

1. Solve these equations by factorization:
 - (a) $x^2 - 9x = 0$.
 - (b) $x^2 + x - 20 = 0$.
 - (c) $x^2 + 36 = 13x$.
 - (d) $x^2 - 6x + 9 = 0$.
 - (e) $3x^2 + 7x - 6 = 0$.

2. Solve these quadratics by completing the square. Where appropriate, leave your answers in simplified surd form.
 - (a) $x^2 + 6x + 8 = 0$.
 - (b) $x^2 - 5x - 14 = 0$.

3. Solve these quadratics by using the formula. Where appropriate, leave your answers in simplified surd form.
 - (a) $x^2 - 7x - 18 = 0$.
 - (b) $x^2 - 3x - 9 = 0$.
 - (c) $2x^2 - 4x - 5 = 0$.
 - (d) $x^2 + x + 1 = 0$.
 - (e) $4x^2 + 25 = 20x$.

4. Solve these questions as problems, beginning, "Let the number be x ", and then forming an equation and solving it. Write a clear conclusion.
 - (a) The area of a rectangular block of land is 1500 m^2 , and one side is 20 m longer than the other. Find the length of the longer side, and then find the perimeter of the block.
 - (b) The sum of a number and 18 times its reciprocal is equal to 9. Find the number.

Quadratic Test

1) ~~$x^2 - 9 = 0$~~ $x(x-9) = 0$ ✓

6) $x^2 + x - 20 = 0$

$(x-4)(x+5) = 0$

$x = 4$ OR $x = -5$ ✓

c) $x^2 + 36 = 13x$

$x^2 - 13x + 36 = 0$

$(x-4)(x-9) = 0$ ✓

$x = 4$ OR $x = 9$ ✓

d) $x^2 - 6x + 9 = 0$

$(x-3)(x-3) = 0$

$x = 3$ ✓

e) $3x^2 + 7x - 6 = 0$

$(3x+9)(3x-2) = 0$

$(x+3)(3x-2) = 0$

$x = -3$ OR $x = \frac{2}{3}$ ✓

10) $x^2 + 6x + 8 = 0$

$x^2 + 6x + 3^2 + 8 = 0$

$x^2 + 6x + 3^2 + 8 = 9 + 9$

$(x+3)^2 + 8 = 18$ ✓

$(x+3)^2 = 10$

$x + 3 = \pm \sqrt{10}$

$x = 3 + \sqrt{10}$ OR $x = 3 - \sqrt{10}$ ✓

b) $x^2 - 5x + 14 = 0$

$x^2 - 5x + (\frac{-5}{2})^2 - 14 + 6.25 = 0$

$(x - \frac{5}{2})^2 = 12.25$

$x - \frac{5}{2} = \pm \sqrt{12.25}$

$x = \frac{9}{2} + \frac{5}{2}$ OR $x = -\frac{9}{2} + \frac{5}{2}$

$x = \frac{14}{2}$ OR $x = -\frac{4}{2}$ ✓

$x = 7$ OR $x = -2$ ✓

Quadratics - Continued

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

Answer Form

a) $x^2 - 7x - 18 = 0$

$x = \frac{7 \pm \sqrt{7^2 - 4(1)(-18)}}{2}$

$x = \frac{7 \pm \sqrt{121}}{2}$

$x = \frac{7+11}{2}$ OR $x = \frac{7-11}{2}$

$x = 9$ OR $x = -2$ ✓

b) $x^2 - 3x - 9 = 0$

$x = \frac{3 \pm \sqrt{45}}{2} = 0$

$x = \frac{3 + \sqrt{45}}{2}$ OR $x = \frac{3 - \sqrt{45}}{2}$

$x = \frac{3 + 3\sqrt{5}}{2}$ OR $x = \frac{3 - 3\sqrt{5}}{2}$ ✓

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

$x = \frac{4 \pm \sqrt{56}}{4} = 0$

$x = \frac{4 \pm \sqrt{56}}{4}$ OR $x = \frac{4 \pm \sqrt{14}}{1}$

$x = \frac{4 + 2\sqrt{14}}{4}$ OR $x = \frac{4 - 2\sqrt{14}}{4}$ ✓

~~$x = \frac{4 \pm \sqrt{56}}{4}$~~ OR $x = 1 + 0.5\sqrt{14}$ OR $x = 1 - 0.5\sqrt{14}$

$x = 1 + \frac{\sqrt{14}}{2}$ OR $x = 1 - \frac{\sqrt{14}}{2}$ ✓

a) $x^2 + x + 1 = 0$ real

$x = \frac{-1 \pm \sqrt{1-3}}{2}$ No real solutions

$x = \frac{-1 \pm \sqrt{3}}{2}$ or $x = \frac{-1 \pm \sqrt{3}}{2}$

3) $4x^2 + 25 = 20x$

$4x^2 - 20x + 25 = 0$

$x = \frac{20 \pm \sqrt{0}}{8}$ *perfect square*

$x = 2.5$ ✓

$x = 2.5$ ✓

4) $1500 = x(x + 20)$

$1500 = x^2 + 20x$

$x^2 + 20x - 1500 = 0$

$x = \frac{-20 \pm \sqrt{6400}}{2}$

$x = \frac{-20 + 80}{2}$ or $x = \frac{-20 - 80}{2}$

$x = 30$ ✓ or $x = -50$ ✓

Area $P = 30 + 50 + 30 + 50$ ✓

Area $P = 1600m$ ✓

b) $x + \frac{18}{x} = 9$

$x^2 + 18 = 9x$

$x^2 - 9x + 18 = 0$

$x = \frac{9 \pm \sqrt{9}}{2}$ ✓

$x = 9 + 3$ or $x = 9 - 3$

$x = 6$ or $x = 3$ ✓