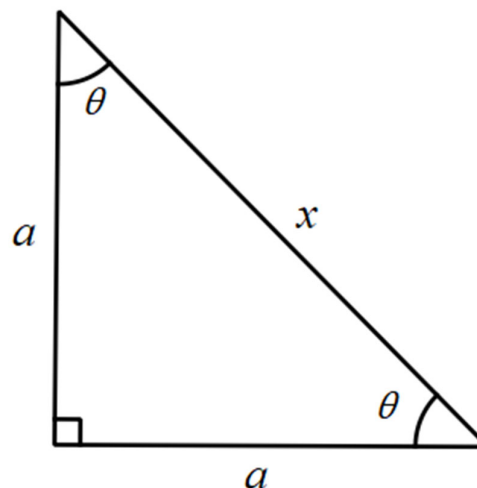


## Part A: Exact values of trigonometric ratios for $45^\circ$

Consider the isosceles triangle:



a) If the length of both equal sides is  $a$ , use Pythagoras theorem to find the length of the hypotenuse  $x$

b) Show that  $\theta = 45^\circ$ .

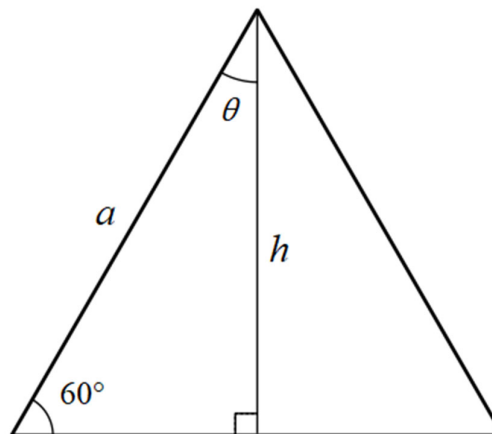
c) Show that  $\sin 45 = \frac{1}{\sqrt{2}}$  (which, once rationalised, is equal to  $\frac{\sqrt{2}}{2}$ )

d) Show that  $\cos 45 = \frac{1}{\sqrt{2}}$  (which, once rationalised, is equal to  $\frac{\sqrt{2}}{2}$ )

e) Show that  $\tan 45 = 1$

## Part B: Exact values of trigonometric ratios for $30^\circ$ and $60^\circ$

Consider the equilateral triangle:



a) Show that  $\theta = 30^\circ$

b) If the length of each side is  $a$ , use Pythagoras theorem to find the length of the height  $h$

c) Using SOHCAHTOA, show that  $\sin 30 = \frac{1}{2}$  and that  $\cos 30 = \frac{\sqrt{3}}{2}$

d) Likewise, show that  $\sin 60 = \frac{\sqrt{3}}{2}$  and that  $\cos 60 = \frac{1}{2}$

e) Using results from c) and d) above, find the exact values of  $\tan 30$  and of  $\tan 60$