



# PING YI SECONDARY SCHOOL

Perseverance Yields Success

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Class 302

Subject E-Math

No. 20

Date 15/1/2009

Ex 2.  $\rightarrow$  pg 39

1 a)  $x^2 + 2x + \boxed{1} = (x+1)^2$

$b = 2$

$\frac{b}{2} = \frac{2}{2} = 1$

b)  $x^2 - 4x + \boxed{4} = (x-2)^2$

$b = -4$

$\frac{b}{2} = \frac{-4}{2} = -2$

c)  $x^2 - 8x + \boxed{16} = (x-4)^2$

$b = -8$

$\frac{b}{2} = \frac{-8}{2} = -4$

d)  $x^2 + 7x + \boxed{\frac{49}{4}} = \left(x + \frac{7}{2}\right)^2$

$b = 7$

$\frac{b}{2} = \frac{7}{2}$

e)  $x^2 + x + \boxed{\frac{1}{4}} = \left(x + \frac{1}{2}\right)^2$

$b = 1$

$\frac{b}{2} = \frac{1}{2}$

f)  $x^2 - 11x + \boxed{\frac{121}{4}} = \left(x - \frac{11}{2}\right)^2$

$b = -11$

$\frac{b}{2} = \frac{-11}{2}$

2 a)  $(x-1)^2 = 25$

$x-1 = \pm\sqrt{25}$

$x-1 = \pm 5$

$\therefore x-1 = 5$  or  $x-1 = -5$

$x = 6.00$  or  $x = -4.00$

$$2. b) (x+3)^2 = 49$$

$$x+3 = \pm\sqrt{49}$$

$$x+3 = \pm 7$$

$$\therefore x+3 = 7 \quad \text{or} \quad x+3 = -7$$

$$x = 4.00\# \quad \text{or} \quad x = -10.0\#$$

$$c) \left[x + \frac{1}{2}\right]^2 = 1$$

$$x + \frac{1}{2} = \pm\sqrt{1}$$

$$\therefore x + \frac{1}{2} = 1 \quad \text{or} \quad x + \frac{1}{2} = -1$$

$$x = \frac{1}{2} = 0.500\# \quad \text{or} \quad x = -1\frac{1}{2} = -1.50\#$$

$$d) \left[x - \frac{5}{2}\right]^2 = \frac{9}{4}$$

$$x - \frac{5}{2} = \pm\sqrt{\frac{9}{4}}$$

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

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

$$x = \frac{8}{2} \quad \text{or} \quad x = \frac{2}{2}$$

$$x = 4.00\# \quad \text{or} \quad x = 1.00\#$$

$$e) [x+4]^2 = 7$$

$$x+4 = \pm\sqrt{7}$$

$$\therefore x+4 = \sqrt{7} \quad \text{or} \quad x+4 = -\sqrt{7}$$

$$x = -6.65\# \quad \text{or} \quad x = -1.35\#$$

$$f) (x-3)^2 = 10$$

$$x-3 = \pm\sqrt{10}$$

$$\therefore x-3 = \sqrt{10} \quad \text{or} \quad x-3 = -\sqrt{10}$$

$$x = 0.162\# \quad \text{or} \quad x = 6.16\#$$



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3a)  $x^2 + 4x + 3 = 0$

$$x^2 + 4x = -3$$

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

$$(x+2)^2 = -3+4$$

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

$$x+2 = \pm\sqrt{1}$$

$$\therefore x+2 = -\sqrt{1} \quad \text{or} \quad x+2 = \sqrt{1}$$

$$x = -3.00\# \quad \text{or} \quad x = -1.00\#$$

b)  $x^2 - 8x + 12 = 0$

$$x^2 - 8x + \left(\frac{8}{2}\right)^2 = -12 + \left(\frac{8}{2}\right)^2$$

$$x^2 - 8x + 16$$

$$(x-4)^2 = -12+16$$

$$(x-4)(x-4)$$

$$x-4 = \pm\sqrt{4}$$

$$\therefore x-4 = 2 \quad \text{or} \quad x-4 = -2$$

$$x = 6.00\# \quad x = 2.00\#$$

c)  $x^2 - 3x + 1 = 0$

$$x^2 - 3x + \left(\frac{3}{2}\right)^2 = -1 + \left(\frac{3}{2}\right)^2$$

$$\left(x - \frac{3}{2}\right)^2 = -1 + \frac{9}{4}$$

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

$$x - \frac{3}{2} = \pm\sqrt{\frac{5}{4}}$$

$$\therefore x - \frac{3}{2} = \sqrt{\frac{5}{4}} \quad \text{or} \quad x - \frac{3}{2} = -\sqrt{\frac{5}{4}}$$

$$x = 3.62\# \quad \text{or} \quad x = 0.38\#$$

d)  $x^2 + 5x - 2 = 0$

$$x^2 + 5x + \left(\frac{5}{2}\right)^2 = 2 + \left(\frac{5}{2}\right)^2$$

$$\left(x + \frac{5}{2}\right)^2 = 2 + \frac{25}{4}$$

$$\left(x + \frac{5}{2}\right)^2 = \frac{33}{4}$$

$$x + \frac{5}{2} = \pm\sqrt{\frac{33}{4}}$$

$$\therefore x + \frac{5}{2} = \sqrt{\frac{33}{4}} \quad \text{or} \quad x + \frac{5}{2} = -\sqrt{\frac{33}{4}}$$

$$x = 0.372\# \quad x = -5.37\#$$

$$4a) x^2 - 12x + 36 = 0$$

$$x^2 - 12x + \left(\frac{12}{2}\right)^2 = -36 + \left(\frac{12}{2}\right)^2$$

$$(x-6)^2 = -36 + 36$$

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

$$x-6 = \pm\sqrt{0}$$

$$x-6 = 0$$

$$x = 6.00\#$$

$$b) x^2 - 4x - 21 = 0$$

$$x^2 - 4x + \left(-\frac{4}{2}\right)^2 = 21 + \left(-\frac{4}{2}\right)^2$$

$$(x-2)^2 = 21 + 4$$

$$(x-2)^2 = 25$$

$$x-2 = \pm\sqrt{25}$$

$$\therefore x-2 = 5 \quad \text{or} \quad x-2 = -5$$

$$x = 7.00\# \quad \text{or} \quad x = -3.00\#$$

$$c) x^2 + 7x - 5 = 0$$

$$x^2 + 7x + \left(\frac{7}{2}\right)^2 = 5 + \left(\frac{7}{2}\right)^2$$

$$\left(x + \frac{7}{2}\right)^2 = 5 + \frac{49}{4}$$

$$\left(x + \frac{7}{2}\right)^2 = \frac{69}{4}$$

$$x + \frac{7}{2} = \pm\sqrt{\frac{69}{4}}$$

$$\therefore x = \sqrt{\frac{69}{4}} - \frac{7}{2} \quad \text{or} \quad x = -\sqrt{\frac{69}{4}} - \frac{7}{2}$$

$$x = 0.65\#$$

$$x = -7.65\#$$

$$d) x^2 - x - 1 = 0$$

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

$$\left(x - \frac{1}{2}\right)^2 = 1 + \frac{1}{4}$$

$$\left(x - \frac{1}{2}\right)^2 = \frac{5}{4}$$

$$x - \frac{1}{2} = \pm\sqrt{\frac{5}{4}}$$

$$\therefore x - \frac{1}{2} = \sqrt{\frac{5}{4}} \quad \text{or} \quad x - \frac{1}{2} = -\sqrt{\frac{5}{4}}$$

$$x = 1.62\#$$

$$x = -0.62\#$$

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