

Quadratics & Algebra Review Sheet

1. Expand and collect like terms

(a) $(2a + b)(b - a) - (a^2 + b^2)$.

$$ab - 3a^2$$

(b) $(2a + b)^2 - (a - b)^2$.

$$3a^2 + 6ab$$

2. Find the equation of the line through $(2, 4)$ and $(2, -5)$.

$$x = 2$$

3. Find the equation of the line through $(7, -2)$ and $(9, -3)$, eliminating all fractions from your answer.

$$2y + x = 3$$

4. Find the equation of the line through $(0, 4)$ perpendicular to $4x + 3y = 0$, eliminating all fractions from your answer.

$$4y = 3x + 16$$

5. Make x the subject in $a\sqrt{x^3 - b^2} = c$.

$$x = \sqrt[3]{\left(\frac{c}{a}\right)^2 + b^2}$$

6. Make x the subject in $a(x + b) = c(x - d)$.

$$x = \frac{ab + cd}{c - a}$$

7. Make x the subject in $\frac{x}{x-1} = a$.

$$x = \frac{a}{a-1}$$

8. Factorise

(a) $x^2 + x - 12$.

$$(x + 4)(x - 3)$$

(b) $2x^2 + 4x$.

$$2x(x + 2)$$

(c) $6x^2 + x - 2$.

$$(2x - 1)(3x + 2)$$

(d) $px + py + qx + qy$.

$$(p + q)(x + y)$$

(e) $4x^2 - 25$.

$$(2x + 5)(2x - 5)$$

(f) $4x^2 - 2x - 6$.

$$2(2x - 3)(x + 1)$$

(g) $800x^2 - 500 + 1800x$.

$$100(4x - 1)(2x + 5)$$

9. Solve

(a) $(2x + 1)(x - 3) = 0$.

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

(b) $x^2 = 3x$.

$$x = 0 \text{ or } x = 3$$

(c) $x^2 = 5x + 14$.

$$x = -2 \text{ or } x = 7$$

(d) $(x + 3)^2 = (x + 4)^2$.

$$x = -\frac{7}{2}$$

(e) $2x^2 + 3x = 14$.

$$x = -\frac{7}{2} \text{ or } x = 2$$

(f) $(x - 1)(x + 2)(2x - 1)(5x + 3) = 0$. [not a lot of working for this part... don't multiply out!]

$$x = 1 \text{ or } x = -2 \text{ or } x = \frac{1}{2} \text{ or } x = -\frac{3}{5}$$

10. Solve the following sets of simultaneous equations

(a) $2x + y = -1$
 $4x - 3y = 8$

$$(x, y) = \left(\frac{1}{2}, -2\right)$$

(b) $y = x - 3$
 $x^2 + 2y^2 = 9$

$$(x, y) = (3, 0) \text{ or } (x, y) = (1, -2)$$

(c) $x + 2y = 4$
 $x^2 - 4y^2 = -8$

$$(x, y) = \left(1, \frac{3}{2}\right)$$