

## Workout

### Question 1:

(a)  $x = -2$  or  $x = -4$

(b)  $x = -6$  or  $x = -4$

(c)  $x = -4$  or  $x = -10$

(d)  $x = -5$  or  $x = 9$

(e)  $x = 5$  or  $x = 7$

(f)  $x = -1$  or  $x = 3$

(g)  $x = -17$  or  $x = 3$

(h)  $x = -2$  or  $x = 8$

(i)  $x = 1$

### Question 2:

(a)  $x = -4$  or  $x = -1$

(b)  $x = -3$  or  $x = 6$

(c)  $x = -4$  or  $x = 3$

(d)  $x = 3$  or  $x = 4$

(e)  $x = 3$  or  $x = 8$

(f)  $x = -3$  or  $x = 10$

### Question 3:

(a)  $x = -2 + \sqrt{7}$  or  $x = -2 - \sqrt{7}$

(b)  $x = -3 + \sqrt{19}$  or  $x = -3 - \sqrt{19}$

(c)  $x = 1 + \sqrt{6}$  or  $x = 1 - \sqrt{6}$

(d)  $x = 5 + 2\sqrt{6}$  or  $x = 5 - 2\sqrt{6}$  (note  $\sqrt{24} = 2\sqrt{6}$ )

(e)  $x = -4 + \sqrt{13}$  or  $x = -4 - \sqrt{13}$

(f)  $x = 4 + \sqrt{38}$  or  $x = 4 - \sqrt{38}$

(g)  $x = -10 + \sqrt{93}$  or  $x = -10 - \sqrt{93}$

(h)  $x = 6 + \sqrt{35}$  or  $x = 6 - \sqrt{35}$

(i)  $x = 15 + 5\sqrt{13}$  or  $x = 15 - 5\sqrt{13}$  (note  $\sqrt{325} = 5\sqrt{13}$ )

### Question 4:

(a)  $x = -\frac{1}{2} + \frac{\sqrt{29}}{2}$  or  $x = -\frac{1}{2} - \frac{\sqrt{29}}{2}$

(b)  $x = \frac{3}{2} + \frac{\sqrt{5}}{2}$  or  $x = \frac{3}{2} - \frac{\sqrt{5}}{2}$

(c)  $x = -\frac{11}{2} + \frac{\sqrt{141}}{2}$  or  $x = -\frac{11}{2} - \frac{\sqrt{141}}{2}$

(d)  $x = \frac{7}{2} + \frac{\sqrt{13}}{2}$  or  $x = \frac{7}{2} - \frac{\sqrt{13}}{2}$

(e)  $x = \frac{1}{2} + \frac{\sqrt{201}}{2}$  or  $x = \frac{1}{2} - \frac{\sqrt{201}}{2}$

(f)  $x = -\frac{13}{2} + \frac{\sqrt{165}}{2}$  or  $x = -\frac{13}{2} - \frac{\sqrt{165}}{2}$

Question 5:

- (a)  $x = 2 - \sqrt{13}$  or  $x = 2 + \sqrt{13}$
- (b)  $x = -5 + 2\sqrt{10}$  or  $x = -5 - 2\sqrt{10}$
- (c)  $x = \frac{1}{2} - \frac{\sqrt{29}}{2}$  or  $x = \frac{1}{2} + \frac{\sqrt{29}}{2}$
- (d)  $x = -1 + \sqrt{6}$  or  $x = -1 - \sqrt{6}$
- (e)  $x = -5 + \sqrt{37}$  or  $x = -5 - \sqrt{37}$
- (f)  $x = -1 - \sqrt{14}$  or  $x = -1 + \sqrt{14}$

Question 6:

- (a)  $x = -3 + \sqrt{11}$  or  $x = -3 - \sqrt{11}$
- (b)  $x = -3$  or  $x = -0.5$
- (c)  $x = -2 + \frac{\sqrt{14}}{3}$  or  $x = -2 - \frac{\sqrt{14}}{3}$
- (d)  $x = \frac{3}{4} + \frac{\sqrt{65}}{4}$  or  $x = \frac{3}{4} - \frac{\sqrt{65}}{4}$
- (e)  $x = -\frac{1}{5} + \frac{\sqrt{41}}{5}$  or  $x = -\frac{1}{5} - \frac{\sqrt{41}}{5}$
- (f)  $x = \frac{1}{10} + \frac{\sqrt{11}}{10}$  or  $x = \frac{1}{10} - \frac{\sqrt{11}}{10}$

### Apply

Question 1: (a) (0, 3) (b)  $(-5 + \sqrt{22}, 0)$  and  $(-5 - \sqrt{22}, 0)$

Question 2: width =  $-10 + 10\sqrt{11}$  cm and length =  $10 + 10\sqrt{11}$  cm

Question 3: When solving using completing the square, Abby will get to the point  $(x+2)^2 = -11$ . She will need to  $\sqrt{-11}$ , which has no solutions (real ones anyway!)

Question 4:  $5\sqrt{17}$

Question 5:  $a = 6$  and  $b = -8$

Question 6: <https://corbettmaths.com/2015/03/19/deriving-the-quadratic-formula/>