Ex1

Solve the following quadratic equation by factorising into two brackets.

$$x^2 + 14x + 48 = 0$$

Ex2

Solve the following quadratic equation by factorising into two brackets.

$$x^2 - 7x + 12 = 0$$

Q1

Solve the following quadratic equation by factorising into two brackets.

[a] $x^2 + 10x + 21 = 0$

[b] $x^2 + 5x + 4 = 0$

[c] $x^2 - 13x + 36 = 0$

[d] $x^2 - 16x + 55 = 0$

[e] $x^2 + 13x + 40 = 0$

[f] $x^2 - 9x + 8 = 0$

[g] $x^2 - 19x + 90 = 0$

Q2

Write the letter of the quadratic equation next to its solutions.

[a] $x^2 - 9x + 14 = 0$

[b] $x^2 + 14x + 33 = 0$

[c] $x^2 + 9x + 20 = 0$

[d] $x^2 - 6x + 8 = 0$

[e] $x^2 - 8x + 7 = 0$

[f] $x^2 + 12x + 20 = 0$

[g] $x^2 - 18x + 77 = 0$

Solutions	Letter
$x = -10,\ x = -2$	
$x = -5,\ x = -4$	
$x = 7,\ x = 2$	
$x = 11,\ x = 7$	
$x = -11,\ x = -3$	
$x = 7,\ x = 1$	
$x = 4,\ x = 2$	

Ex3
Solve the following quadratic equation by factorising into two brackets.
$$x^2 + 11x - 80 = 0$$

Ex4
Solve the following quadratic equation by factorising into two brackets.
$$x^2 - 10x - 24 = 0$$

Q3
Solve the following quadratic equation by factorising into two brackets.

[a] $x^2 - 4x - 12 = 0$

[b] $x^2 + 6x - 16 = 0$

[c] $x^2 + x - 2 = 0$

[d] $x^2 - 4x - 21 = 0$

[e] $x^2 + 2x - 24 = 0$

[f] $x^2 + 3x - 88 = 0$

[g] $x^2 - x - 110 = 0$

Q4   *Hint: First set equal to 0.*
Solve the quadratic equations by factorising into two brackets.

[a] $x^2 = 3x + 28$

[b] $x^2 + 9 = 6x$

[c] $x^2 - 3x = 10$

[d] $x(x - 5) = 4x + 10$

[e] $9x = 22 - x^2$

Q5 Factorise the following quadratic expressions into double brackets.

[a] $x^2 + 3x + 2 = 0$

[b] $x^2 + 5x - 24 = 0$

[c] $x^2 - 2x - 48 = 0$

[d] $x^2 + 15x + 56 = 0$

[e] $x^2 + 14x + 45 = 0$

[f] $x^2 + 15x + 44 = 0$

[g] $x^2 - x - 20 = 0$

[h] $x^2 + 8x + 7 = 0$

[i] $x^2 - x - 30 = 0$

[j] $x^2 + 3x - 54 = 0$

[k] $x^2 + 12x + 35 = 0$

[l] $x^2 + x - 42 = 0$

[m] $x^2 - 9x + 14 = 0$

[n] $x^2 + 16x + 60 = 0$

[o] $x^2 - 4x - 32 = 0$

[p] $x^2 - 17x + 72 = 0$

Ex1

Solve the following quadratic equation by factorising into two brackets.
$$5x^2 - 11x + 6 = 0$$

Ex2

Solve the following quadratic equation by factorising into two brackets.
$$2x^2 + 13x - 45 = 0$$

Q1

Solve the following quadratic equation by factorising into two brackets.

[a] $5x^2 - 21x + 4 = 0$

[b] $2x^2 + 3x - 35 = 0$

[c] $4x^2 - 3x - 22 = 0$

[d] $3x^2 + 4x - 4 = 0$

[e] $2x^2 - 11x - 40 = 0$

[f] $4x^2 + 21x - 18 = 0$

Q2

Solve the quadratic equations by factorising into two brackets.

[a] $2x^2 = 3x + 5$

[b] $3x^2 + 6x = x - 2$

[c] $2x^2 + 1 = 3x$

[d] $3(x^2 + 5) + 1 = 14x$

[e] $5x(x + 3) = 3x - 4$

Ex3
Solve the following quadratic equation by factorising into two brackets.
$$12x^2 - 23x + 5 = 0$$

Ex4
Solve the following quadratic equation by factorising into two brackets.
$$6x^2 + 11x + 3 = 0$$

Q3
Solve the following quadratic equation by factorising into two brackets.

[a] $8x^2 - 18x + 9 = 0$

[b] $6x^2 + 7x - 20 = 0$

[c] $9x^2 + 27x + 20 = 0$

[d] $9x^2 + 12x - 5 = 0$

[e] $8x^2 - 26x - 7 = 0$

[f] $15x^2 - 13x + 2 = 0$

Q4
Write the letter of the quadratic equation next to its solutions.

[a] $6x^2 - 25x + 25 = 0$

[b] $9x^2 - 18x + 8 = 0$

[c] $10x^2 - 21x - 10 = 0$

[d] $6x^2 - 17x + 12 = 0$

[e] $25x^2 + 5x - 2 = 0$

[f] $15x^2 + 37x + 21 = 0$

[g] $15x^2 + 44x + 21 = 0$

Solutions	Letter
$x = \frac{5}{3}$, $x = \frac{5}{2}$	
$x = \frac{-7}{3}$, $x = \frac{-3}{5}$	
$x = \frac{-7}{3}$, $x = \frac{-3}{4}$	
$x = \frac{-2}{5}$, $x = \frac{5}{2}$	
$x = \frac{4}{3}$, $x = \frac{2}{3}$	
$x = \frac{-2}{5}$, $x = \frac{1}{5}$	
$x = \frac{3}{2}$, $x = \frac{4}{3}$	

Q5 Factorise the following quadratic expressions into double brackets.

[a] $4x^2 + 23x + 15 = 0$

[b] $2x^2 - 7x + 6 = 0$

[c] $4x^2 - 8x + 3 = 0$

[d] $15x^2 + 7x - 4 = 0$

[e] $2x^2 + 5x - 7 = 0$

[f] $3x^2 + 16x + 21 = 0$

[g] $10x^2 + 31x - 14 = 0$

[h] $5x^2 + 41x + 8 = 0$

[i] $12x^2 - 13x - 4 = 0$

[j] $7x^2 + 36x + 5 = 0$

[k] $10x^2 + 31x + 15 = 0$

[l] $30x^2 + 7x - 2 = 0$

Q1

Solve the following quadratic equations, giving your answer to two decimal places.

[a] $5x^2 + 19x + 5 = 0$

[b] $2x^2 + 2x - 3 = 0$

[c] $3x^2 + 9x - 10 = 0$

[d] $5x^2 - x - 16 = 0$

[e] $3x^2 - 9x - 15 = 0$

[f] $4x^2 + 5x - 14 = 0$

Q2

Fill in the blanks to complete the work working correct and find the solutions to the quadratic equation to three decimal places.

$$2x^2 + \boxed{}x - 9 = 0$$

$$a = 2 \qquad b = 10 \qquad c = \boxed{}$$

$$x = \frac{-(10) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(-9)}}{2(\boxed{})}$$

$$x_+ = \frac{-10\boxed{}\sqrt{\boxed{}}}{2} \qquad x_- = \frac{\boxed{} + \sqrt{\boxed{}}}{2}$$

$$x_+ = \boxed{} \qquad x_- = \boxed{}$$

Q3

Write the letter of the quadratic equation next to its solutions, given to one decimal place.

[a] $5x^2 + 19x + 5 = 0$ **[e]** $3x^2 - 9x - 15 = 0$

[b] $2x^2 + 2x - 3 = 0$ **[f]** $4x^2 + 5x - 14 = 0$

[c] $3x^2 + 9x - 10 = 0$ **[g]** $4x^2 + 5x - 14 = 0$

[d] $5x^2 - x - 16 = 0$

Solutions	Letter
$x_+ = 3.3$, $x_- = -0.5$	
$x_+ = 2.3$, $x_- = -2.9$	
$x_+ = 3.1$, $x_- = -0.6$	
$x_+ = 0.5$, $x_- = -4.1$	
$x_+ = -1.6$, $x_- = -6.4$	
$x_+ = 2.5$, $x_- = -0.7$	
$x_+ = -0.1$, $x_- = -4.5$	

Q4

Identify and correct the mistakes in the working below before finding the correct solutions to four significant figures.

$$2x^2 - 5x - 4 = 0$$

Step ① $a = 2 \qquad b = -5 \qquad c = -4$

Step ② $x = \dfrac{-(5) \pm \sqrt{(-5)^2 - 4(2)(-4)}}{2}$

Step ③ $x_+ = \dfrac{-5 + \sqrt{57}}{2}$

$x_- = \dfrac{-5 + \sqrt{57}}{2}$

Step ④ $x_+ = 1.275 \qquad x_- = -6.275$

Q5

Solve the following quadratic equations, giving your answer to three significant figures.   **Hint:** *First set equal to 0.*

[a] $3x^2 + 13x = 20$

[b] $5x^2 = 7x + 4$

[c] $2(x^2 + 4) = 15x$

[d] $4(x^2 - 3) = 11x$

Ex1

Solve the following quadratic equation, giving your answer in exact form.

$$3x^2 + 11x + 7 = 0$$

Ex2

Solve the following quadratic equation, giving your answer in exact form.

$$5x^2 + 3x - 4 = 0$$

Q1

Fill in the blanks to complete the work working correct and find the exact solutions to the quadratic equation. $3x^2 + \boxed{}x - 8 = 0$

$$a = 3 \quad b = 20 \quad c = \boxed{}$$

$$x = \frac{\text{-}(20) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(\text{-}8)}}{2(\boxed{})}$$

$$x_+ = \frac{\text{-}20 \boxed{} \sqrt{\boxed{}}}{\boxed{}} \qquad x_- = \frac{\boxed{} - \sqrt{\boxed{}}}{\boxed{}}$$

$$x_+ = \frac{\boxed{} + \boxed{}\sqrt{\boxed{}}}{\boxed{}} \qquad x_- = \frac{\boxed{} - \boxed{}\sqrt{\boxed{}}}{\boxed{}}$$

Q2

Explain why we cannot find a solution to the following quadratic equation.

$$2x^2 + 7x + 9 = 0$$

Q3

Solve the following quadratic equations, giving your answer to three significant figures.

$$5x(x + 2) = 2(4x + 3)$$

Ex3

Find the quadratic equation whose solutions are,

$$x = \frac{-9 \pm \sqrt{21}}{6}$$

Ex4

Find the quadratic equation whose solutions are,

$$x = \frac{7 \pm \sqrt{29}}{10}$$

Q4

Fill in the blanks to complete the working to find the quadratic equation whose solutions are, $x = \frac{11 \pm \sqrt{73}}{8}$

Step ① $\frac{\boxed{}}{\boxed{}} = \frac{11}{\boxed{}}$

$\boxed{} = \boxed{}$

Step ② $\frac{2a}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

$\boxed{} = \boxed{}$

Step ③ $\boxed{} = \boxed{}$

$\boxed{} - 4\boxed{}c = \boxed{}$

$\boxed{} - \boxed{}c = \boxed{}$

$-\boxed{} \qquad -\boxed{}$

$\frac{\boxed{}c}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

$c = \boxed{}$

Step ④ $\boxed{}x^2 - \boxed{}x + \boxed{} = 0$

Q5

Write the letter of the quadratic equation next to its solutions.

[a] $x = \frac{11 \pm \sqrt{97}}{4}$

[b] $x = \frac{-7 \pm \sqrt{5}}{22}$

[c] $x = \frac{7 \pm \sqrt{93}}{22}$

[d] $x = \frac{-7 \pm \sqrt{33}}{4}$

[e] $x = \frac{-11 \pm \sqrt{97}}{4}$

Equations	Letter
$11x^2 + 7x + 1 = 0$	
$2x^2 + 11x + 3 = 0$	
$2x^2 + 7x + 2 = 0$	
$2x^2 - 11x + 3 = 0$	
$11x^2 - 7x - 1 = 0$	

Q1

Fill in the blanks to complete the working below and solve the following quadratic equation by first expressing it in the form $(x + p)^2 + q = 0$.

$$x^2 - 4x - 45 = 0$$
$$(\boxed{}\ \boxed{})^2 - \boxed{}\ \boxed{} = 0$$
$$(\boxed{})^2\ \boxed{} = 0$$
$$(\boxed{})^2 = \boxed{}$$
$$x_+ = \boxed{} \qquad \boxed{}\ \boxed{}$$
$$x_- = \boxed{} \qquad \boxed{} = \boxed{}$$
$$x = \boxed{}$$

Q2

Fill in the blanks to complete the working below and solve the following quadratic equation by first expressing it in the form $(x + p)^2 + q = 0$.

$$x^2 + 6x - 3 = 0$$
$$(\boxed{}\ \boxed{})^2 - \boxed{}\ \boxed{} = 0$$
$$(\boxed{})^2\ \boxed{} = 0$$
$$(\boxed{})^2 = \boxed{}$$
$$x_+ = \boxed{}$$
$$x_- = \boxed{} \qquad \boxed{} = \boxed{}$$
$$x = \boxed{}$$

Q3

Identify and correct the mistakes in the following working below before finding the exact solutions to the quadratic equation.

$$x^2 - 8x - 20 = 0$$
$$(x + 4)^2 - 16 - 20 = 0$$
$$(x + 4)^2 - 36 = 0$$
$$\begin{array}{c|c} +36 & +36 \end{array}$$
$$(x + 4)^2 = 36$$
$$\sqrt{} \quad \sqrt{}$$
$$x + 4 = 6$$
$$\begin{array}{c|c} -4 & -4 \end{array}$$
$$x = 6 - 4 \Rightarrow x = 2$$

Q4

Solve the following quadratic equations by first expressing them in the form $(x + p)^2 + q = 0$.

[a] $x^2 + 2(3x + 4) = 0$

[b] $x^2 + 1 = 5(x + 3)$

[c] $x^2 + x = 8.75$

[d] $x^2 = 5(1.95 - x)$

Q5

Write the letter of the quadratic equation next to its completed square and solutions.

[a] $x^2 - 8x + 8 = 0$

[b] $x^2 - 6x - 12 = 0$

[c] $x^2 + 10x + 20 = 0$

[d] $x^2 - 6x - 20 = 0$

[e] $x^2 + 8x + 14 = 0$

[f] $x^2 + 10x + 21 = 0$

[g] $x^2 - 6x - 26 = 0$

[h] $x^2 - 15x - 34 = 0$

Completed square form	Letter	Solutions	Letter
$(x - 3)^2 - 35 = 0$		$x_+ = -5 + \sqrt{5},\ x_- = -5 - \sqrt{5}$	
$(x - 4)^2 - 8 = 0$		$x_+ = 3 + \sqrt{29},\ x_- = 3 - \sqrt{29}$	
$(x - 3)^2 - 29 = 0$		$x_+ = 3 + \sqrt{35},\ x_- = 3 - \sqrt{35}$	
$(x + 5)^2 - 4 = 0$		$x_+ = -4 + \sqrt{2},\ x_- = -4 - \sqrt{2}$	
$(x + 4)^2 - 2 = 0$		$x_+ = 3 + \sqrt{21},\ x_- = 3 - \sqrt{21}$	
$(x - 3)^2 - 21 = 0$		$x_+ = 4 + 2\sqrt{2},\ x_- = 4 - 2\sqrt{2}$	
$(x - 7.5)^2 - 90.3 = 0$		$x_+ = -3,\ x_- = -7$	
$(x + 5)^2 - 5 = 0$		$x_+ = 17,\ x_- = -2$	

Q1

The following quadratic equations are expressed in completed square form, $a(x + b)^2 + c = 0$.
Find their exact solutions.

[a] $2(x - 2)^2 - 1 = 0$

[b] $4(x - 2)^2 - 7 = 0$

[c] $3(x - 1)^2 - 1 = 0$

[d] $2(x - 3)^2 - 1 = 0$

Q2

Fill in the blanks to complete the working below and solve the following quadratic equation by first expressing it in the form $p - (x + p)^2 = 0$.

Start $4x - 1 - 2x^2 = 0$

$\boxed{}x^2 + 4x\boxed{} = 0$

$-2\left[x^2 - \boxed{}\right]\boxed{} = 0$

$-2\left[(x - \boxed{})^2 - 1\right]\boxed{} = 0$

$-2(x - \boxed{})^2\boxed{}\boxed{} = 0$

$-2(x - \boxed{})^2\boxed{} = 0$

$\boxed{}$

$\dfrac{1}{2} = \boxed{}$

$\dfrac{1}{2} = \boxed{}$

$\sqrt{} \qquad \sqrt{}$

$\dfrac{\boxed{}}{2} = x - 1$

$\dfrac{\boxed{}}{2} = x$

$x_+ = \boxed{} \qquad x_- = \boxed{}$

End

Q3

Solve the following quadratic equations by first expressing them in the form $p(x + q)^2 + r = 0$.

[a] $2x^2 + 10x - 3 = 0$

[b] $4x^2 + 12x - 1 = 0$

[c] $3x^2 + 12x - 7 = 0$

Q4

Solve the following quadratic equations by first expressing them in the form $p(x + q)^2 + r = 0$.

[a] $3(x^2 - 6x) = \text{-}17$

[b] $5(x^2 + 2x) = 9$

[c] $7 = 4(4x - x^2)$

Q5

Write the letter of the quadratic equation next to its completed square and solutions.

[a] $2x^2 + 4x - 3 = 0$

[b] $2x^2 - 12x + 13 = 0$

[c] $2x^2 - 16x + 11 = 0$

[d] $2x^2 - 4x - 3 = 0$

[e] $2x^2 + 8x - 1 = 0$

[f] $2(x - 1)^2 - 5 = 0$

[g] $2(x - 3)^2 - 5 = 0$

[h] $2(x + 1)^2 - 5 = 0$

[i] $2(x - 4)^2 - 21 = 0$

[j] $2(x + 2)^2 - 9 = 0$

[k] $x_+ = \dfrac{6 + \sqrt{10}}{2}$ $\qquad x_- = \dfrac{6 - \sqrt{10}}{2}$

[l] $x_+ = \dfrac{8 + \sqrt{42}}{2}$ $\qquad x_- = \dfrac{2 - \sqrt{42}}{2}$

[m] $x_+ = \dfrac{\text{-}2 + \sqrt{10}}{2}$ $\qquad x_- = \dfrac{\text{-}2 - \sqrt{10}}{2}$

[n] $x_+ = \dfrac{\text{-}4 + 3\sqrt{2}}{2}$ $\qquad x_- = \dfrac{\text{-}4 - 3\sqrt{2}}{2}$

[o] $x_+ = \dfrac{2 + \sqrt{10}}{3}$ $\qquad x_- = \dfrac{2 - \sqrt{10}}{3}$

Equation	Completed square	Solutions