

ALGEBRA (Q 2 & 3, PAPER 1)

LESSON NO. 2: LINEAR EQUATIONS

2007

3 (a) Solve $2x = 3(5 - x)$.

SOLUTION

$$2x = 3(5 - x) \Rightarrow 2x = 15 - 3x$$

$$\Rightarrow 2x + 3x = 15$$

$$\Rightarrow 5x = 15$$

$$\Rightarrow x = \frac{15}{5}$$

$$\therefore x = 3$$

2005

2 (c) (i) Write $\sqrt{x} + \frac{1}{\sqrt{x}}$ as a single fraction.

(ii) Hence, or otherwise, simplify $\left(\frac{2\sqrt{x}}{1+x}\right)\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$.

(iii) Solve for x

$$\left(\frac{2\sqrt{x}}{1+x}\right)\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) = x - 3.$$

SOLUTION

2 (c) (i)

$$\frac{\sqrt{x}}{1} + \frac{1}{\sqrt{x}} = \frac{\sqrt{x}\sqrt{x} + 1}{\sqrt{x}} = \frac{x+1}{\sqrt{x}}$$

2 (c) (ii)

$$\left(\frac{2\sqrt{x}}{1+x}\right)\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) = \left(\frac{2\sqrt{x}}{x+1}\right)\left(\frac{x+1}{\sqrt{x}}\right) = 2$$

2 (c) (iii)

$$\left(\frac{2\sqrt{x}}{1+x}\right)\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) = x - 3 \Rightarrow 2 = x - 3$$

$$\therefore x = 5$$

2004

3 (a) Solve for x

$$2x = 3(5 - x).$$

SOLUTION

$$2x = 3(5 - x) \Rightarrow 2x = 15 - 3x$$

$$\Rightarrow 2x + 3x = 15$$

$$\Rightarrow 5x = 15$$

$$\Rightarrow x = \frac{15}{5} = 3$$

Multiply every term by every term and then tidy up by adding and subtracting like terms.

2002

2 (a) Solve for x : $\frac{x-7}{2} = \frac{x+3}{6}$.

SOLUTION

$$\frac{x-7}{2} = \frac{x+3}{6} \text{ [Multiply each side by 6.]}$$

$$\Rightarrow \frac{6(x-7)}{2} = \frac{6(x+3)}{6} \Rightarrow 3(x-7) = 1(x+3)$$

$$\Rightarrow 3x - 21 = x + 3$$

$$\Rightarrow 3x - x = 3 + 21$$

$$\Rightarrow 2x = 24 \Rightarrow x = 12$$

1999

2 (a) Solve for x

$$2(x+8) = 7x.$$

SOLUTION

$$2(x+8) = 7x \text{ [Multiply out the brackets.]}$$

$$\Rightarrow 2x + 16 = 7x \text{ [Bring the } x \text{ terms to the right.]}$$

$$\Rightarrow 16 = 7x - 2x \text{ [Add the } x \text{ terms.]}$$

$$\Rightarrow 16 = 5x \text{ [Isolate the } x \text{ by dividing both sides by 5.]}$$

$$\therefore x = \frac{16}{5}$$

1997

2 (a) Solve for x

$$3(2x - 1) = 4x.$$

SOLUTION

$$3(2x - 1) = 4x \text{ [Multiply out the brackets.]}$$

$$\Rightarrow 6x - 3 = 4x \text{ [Bring the } x \text{ terms to the left and the numbers to the right.]}$$

$$\Rightarrow 6x - 4x = 3 \text{ [Add like terms.]}$$

$$\Rightarrow 2x = 3 \text{ [Divide both sides by 2.]}$$

$$\Rightarrow x = \frac{3}{2}$$