Lesson 2.1.2

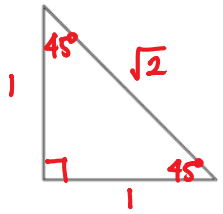
Saturday, February 4, 2017 4:35 PM

For angles of 30°, 45°, and 60°, you can determine the exact values of trigonometric ratios.

$1^2+1^2=c^2$

$2=c^2$

$\sqrt{2}=c$



$\sin 45^\circ = \frac{1}{\sqrt{2}}$

$\cos 45^\circ = \frac{1}{\sqrt{2}}$

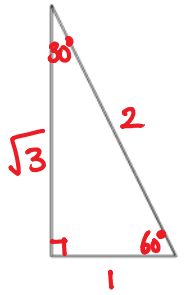
$\tan 45^\circ = \frac{1}{1} = 1$

$2^2-1^2=a^2$

$4-1=a^2$

$3=a^2$

$\sqrt{3}=a$



$\sin 30^\circ = \frac{1}{2}$

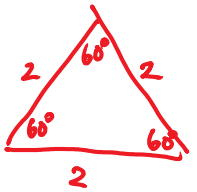
$\cos 30^\circ = \frac{\sqrt{3}}{2}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$

$\sin 60^\circ = \frac{\sqrt{3}}{2}$

$\cos 60^\circ = \frac{1}{2}$

$\tan 60^\circ = \frac{\sqrt{3}}{1} = \sqrt{3}$



Example 1: Find the smallest positive angle θ which satisfies each equation:

a. $\sin\theta = \frac{1}{\sqrt{2}}$

$\theta = 45^\circ$

b. $\tan\theta = 1$

$\theta = 45^\circ$

c. $\cos\theta = \frac{\sqrt{3}}{2}$

$\theta = 30^\circ$

d. $\tan\theta = \frac{1}{\sqrt{3}}$

$\theta = 30^\circ$

e. $\cos\theta = \frac{1}{2}$

$\theta = 60^\circ$

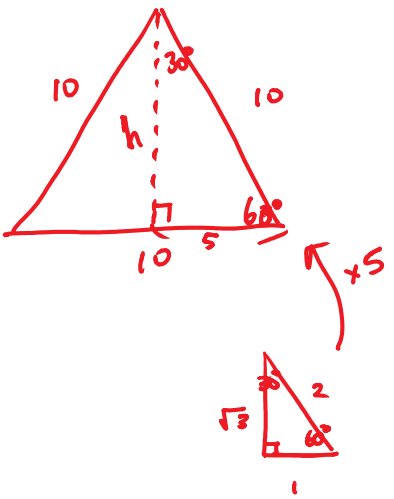
f. $\sin\theta = \frac{1}{2}$

$\theta = 30^\circ$

g. $\tan\theta = \sqrt{3}$

$\theta = 60^\circ$

Example 2: Find the area of an equilateral triangle with sides 10 cm in length.



$\therefore h = 5\sqrt{3}$

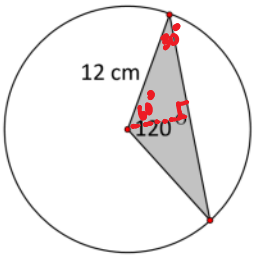
$$A = \frac{b \times h}{2}$$

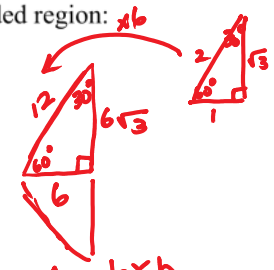
$$= \frac{10 \times 5\sqrt{3}}{2}$$

$$= 25\sqrt{3} \text{ cm}^2$$

$$\simeq 43.3 \text{ cm}^2$$

Example 3: Find the area of the shaded region:



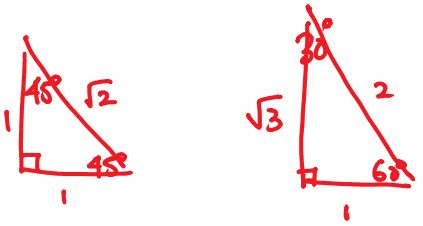


$$A = \frac{b \times h}{2}$$

$$= \frac{2(6\sqrt{3}) \times 6}{2}$$

$$= \frac{\cancel{12}^{6}\sqrt{3} \times 6}{\cancel{2}}$$

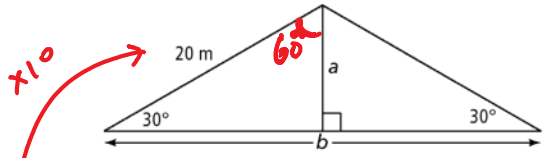
$$= 36\sqrt{3} \text{ cm}^2$$



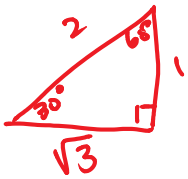
Example 4: Determine the exact value of each indicated side.

↳ No decimals

a) side a, side b

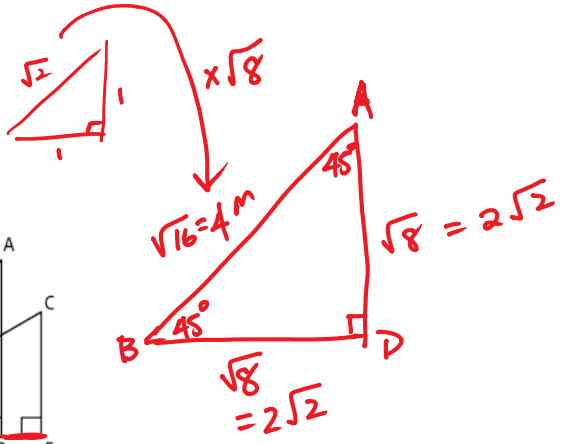


×10

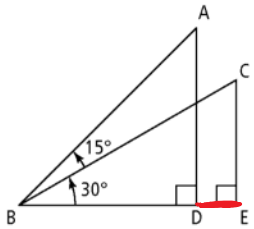


$a = 1 \times 10 = 10\text{ m}$

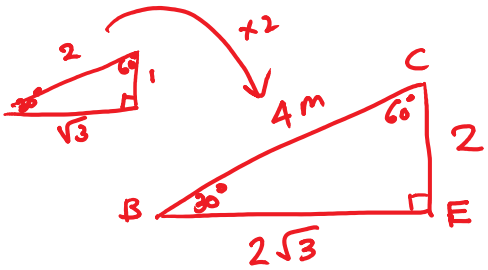
$b = 10\sqrt{3} \times 2 = 20\sqrt{3}\text{ m}$



b) DE



AB = BC = 4 m



$DE = BE - BD$

$= 2\sqrt{3} - 2\sqrt{2}$ ← either ok

$= 2(\sqrt{3} - \sqrt{2})\text{ m}$

Assignment: pg. 83 #8, 11, 13, 15-17, 20, 21