Solving Quadratic Equations

1.

Solve each of the following quadratic equations by

(i) completing the table.
(ii) plotting the points and drawing the smooth parabola.
(iii) reading off the roots from the graph.

(a) $x^2 - 2x - 8 = 0$

x	–3	–2	–1	0	1	2	3	4	5
$y = x^2 - 2x - 8$	7	…	…	–8	…	…	…	…	…

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

x	–4	–3	–2	–1	0	1	2
$y = x^2 + 2x - 3$	…	…	–3	…	…	…	…

2.

Solve the following quadratic equations by factorising:

(a) $x^2 - 7x = 0$ (b) $x^2 - 9 = 0$ (c) $x^2 + 8x + 12 = 0$

(d) $6x^2 + 9x = 0$ (e) $25 - x^2 = 0$ (f) $x^2 - x - 30 = 0$

(g) $4x^2 - 9 = 0$ (h) $x^2 - 7x + 10 = 0$ (i) $2x^2 + 7x - 15 = 0$

(j) $x(x + 5) = 14$ (k) $(x - 1)(x + 2) = 18$ (l) $(x - 2)^2 = 16$

3.

Solve the following quadratic equations using the formula.
(Give the answers correct to 2 decimal places):

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

(a) $x^2 + 6x + 3 = 0$ (b) $x^2 - 4x + 1 = 0$ (c) $3x^2 + 10x + 6 = 0$

(d) $x^2 + 5x - 2 = 0$ (e) $x^2 - 6x - 4 = 0$ (f) $2x^2 - x - 5 = 0$

Answers

1 (a) graph and $x = 4$ or $x = -2$ (b) graph and $x = 1$ or $x = -3$

2 (a) 0, 7 (b) 3, –3 (c) –2, –6 (d) 0, $-\frac{3}{2}$ (e) 5, –5 (f) 6, –5
(g) $\frac{3}{2}$,$-\frac{3}{2}$ (h) 2, 5 (i) –5, $\frac{3}{2}$ (j) 2, –7 (k) 4, –5 (l) 6, –2

3 (a) –0·55, –5·45 (b) 3·73, 0·27 (c) –0·78, –2·55
(d) 0·37, –5·37 (e) 6·61, –0·61 (f) 1·85, –1·35