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 ✓①

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

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

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

$0 = 2x^2 - 10x + 5$ ✓①

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

$\frac{10 \pm \sqrt{(-10)^2 - (4\times2\times5)}}{2\times2}$ ✓①

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

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

÷2

roots can only ÷ with roots. Have to do

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

$= \sqrt{15}$

$\frac{5 \pm \sqrt{15}}{2}$ ✓①

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

(Total for Question 1 is 4 marks)