

1 Solve $\frac{1}{2x-1} + \frac{3}{x-1} = 1$

Give your answer in the form $\frac{p \pm \sqrt{q}}{2}$ where p and q are integers.

$$\frac{1}{2x-1} + \frac{3}{x-1} = 1$$

cross multiply

$$\frac{1(x-1) + 3(2x-1)}{(2x-1)(x-1)} = 1 \quad \checkmark \textcircled{1}$$

$$x-1 + 6x-3 = (2x-1)(x-1)$$

$$7x-4 = 2x^2 - 3x + 1$$

$$0 = 2x^2 - 10x + 5 \quad \checkmark \textcircled{1}$$

quadratic formula

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

$$\frac{10 \pm \sqrt{(-10)^2 - (4 \times 2 \times 5)}}{2 \times 2} \quad \checkmark \textcircled{1}$$

$$= \frac{10 \pm \sqrt{100 - 40}}{4}$$

$$\frac{10 \pm \sqrt{60}}{4}$$

$\div 2$

$$\frac{5 \pm \sqrt{15}}{2} \quad \checkmark \textcircled{1}$$

$$\frac{5 \pm \sqrt{15}}{2}$$

roots can only \div with

roots. Have to do

$$\sqrt{60} \div \sqrt{4}$$

$$\downarrow = \sqrt{15}$$

(Total for Question 1 is 4 marks)