$BC = (\sqrt{3}-1)^2 - \sqrt{16} + \sqrt{75}$

$= 3 - 2\sqrt{3} + 1 - \sqrt{4^2} + \sqrt{5^2 \times 3}$

$= 4 - 2\sqrt{3} - 4 + 5\sqrt{3}$

$BC = 3\sqrt{3}$ units

To check if Δ is right apply converse of pythagorean theorem: longest side$^2 \overset{?}{=} leg_1^2 + leg_2^2$

$AC^2 \overset{?}{=} BC^2 + BA^2$.

$36 \overset{?}{=} 9 + 27$.

$36 = 36$

$AC = 6 = \sqrt{36}$

$AB = 3 = \sqrt{9}$

$BC = 3\sqrt{3} = \sqrt{27}$.

So, ΔABC is right at B.

but smallest side $(AB) = \frac{1}{2}$ hyp (AC)

Thus, ΔABC is semi-equilateral True.

4) Take L.H.S: $\frac{\sin\alpha}{1+\cos\alpha} + \frac{1+\cos\alpha}{\sin\alpha} = \frac{\sin^2\alpha + (1+\cos\alpha)^2}{\sin\alpha(1+\cos\alpha)}$.

$= \frac{\sin^2\alpha + 1 + 2\cos\alpha + \cos^2\alpha}{\sin\alpha(1+\cos\alpha)}$ but $\cos^2\alpha + \sin^2\alpha = 1$

$= \frac{2 + 2\cos\alpha}{\sin\alpha(1+\cos\alpha)}$.

$= \frac{2(1+\cos\alpha)}{\sin\alpha(1+\cos\alpha)}$

$= \frac{2}{\sin\alpha} = R.H.S$ True

5) $\frac{x}{\sqrt{5}-1} = \frac{\sqrt{5}-1}{x}$ $(x \neq 0)$

So, $x^2 = (\sqrt{5}-1)^2$

$x^2 - (\sqrt{5}-1)^2 = 0$

$(x - \sqrt{5} + 1)(x + \sqrt{5} - 1) = 0$

So $x = \sqrt{5} - 1 \simeq 1.23$

or $x = 1 - \sqrt{5} \simeq -1.23$.

$\left(\frac{3x-5}{2} - \frac{x+3}{3} \leq 2\right) \times 6$.

$3(3x-5) - 2(x+3) \leq 2(6)$

$7x - 21 \leq 12$

$x \leq \frac{33}{7}$. $\frac{33}{7} \simeq 4.714$

Since both roots of given eqn are less than $\frac{33}{7}$, then both roots satisfy inequality. True