

THE QUADRATIC FORMULA - PRACTICE QUESTIONS
CALCULATOR ALLOWED



1.

Solve $x^2 + 7x - 11 = 0$, giving your answers to 2 decimal places.

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

$$\begin{aligned} a &= 1 \\ b &= 7 \\ c &= -11 \end{aligned}$$

$$\begin{aligned} x &= \frac{-7 \pm \sqrt{7^2 - 4 \times 1 \times -11}}{2 \times 1} \\ &= \underline{\underline{1.32, -8.32}} \end{aligned}$$

2.

Solve $2x^2 + 5x - 4 = 0$, giving your answers to 3 decimal places.

$$\begin{aligned} a &= 2 \\ b &= 5 \\ c &= -4 \end{aligned}$$

$$\begin{aligned} x &= \frac{-5 \pm \sqrt{5^2 - 4 \times 2 \times -4}}{2 \times 2} \\ &= \underline{\underline{-3.137, 0.637}} \end{aligned}$$

3.

Solve $3x^2 + 8x - 5 = 0$, giving your answers to 3 significant figures.

$$\begin{aligned} a &= 3 \\ b &= 8 \\ c &= -5 \end{aligned}$$

$$\begin{aligned} x &= \frac{-8 \pm \sqrt{8^2 - 4 \times 3 \times -5}}{2 \times 3} \\ &= \underline{\underline{0.523, -3.19}} \end{aligned}$$

4.

Solve $2x^2 - 9x + 8 = 0$, giving your answers to 3 decimal places.

$$\begin{aligned} a &= 2 \\ b &= -9 \\ c &= 8 \end{aligned}$$

$$\begin{aligned} x &= \frac{-(-9) \pm \sqrt{(-9)^2 - 4 \times 2 \times 8}}{2 \times 2} \\ &= \underline{\underline{1.219, 3.281}} \end{aligned}$$

5.

Solve $3x^2 - 5x - 10 = 0$, giving your answers to 3 decimal places.

$$\begin{aligned} a &= 3 \\ b &= -5 \\ c &= -10 \end{aligned}$$

$$\begin{aligned} x &= \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 3 \times -10}}{2 \times 3} \\ &= \underline{\underline{2.840, -1.174}} \end{aligned}$$

6.

Solve $4x^2 - 6x - 13 = 0$, giving your answers to 4 significant figures.

$$\begin{aligned} a &= 4 \\ b &= -6 \\ c &= -13 \end{aligned}$$

$$\begin{aligned} x &= \frac{-(-6) \pm \sqrt{(-6)^2 - 4 \times 4 \times -13}}{2 \times 4} \\ &= \underline{\underline{-1.203, 2.703}} \end{aligned}$$

7.

Solve $5x^2 + 4x + 5 = 16$, giving your answers to 4 significant figures.

$$5x^2 + 4x - 11 = 0$$

$$a = 5$$

$$b = 4$$

$$c = -11$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \times 5 \times -11}}{2 \times 5}$$

$$= \underline{1.136, -1.936}$$

8.

Solve $3x^2 - 12x + 20 = 15 - 2x$, giving your answers to 4 significant figures.

$$3x^2 - 10x + 5 = 0$$

$$a = 3$$

$$b = -10$$

$$c = 5$$

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4 \times 3 \times 5}}{2 \times 3}$$

$$= \underline{0.6126, 2.721}$$

9.

Solve $5x^2 + 13x - 6 = 3x^2 + 6x + 6$, giving your answers to 4 significant figures.

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

$$a = 2$$

$$b = 7$$

$$c = -12$$

$$x = \frac{-7 \pm \sqrt{7^2 - 4 \times 2 \times -12}}{2 \times 2}$$

$$= \underline{1.260, -4.760}$$

10.

Solve $3x^2 - 10x = 15$, giving your answers to 4 significant figures.

$$3x^2 - 10x - 15 = 0$$

$$\begin{aligned} a &= 3 \\ b &= -10 \\ c &= -15 \end{aligned}$$

$$\begin{aligned} x &= \frac{-(-10) \pm \sqrt{(-10)^2 - 4 \times 3 \times -15}}{2 \times 3} \\ &= \underline{\underline{-1.122, 4.456}} \end{aligned}$$

11.

Solve $4x^2 + 2 = 7x$, giving your answers to 4 significant figures.

$$4x^2 - 7x + 2 = 0$$

$$\begin{aligned} a &= 4 \\ b &= -7 \\ c &= 2 \end{aligned}$$

$$\begin{aligned} x &= \frac{-(-7) \pm \sqrt{(-7)^2 - 4 \times 4 \times 2}}{2 \times 4} \\ &= \underline{\underline{1.390, 0.3596}} \end{aligned}$$

12.

Solve $x^2 = 19 - 10x$, giving your answers to 4 significant figures.

$$x^2 + 10x - 19 = 0$$

$$\begin{aligned} a &= 1 \\ b &= 10 \\ c &= -19 \end{aligned}$$

$$\begin{aligned} x &= \frac{-10 \pm \sqrt{10^2 - 4 \times 1 \times -19}}{2 \times 1} \\ &= \underline{\underline{-11.63, 1.633}} \end{aligned}$$

13.

Solve $\frac{3}{y} + 8 - y = 0$, giving your answers to 3 significant figures.

$\times y$

$$3 + 8y - y^2 = 0$$

$$a = -1$$

$$b = 8$$

$$c = 3$$

$$x = \frac{-8 \pm \sqrt{8^2 - 4 \times -1 \times 3}}{2 \times -1}$$

$$= \underline{\underline{-0.359, 8.36}}$$

14.

Solve $\frac{z^2 - 6}{z} = 9$, giving your answers to 3 significant figures.

$\times z$

$$z^2 - 6 = 9z$$

$$z^2 - 9z - 6 = 0$$

$$a = 1$$

$$b = -9$$

$$c = -6$$

$$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4 \times 1 \times -6}}{2 \times 1}$$

$$= \underline{\underline{-0.623, 9.62}}$$

15.

Solve $\frac{3t^2 - 10t + 7}{t} = t + 10$, giving your answers to 4 significant figures.

$\times t$

$$3t^2 - 10t + 7 = t^2 + 10t$$

$$2t^2 - 20t + 7 = 0$$

$$a = 2$$

$$b = -20$$

$$c = 7$$

$$x = \frac{-(-20) \pm \sqrt{(-20)^2 - 4 \times 2 \times 7}}{2 \times 2}$$

$$= \underline{\underline{9.637, 0.3632}}$$

16.

Without using a calculator, use the quadratic formula to find x in the form $\sqrt{a} + b$.

$$x^2 + 6x + 7 = 0$$

$$\begin{aligned} a &= 1 \\ b &= 6 \\ c &= 7 \end{aligned}$$

$$\begin{aligned} x &= \frac{-6 + \sqrt{6^2 - 4 \times 1 \times 7}}{2 \times 1} \\ &= \frac{-6 + \sqrt{36 - 28}}{2} \\ &= \frac{-6 + \sqrt{8}}{2} \\ &= \frac{-6 + 2\sqrt{2}}{2} \\ &= -3 + \sqrt{2} \end{aligned}$$

$$\begin{aligned} \sqrt{8} &= \sqrt{4 \times 2} \\ &= 2\sqrt{2} \end{aligned}$$

17.

Without using a calculator, use the quadratic formula to find r in the form $a\sqrt{b} + c$.

$$r^2 - 10r + 7 = 0$$

$$\begin{aligned} a &= 1 \\ b &= -10 \\ c &= 7 \end{aligned}$$

$$\begin{aligned} r &= \frac{-(-10) + \sqrt{(-10)^2 - 4 \times 1 \times 7}}{2 \times 1} \\ &= \frac{10 + \sqrt{100 - 28}}{2} \\ &= \frac{10 + \sqrt{72}}{2} \\ &= \frac{10 + 6\sqrt{2}}{2} \\ &= 5 + 3\sqrt{2} \end{aligned}$$

$$\begin{aligned} \sqrt{72} &= \sqrt{36 \times 2} \\ &= 6\sqrt{2} \end{aligned}$$