

$\frac{1}{2}\left(\frac{b}{a}\right)=\frac{b}{2a}$

$\left(\frac{b}{2a}\right)^2=$

$x^2+\frac{b}{a}x+\left(\frac{b}{2a}\right)^2=-\frac{c}{a}+\left(\frac{b}{2a}\right)^2$

$\left(x+\frac{b}{2a}\right)^2=\frac{4a}{4a}\cdot\frac{-c}{a}+\frac{b^2}{4a^2}$

$\sqrt{\left(x+\frac{b}{2a}\right)^2}=\pm\sqrt{\frac{-4ac+b^2}{4a^2}}$

The Quadratic Equation!

$x+\frac{b}{2a}=\frac{\pm\sqrt{b^2-4ac}}{2a}$

$x=-\frac{b}{2a}\pm\frac{\sqrt{b^2-4ac}}{2a}$

$=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

Ex] Solve $2x^2 - 3x = 7$ using the Quadratic Formula

$a = 2$
$b = -3$
$c = -7$

$$x = \frac{3 \pm \sqrt{(-3)^2 - 4(2)(-7)}}{2(2)}$$

$$= \frac{3 \pm \sqrt{9 + 56}}{4}$$

$$= \frac{3 \pm \sqrt{65}}{4}$$

Consecutive numbers

1st $x = 17$ $\quad x = -18$

next $x+1 = 18$ $\quad x+1 = -17$

Ex) The sum of the squares of two consecutive numbers is 613. Find the two numbers.

$$x^2 + (x+1)^2 = 613$$

$$x^2 + x^2 + 2x + 1 = 613$$

$$2x^2 + 2x - 612 = 0$$

divide all by 2

$$x^2 + x - 306 = 0$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(1)(-306)}}{2(1)}$$

$$= \frac{-1 \pm \sqrt{1225}}{2} = \frac{-1 \pm 35}{2}$$

$x = \frac{-36}{2}$ or $x = \frac{34}{2}$

$x = -18$ or $x = 17$

$\pm 17, \pm 18$

HW 2E 2-8 even
9, 10
2F 1, 3, 4
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