

Answers

1) a) $x^2 - 6x$
 $= x(x-6)$

b) $2x^2 + 8x$
 $= 2x(x+4)$

c) $x^2 - 100$
 $= x^2 - 10^2$
 $= (x+10)(x-10)$

d) $9x^2 - 25$
 $= (3x)^2 - 5^2$
 $= (3x+5)(3x-5)$

e) $x^2 + 3x - 10$
 $= (x+5)(x-2)$

x	+
-10	+3
(x+5)(x-2)	

f) $x^2 - 7x - 18$
 $= (x-9)(x+2)$

x	+
-18	-7
(-9)(+2)	

g) $2x^2 - 5x - 3$

BY INSPECTION

$= (2x+1)(x-3)$

h) $3x^2 - 5x + 2$

BY HARD TABLE METHOD

$= 3x^2 - 3x - 2x + 2$
 $= 3x(x-1) - 2(x-1)$
 $= (x-1)(3x-2)$

x	+
+6	-5
(x-1)(3x-2)	

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

either $3x = 0$ or $x-3 = 0$
 $\div 3$ $x = 0$ $\div 3$ $x = 3$

b) $x^2 - 12x + 20 = 0$
 $(x-10)(x-2) = 0$

either $x-10 = 0$ or $x-2 = 0$
 $x = 10$ $x = 2$

x	+
+20	-12
(-10)(-2)	

$$c) \quad 5x^2 + 9x - 2 = 0$$

x	+
-10	+9
(-1)(+10)	

$$5x^2 + 10x - x - 2 = 0$$

$$5x(x+2) - 1(x+2) = 0$$

$$(5x-1)(x+2) = 0$$

either $5x-1=0$ or $x+2=0$

$$5x = 1 \quad \quad \quad x = -2$$

$$x = \frac{1}{5}$$

$$d) \quad x^2 - 16 = 0$$

$$x^2 - 4^2 = 0$$

$$(x+4)(x-4) = 0$$

either or $x-4=0$

$$x+4=0 \quad \quad \quad x=4$$

$$x=-4$$

$$e) \quad x^2 = -5x - 6$$

$$x^2 + 5x + 6 = 0$$

$$(x+3)(x+2) = 0$$

x	+
+6	+5
(3)(2)	

either or

$$x+3=0 \quad \quad \quad x+2=0$$

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

$$f) \quad x^2 = 5x$$

$$x^2 - 5x = 0$$

$$x(x-5) = 0$$

either or $x-5=0$

$$x=0 \quad \quad \quad x=5$$

$$g) \quad (x-2)(x-3) = 12$$

expand first

$$x^2 - 3x - 2x + 6 = 12$$

$$x^2 - 5x + 6 = 12$$

$$x^2 - 5x - 6 = 0$$

$$(x-6)(x+1) = 0$$

either $x-6=0$ or $x+1=0$

$$x=6 \quad \quad \quad x=-1$$

We now have ZERO!!

x	+
-6	-5
(-6)(+1)	

$$3) a) 2x^2 - 8x + 1 = 0$$

$$a = 2 \quad b = -8 \quad c = +1$$

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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(+1)}}{2(2)}$$

$$x = \frac{8 \pm \sqrt{64 - 8}}{4}$$

$$x = \frac{8 \pm \sqrt{56}}{4}$$

$$\text{either } x = \frac{8 + \sqrt{56}}{4} \quad \text{or } x = \frac{8 - \sqrt{56}}{4}$$

$$x = \frac{8 + 7.483}{4}$$

$$x = \frac{8 - 7.483}{4}$$

$$x = \frac{15.483}{4}$$

$$x = \frac{0.517}{4}$$

$$x = 3.87$$

$$x = 0.13 \text{ to 2 d.p.}$$

$$b) \quad 3x^2 + 2x - 15 = 0$$

$$a = 3 \quad b = +2 \quad c = -15$$

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

$$x = \frac{-(+2) \pm \sqrt{(+2)^2 - 4(3)(-15)}}{2(3)}$$

$$x = \frac{-2 \pm \sqrt{4 + 180}}{6}$$

$$x = \frac{-2 \pm \sqrt{184}}{6}$$

$$\text{either } x = \frac{-2 + \sqrt{184}}{6} \quad \text{or } x = \frac{-2 - \sqrt{184}}{6}$$

$$x = \frac{-2 + 13.565}{6}$$

$$x = \frac{-2 - 13.565}{6}$$

$$x = \frac{11.565}{6}$$

$$x = \frac{-15.565}{6}$$

$$x = 1.93$$

$$x = -2.59$$

to 2 d.p.

$$c) \quad 2x^2 - 5x - 1 = 0$$

$$a = 2 \quad b = -5 \quad c = -1$$

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

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

$$x = \frac{5 \pm \sqrt{25 + 8}}{4}$$

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

either

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

$$\text{or } x = \frac{5 - \sqrt{33}}{4}$$

$$x = \frac{5 + 5.745}{4}$$

$$x = \frac{5 - 5.745}{4}$$

$$x = \frac{10.745}{4}$$

$$x = \frac{-0.745}{4}$$

$$x = 2.69$$

$$x = -0.19$$

to 2 d.p.

d) $x^2 = 6x - 2$
 $x^2 - 6x + 2 = 0$ Must get ZERO

$a = 1 \quad b = -6 \quad c = +2$

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

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(+2)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{36 - 8}}{2}$$

$$x = \frac{6 \pm \sqrt{28}}{2}$$

either

$$x = \frac{6 + \sqrt{28}}{2}$$

or

$$x = \frac{6 - \sqrt{28}}{2}$$

$$x = \frac{6 + 5.292}{2}$$

$$x = \frac{6 - 5.292}{2}$$

$$x = \frac{11.292}{2}$$

$$x = \frac{0.708}{2}$$

$$x = 5.65$$

$$x = 0.35$$

to 2 d.p.