

A LEVEL MATHEMATICS BRIDGING PACK

SECTION A: Linear Algebra

1. Solve the following:

(a) $2x + 3 = 13$

(b) $5x + 2 = 7 + 3x$

(c) $4(x + 1) + 5(4 - x) = 21$

2. Rearrange the following to make x the subject of the formula:

(a) $y = 3x^2 + 4$

(d) $y = (x+2)^2 - 1$

(b) $y = \frac{x+5}{8}$

(e) $y = \sqrt{x + 2}$

(c) $y = \frac{4}{3}x - 3$

3. Inequalities

Use inequality signs to represent the following statements:

(a) x is between 3 and 9 inclusive

(b) x is less than -3 but greater than 7 (non-inclusive)

Solve:

(a) $3x - 1 < 9 + x$

(b) $5x + 8 < 3x + 14$

4. Simultaneous Equations

Solve:

(a) $3x + 2y = 12$

$3x + 8y = 30$

SECTION B: Quadratics

1. Multiply out

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

(b) $(3x - 2)(2x + 4)$

2. Factorise

(a) $xy + y^2$

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(b) $2a^2b + a + ab$

3. Factorise

(a) $x^2 + 6x + 8$

(b) $x^2 + 18x - 40$

(c) $3x^2 - x - 2$

4. Use the quadratic formula to solve:

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

(a) $2x^2 + x - 8 = 0$

SECTION C: Surds

1. Simplify

(a) $\sqrt{6} + \sqrt{6}$

(b) $2\sqrt{3} + 4\sqrt{5} + 3\sqrt{3} - \sqrt{5}$

(c) $2 \times \sqrt{7}$

(d) $\frac{1}{3} \times 9\sqrt{5}$

(e) $\sqrt{2} \times \sqrt{6}$

(f) $\sqrt{6} \times \sqrt{6}$

(g) $(\sqrt{8})^2$

(h) $3\sqrt{4} \times 2\sqrt{4}$

(i) $(2 + \sqrt{3})(\sqrt{3} + 4)$

2. Rationalise the denominator

(a) $\frac{4}{\sqrt{5}}$

(b) $\frac{1}{2\sqrt{8}}$

(c) $\frac{1}{(2 + \sqrt{3})}$

SECTION D: Fractions

1. Calculate without a calculator:

(a) $\frac{4}{5} + \frac{2}{3}$

(b) $\frac{4}{5} - \frac{1}{3}$

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(c) $\frac{5}{6} \times \frac{3}{13}$

(d) $\frac{3}{5} \div \frac{2}{10}$

(e) $2 \div \frac{3}{5}$

2. Simplify

(a) $\frac{2x+4}{2}$

(b) $\frac{x^2-x}{x}$

(c) $\frac{4x^2+8x}{2x}$