Answer on Question#37228

How to compare the following numbers without using the calculator?

$\sqrt{5}-\sqrt{3}$ and $\sqrt{8-2\sqrt{15}}$

Solution.

Consider the second number. Let's isolate a perfect square:

$$8-2\sqrt{15}=5-2\sqrt{15}+3=\sqrt{5}^2-2\cdot\sqrt{5}\cdot\sqrt{3}+\sqrt{3}^2=\left(\sqrt{5}-\sqrt{3}\right)^2$$

So

$$\sqrt{8-2\sqrt{15}}=\sqrt{\left(\sqrt{5}-\sqrt{3}\right)^2}=\left|\sqrt{5}-\sqrt{3}\right|=\sqrt{5}-\sqrt{3}$$

We can see that $\sqrt{5}-\sqrt{3}=\sqrt{8-2\sqrt{15}}$

Answer: $\sqrt{5}-\sqrt{3}=\sqrt{8-2\sqrt{15}}$