Mathematics 11U

5.2 – Special Triangles

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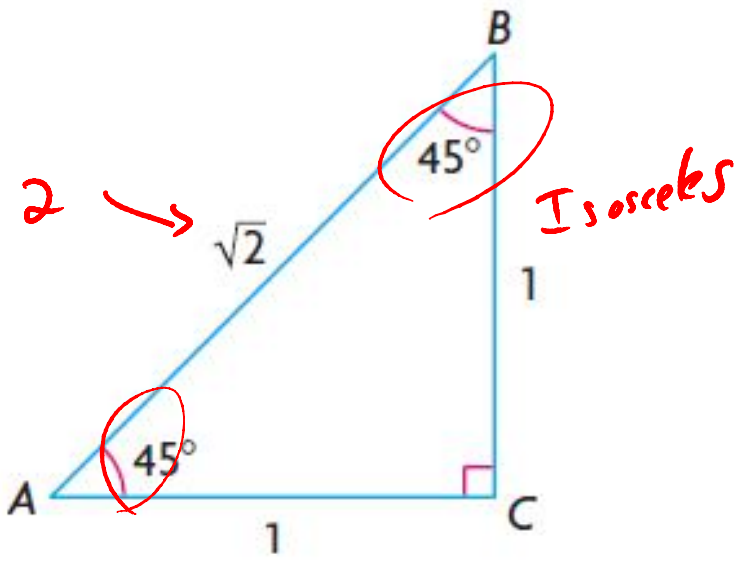
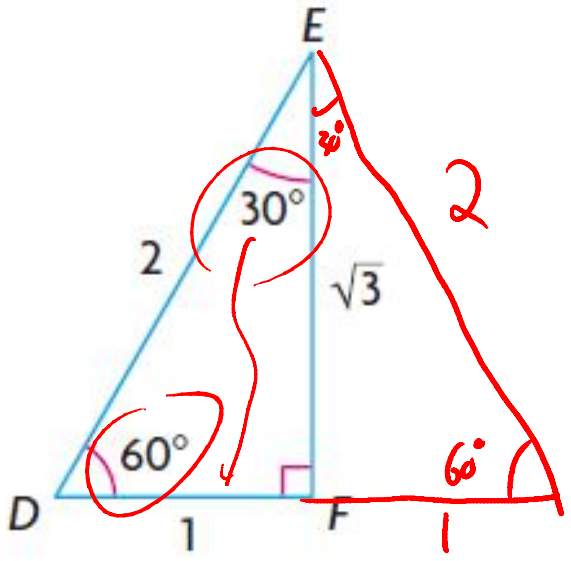
There are two special triangles: Exact value = no decimal



$1^2+1^2=2$ → Isosceles



θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
30°	$\frac{1}{2} = 0.5$	$\frac{\sqrt{3}}{2} \doteq 0.8660$	$\frac{\sqrt{3}}{3} \doteq 0.5774$
45°	$\frac{\sqrt{2}}{2} \doteq 0.7071$	$\frac{\sqrt{2}}{2} \doteq 0.7071$	1
60°	$\frac{\sqrt{3}}{2} \doteq 0.8660$	$\frac{1}{2} = 0.5$	$\frac{\sqrt{3}}{1} \doteq 1.7321$

$\sin 45 = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan 30 = \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

MUST MEMORIZE

Determine the exact values of the following:

1. $\sin 30 + \cos^2 45 - \tan 45$

$= (\cos 45)^2$

$= \frac{1}{2} + \left(\frac{\sqrt{2}}{2}\right)^2 - 1$

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

$= \frac{1}{2} + \frac{2}{4} - 1$

$= 1 - 1 = 0$!!

2. $\tan 30 \times \csc 60 - \sec 60$

$= \frac{\sqrt{3}}{3} \times \frac{2}{\sqrt{3}} - 2$

$= \frac{2}{3} - 2$

$= \frac{2}{3} - \frac{6}{3} = \frac{-4}{3}$

Determine the exact values of the following:

3. $\sin^2 60 + \cos^2 60$

$$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

Determine the following angle:

4. $\sqrt{2}\sin\theta = 1$

$$\frac{\sqrt{2}}{\sqrt{2}}$$

$$\sin\theta = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$\sin\theta = \frac{\sqrt{2}}{2} \qquad \theta = 45^\circ$$