Solving Quadratics

You may write on the sheet. **Show ALL your working.** You will not need a calculator.

Section A:

Write down the first 10 square numbers. One example has been done for you.

x	1	2	3	4	5	6	7	8	9	10
x^2				16						

You may use this table to help you with Section B.

Section B:

Rearrange and solve the following equations. There should be two solutions for each one.
Show **every line** of your working.

1.	$x^2 = 36$	**2.**	$2x^2 = 2$
3.	$3x^2 = 48$	**4.**	$x^2 + 24 = 49$
5.	$x^2 - 16 = 9$	**6.**	$x^2 + 1 = 82$
7.	$5y^2 = 45$	**8.**	$9y^2 = 81$
9.	$4y^2 = 100$	**10.**	$51 + x^2 = 100$

Solving Quadratics SOLUTIONS

You may write on the sheet. **Show ALL your working.** You will not need a calculator.

Section A:

Write down the first 10 square numbers. One example has been done for you.

x	1	2	3	4	5	6	7	8	9	10
x^2	1	4	9	16	25	36	49	64	81	100

You may use this table to help you with Section B.

Section B:

Rearrange and solve the following equations. There should be two solutions for each one. Show **every line** of your working.

1.	$x^2 = 36$ $x = 6 \quad or \quad x = -6$	2.	$2x^2 = 2$ $x^2 = 1$ $x = 1 \quad or \quad x = -1$
3.	$3x^2 = 48$ $x^2 = 16$ $x = 4 \quad or \quad x = -4$	4.	$x^2 + 24 = 49$ $x = 25$ $x = 5 \quad or \quad x = -5$
5.	$x^2 - 16 = 9$ $x^2 = 25$ $x = 5 \quad or \quad x = -5$	6.	$x^2 + 1 = 82$ $x = 81$ $x = 9 \quad or \quad x = -9$
7.	$5y^2 = 45$ $y^2 = 9$ $y = 3 \quad or \quad y = -3$	8.	$9y^2 = 81$ $y^2 = 9$ $y = 3 \quad or \quad y = -3$
9.	$4y^2 = 100$ $y^2 = 25$ $y = 5 \quad or \quad y = -5$	10.	$51 + x^2 = 100$ $x^2 = 49$ $x = 7 \quad or \quad x = -7$

More Quadratic Equations

Section A:

The first set of questions should be solved without a calculator, giving answers as fractions in their simplest form where necessary.

1. $$2x^2 - 5 = 45$$	2. $$7x^2 + 58 = 758$$
3. $$8 - x^2 = 4$$	4. $$64x^2 = 36$$
5. $$x^2 = \frac{100}{49}$$	6. $$3x^2 = \frac{49}{3}$$
7. $$26 - 2x^2 = -6$$	8. $$81x^2 = 1$$

Section B:

You may use a calculator for these questions, giving your answers as decimals correct to 2 d.p. where necessary. Warning: one of these quadratics has no solution – can you see which one, and why?

1. $$3 + 5 = 7x^2$$	2. $$14 - 5x^2 = 27$$
3. $$5x^2 - \frac{1}{2} = 15$$	3. $$64 - 25x^2 = \frac{81}{16}$$

More Quadratic Equations SOLUTIONS

Hint:

$$\sqrt{\frac{4}{9}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3} \quad or \quad -\frac{2}{3}$$

To square root a fraction, you can square root the top and square root the bottom.

Section A:

The first set of questions should be solved without a calculator, giving answers as fractions in their simplest form where necessary.

1. $$2x^2 - 5 = 45$$ $$2x^2 = 50$$ $$x^2 = 25$$ $$x = \pm 5$$	2. $$7x^2 + 58 = 758$$ $$7x^2 = 700$$ $$x^2 = 100$$ $$x = \pm 10$$
3. $$8 - x^2 = 4$$ $$8 = 4 + x^2$$ $$4 = x^2$$ $$\pm 2 = x$$	4. $$64x^2 = 36$$ $$x^2 = \frac{36}{64}$$ $$x = \pm\frac{6}{8} = \pm\frac{3}{4}$$
5. $$x^2 = \frac{100}{49}$$ $$x = \pm\frac{10}{7}$$	6. $$3x^2 = \frac{49}{3}$$ $$x^2 = \frac{49}{9}$$ $$x = \pm\frac{7}{3}$$
7. $$26 - 2x^2 = -6$$ $$26 = 2x^2 - 6$$ $$32 = 2x^2$$ $$16 = x^2$$ $$\pm 4 = x^2$$	8. $$81x^2 = 1$$ $$x^2 = \frac{1}{81}$$ $$x = \pm\frac{1}{9}$$

Section B:

You may use a calculator for these questions, giving your answers as decimals correct to 2 d.p. where necessary. Warning: one of these quadratics has no solution – can you see which one, and why?

1. $$3 + 5 = 7x^2$$ $$8 = 7x^2$$ $$\frac{8}{7} = x^2$$ $$\pm 1.07 = x$$	2. $$14 - 5x^2 = 27$$ $$14 = 27 + 5x^2$$ $$-13 = 5x^2$$ $$-\frac{13}{5} = x^2 \implies No\ Solutions!\ (\sqrt{-ve})$$
3. $$5x^2 - \frac{1}{2} = 15$$ $$5x^2 = 15.5$$ $$x^2 = 3.1$$ $$x = \pm 1.76$$	3. $$64 - 25x^2 = \frac{81}{16}$$ $$64 = \frac{81}{16} + 25x^2$$ $$58.9375 = 25x^2$$ $$2.3575 = x^2$$ $$\pm 1.54 = x$$