

1. Solve  $3x^2 + 7x - 13 = 0$   
Give your solutions correct to 2 decimal places.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$= \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-13)}}{2(3)}$$

$$x = 1.22 \text{ or } x = -3.55$$

(3 marks)

2. Solve the equation

$$2x^2 + 6x - 95 = 0$$

Give your solutions correct to 3 significant figures.

$$x = \frac{-6 \pm \sqrt{6^2 - 4(2)(-95)}}{2(2)}$$

$$x = 5.55 \text{ or } x = -8.55$$

(3 marks)

3. Solve  $x^2 + 3x - 5 = 0$   
Give your solutions correct to 4 significant figures.

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

$$= \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-5)}}{2(1)}$$

$$x = 1.193 \text{ and } -4.193$$

.....

**(3 marks)**

4. Solve this quadratic equation.

$$x^2 - 5x - 8 = 0$$

Give your answers correct to 3 significant figures.

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-8)}}{2(1)}$$

$$x = \dots\dots\dots 6.27 \dots\dots\dots \text{ or } x = \dots\dots\dots -1.27 \dots\dots\dots$$

**(3 marks)**

5. (a) Solve  $x^2 - 2x - 1 = 0$

Give your solutions correct to 2 decimal places.

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

$$x = 2.41 \quad \text{and} \quad -0.41$$

..... (3)

(b) Write down the solutions, correct to 2 decimal places, of  $3x^2 - 6x - 3 = 0$

2.41 and -0.41  
..... (2)

(5 marks)

6. (a) Solve  $x^2 + x + 11 = 14$   
Give your solutions correct to 3 significant figures.

$$x^2 + x + 11 = 14$$

$$x^2 + x - 3 = 0$$

$$x = \frac{- (1) \pm \sqrt{(1)^2 - 4(1)(-3)}}{2(1)}$$

$$x = 1.30 \quad \text{and} \quad -2.30$$

.....  
(3)

$$y = x^2 + x + 11$$

The value of  $y$  is a prime number when  $x = 0, 1, 2$  and  $3$

The following statement is **not** true.

' $y = x^2 + x + 11$  is **always** a prime number when  $x$  is an integer'

- (b) Show that the statement is not true.

$$(10)^2 + (10) + 11 = 121$$

.....  
121 is not prime (11 x 11)  
.....

(2)

**(5 marks)**

7. The diagram below shows a 6-sided shape.  
All the corners are right angles.  
All the measurements are given in centimetres.

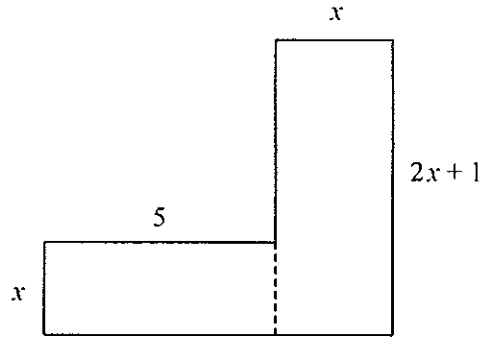


Diagram NOT accurately drawn

The area of the shape is  $95 \text{ cm}^2$ .

- (a) Show that  $2x^2 + 6x - 95 = 0$

$$\begin{aligned} \text{Area} &= 5x + x(2x+1) \\ 95 &= 5x + 2x^2 + x \\ 0 &= 2x^2 + 6x - 95 \end{aligned}$$

(3)

- (b) Solve the equation

$$2x^2 + 6x - 95 = 0$$

Give your solutions correct to 3 significant figures.

$$x = \frac{-6 \pm \sqrt{(6)^2 - 4(2)(-95)}}{2(2)}$$

$$x = \dots\dots\dots 5.55 \dots\dots\dots \text{ or } x = \dots\dots\dots - 8.55 \dots\dots\dots$$

(3)

(6 marks)

8. The diagram below shows a 6-sided shape.

All the corners are right angles.

All measurements are given in centimetres.

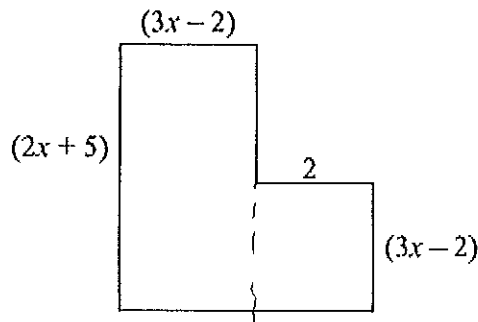


Diagram NOT accurately drawn

The area of the shape is  $25 \text{ cm}^2$ .

(a) Show that  $6x^2 + 17x - 39 = 0$

$$\begin{aligned} (3x-2)(2x+5) + 2(3x-2) &= 25 \\ 6x^2 + 15x - 4x - 10 + 6x - 4 &= 25 \\ 6x^2 + 17x - 14 &= 25 \end{aligned}$$

(3)

(b) (i) Solve the equation  $6x^2 + 17x - 39 = 0$

$$6x^2 + 17x - 39 = 0$$

$$x = \frac{-(17) \pm \sqrt{(17)^2 - 4(6)(-39)}}{2(6)}$$

$$x = \dots 1.5 \dots \text{ or } x = \dots -\frac{13}{3} \dots$$

(ii) Hence work out the length of the longest side of the shape.

$$2(1.5) + 5$$

$$\dots 8 \dots \text{cm}$$

(4)

(7 marks)

9. The diagram shows a 6-sided shape.  
 All the corners are right angles.  
 All the measurements are given in centimetres.

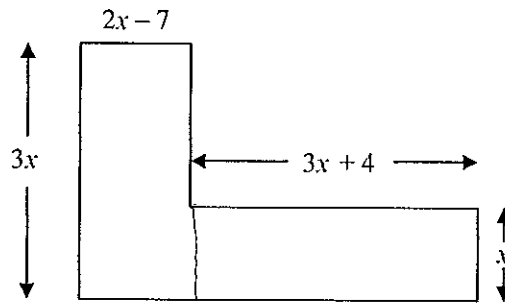


Diagram NOT accurately drawn

The area of the shape is  $85 \text{ cm}^2$ .

- (a) Show that  $9x^2 - 17x - 85 = 0$

$$\begin{aligned}
 3x(2x-7) + x(3x+4) &= 85 \\
 6x^2 - 21x + 3x^2 + 4x &= 85 \\
 9x^2 - 17x - 85 &= 0
 \end{aligned}$$

(3)

- (b) (i) Solve  $9x^2 - 17x - 85 = 0$

Give your solutions correct to 3 significant figures.

$$x = \frac{-(-17) \pm \sqrt{(-17)^2 - 4(9)(-85)}}{2(9)}$$

$$x = \dots\dots\dots -2.27 \dots\dots\dots \text{ or } x = \dots\dots\dots 4.16 \dots\dots\dots$$

- (ii) Hence, work out the length of the shortest side of the 6-sided shape.

$$\dots\dots\dots 1.32 \dots\dots\dots \text{ cm} \quad (3 \text{ sf})$$

(4)

(7 marks)