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Dec 3 2015

8.1 Solving Quadratic equations by completing the square

* Give an example of a quadratic equation.

$\boxed{7}x^2 + \boxed{9}x + \boxed{3} = 0$

Ex: Give an example of an equation that is not quadratic.

EX: part A:

- Use the sq. root prop

a) $(4x+4)^2 = 5$

$4x+4 = \pm\sqrt{5}$

b) $(3y^2) = 0$

$= 3y = \pm\sqrt{0}$

c) $(9z-2)^2 = -4$

$= 9z-2 = \pm\sqrt{-4}$

Prof #17) Solve using sq. root prop

$(8x-5)^2 = -49$

$= 8x-5 = \pm\sqrt{-49}$

$= 8x-5 = \pm 7i$

$\frac{8x}{8} = \frac{5 \pm 7i}{8} \quad = \quad x = \frac{5 \pm 7i}{8}$

$= x = \frac{5}{8} \pm \frac{7i}{8}$

$= x = \frac{5}{8} \pm \frac{7}{8}i$ OR $\boxed{x = \frac{5}{8} + \frac{7}{8}i,\ \frac{5}{8} - \frac{7}{8}i}$

Using matlab you might have to write a separately.

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Dec 3 2015

8.1 Solving Quadratic equations by completing the square

* Give an example of a quadratic equation:

$\boxed{7}x^2 + \boxed{19}x + \boxed{3} = 0$

EX2: Give an example of an equation that is not quadratic:

EX. Part A:

- Use the sq. root prop.

(a) $(4x+4)^2 = 5$

$4x+4 = \pm\sqrt{5}$

b) $(3y^2) = 0$

$= 3y = \pm\sqrt{0}$

c) $(9z-2)^2 = -4$

$= 9z-2 = \pm\sqrt{-4}$

Prop #17) Solve using sq. root Prop

$(8x-5)^2 = -49$

$= 8x-5 = \pm\sqrt{-49}$

$= 8x-5 = \pm 7i$

$= \frac{8x}{8} = \frac{5 \pm 7i}{8} \quad = \quad x = \frac{5 \pm 7i}{8}$

$= x = \frac{5}{8} \pm \frac{7(i)}{8}$

$= x = \frac{5}{8} \pm \frac{7}{8}i$ OR $\boxed{x = \frac{5}{8} + \frac{7}{8}i \;,\; \frac{5}{8} - \frac{7}{8}i}$

Using matlab you might have to write separately.

Problem #46

$s(t)$ = distance (feet) $= 16t^2$

$\Rightarrow \frac{866}{16} = \frac{16t^2}{16}$

$= t^2 = \frac{866}{16} \Rightarrow t = \pm\sqrt{\frac{866}{16}}$

$t \approx \pm 7.36$ seconds

Side note: Since this is a real problem we can round but only at the end.

$t = 7.36$ sec, ~~$t = -7.36$ sec~~ extraneous solution because it's a negative, time cannot be negative

1) $y^2 + 10y + \underline{25}$ $\quad (y+5)(y+5) = (y+5)^2$

2) $x^2 - 8x + \underline{16}$ $\quad (x-4)(x-4) = (x-4)^2$

3) $z^2 - 2z + \underline{1}$ $\quad (z-1)(z-1) = (z-1)^2$

Ex) $x^2 + 11x + \frac{121}{4}$

$= x^2 + 11x + 30.25$

★ Solving quadratic equations by completing the square

Problem #33

Solve by completing the square.

$9x^2 - 24x + 11 = 0$

Simplify

$-\frac{8}{3} \cdot \frac{1}{2} = \left(-\frac{4}{3}\right)$

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

[9] $\frac{x^2 - 24x + 10}{4} = 0 \quad = x^2 - \frac{24}{8_3}x + \frac{11}{9} = 0$

$= x^2 - \frac{8}{3}x + \frac{11}{9} = 0$

$= x^2 - \frac{8}{3}x = -\frac{11}{9} \quad = x^2 - \frac{8}{3}x + \frac{16}{9} = -\frac{11}{9} + \frac{16}{9}$

$= \left(x - \frac{4}{3}\right)^2 = \frac{5}{9}$

$= x - \frac{4}{3} = \pm\sqrt{\frac{5}{9}} \quad = x - \frac{4}{3} = \pm\frac{\sqrt{5}}{\sqrt{9}}$

$= x - \frac{4}{3} = \pm\frac{\sqrt{5}}{3} \Rightarrow x = \frac{4}{3} \pm \frac{\sqrt{5}}{3}$

OR

$x = \frac{4}{3} + \frac{\sqrt{5}}{3}, \quad \frac{4}{3} - \frac{\sqrt{5}}{3}$

★ Solving Quadratic equations by using the Quadratic formula

No (#14) Solve using quadratic formula

$7\left(\frac{2}{7}y^2 + \frac{1}{7}y\right) = \left(\frac{10}{7}\right)7$

$= 2y^2 + y \quad = 10 \Rightarrow 2y^2 + y - 10 = 0$

$a = 2, \quad b = 1, \quad c = -10$

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

$a = 2, \quad b = 1 \quad c = -10$

$$y = \frac{-1 \pm \sqrt{(1)^2 - 4(2)(-10)}}{2(2)}$$

$$y = \frac{-1 \pm \sqrt{1 + 80}}{4} = \frac{-1 \pm \sqrt{81}}{4} = \frac{-1 \pm 9}{4}$$

$$y = \frac{-1+9}{4}, \quad \frac{-1-9}{4}$$

$$\boxed{y = 2, \ -\frac{5}{2}}$$

Prob #17 Solve with quad formula

$$(m+3)(5m+1) = 3(m-4) + 7$$

$$= 5m^2 + m + 15m + 3 = 3m - 12 + 7 \quad (-5)$$

$$= 5m^2 + m - 3m + 15m + 3 + 5 = 0$$

$$= 5m^2 + 13m + 8 = 0$$

$a \quad b \quad c$

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

$$m = \frac{-13 \pm \sqrt{13^2 - 4(5)(8)}}{2(5)} = \frac{-13 \pm \sqrt{169 - 160}}{10}$$