

SAMPLE PAPER 2: PAPER 1

QUESTION 1 (25 MARKS)

Question 1 (a) (i)

$$f(x) = \frac{x-3}{2}$$

$$f(1) = \frac{1-3}{2} = \frac{-2}{2} = -1$$

$$f(2) = \frac{2-3}{2} = \frac{-1}{2} = -\frac{1}{2}$$

$$f(5) = \frac{5-3}{2} = \frac{2}{2} = 1$$

Question 1 (b)

$$\begin{aligned} f(x) + g(x) &= \frac{x-3}{2} + \frac{2x-1}{3} \\ &= \frac{3(x-3) + 2(2x-1)}{6} \\ &= \frac{3x-9+4x-2}{6} \\ &= \frac{7x-11}{6} \end{aligned}$$

Question 1 (c)

$$6(f(x) + g(x)) + 11 = x^2 + 12$$

$$6\left(\frac{7x-11}{6}\right) + 11 = x^2 + 12$$

$$7x - 11 + 11 = x^2 + 12$$

$$7x = x^2 + 12$$

$$x^2 - 7x + 12 = 0$$

$$(x-3)(x-4) = 0$$

$$\therefore x = 3, 4$$

Question 1 (a) (ii)

$$g(x) = \frac{2x-1}{3}$$

$$g(1) = \frac{2(1)-1}{3} = \frac{1}{3}$$

$$g(2) = \frac{2(2)-1}{3} = \frac{3}{3} = 1$$

$$g(5) = \frac{2(5)-1}{3} = \frac{9}{3} = 3$$

$$f(x) + g(x) = 4$$

$$\therefore \frac{7x-11}{6} = 4$$

$$7x - 11 = 24$$

$$7x = 24 + 11 = 35$$

$$x = \frac{35}{7} = 5$$

Verify your answer: $f(5) + g(5) = 1 + 3 = 4$