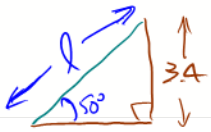
MCR3U - Chapter 5: Trigonometric Ratios - Practice

1. A ladder is leaning against a 3.4 m tall building at an angle of elevation of 50°. Determine the length of the ladder to the nearest tenth of a metre.

   a. 3.9 m
   b. 3.0 m
   c. 4.4 m
   d. 5.3 m



$\sin(50) = \frac{3.4}{l}$

$\Rightarrow l = \frac{3.4}{\sin(50)} = 4.4\text{ m}$

2. Determine the value of θ to the nearest degree if $\cot\theta = 0.75$.

   a. 53°
   b. 37°
   c. 45°
   d. 42°

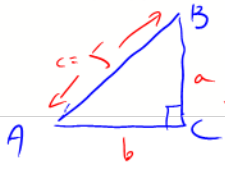
$\cot(\theta) = 0.75$

$\Rightarrow \tan(\theta) = \frac{1}{0.75} = 1.\dot{3}$

$\Rightarrow \theta = \tan^{-1}(1.\dot{3}) = 53°$

3. The hypotenuse, c, of right $\triangle ABC$ is 5.0 cm long. Given the trigonometric ratio $\cos A = 0.75$ for angle A, what is the area of the triangle to the nearest tenth of a cm²?

   a. 5.4 cm
   b. 6.2 cm
   c. 7.3 cm
   d. 8.0 cm



$\cos A = \frac{b}{c}$

$\Rightarrow 0.75 = \frac{b}{5}$

base: $b = (5)(0.75) = 3.75$

height: $a^2 = c^2 - b^2$

$\Rightarrow a = \sqrt{5^2 - 3.75^2}$

$= 3.3$

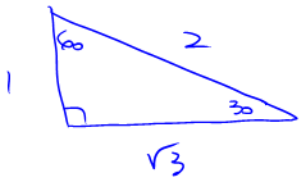
$A = \frac{1}{2}bh$

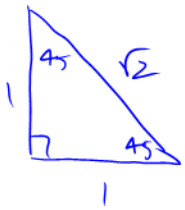
$= \frac{1}{2}(3.75)(3.3)$

$\doteq 6.2\text{ cm}^2$

4. Determine the exact value of $\tan^2 45° - \cos 30°$.

   a. $2 - \frac{\sqrt{3}}{2}$
   b. $1 + \frac{\sqrt{3}}{2}$
   c. $1 - \sqrt{3}$
   d. $\frac{2-\sqrt{3}}{2}$

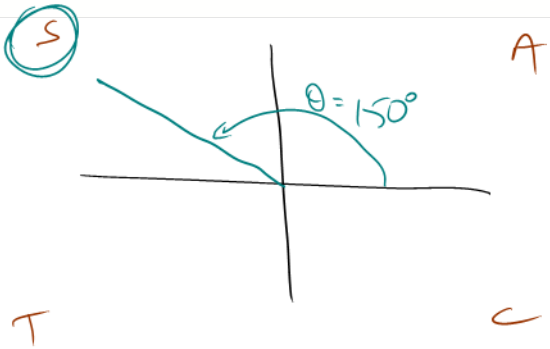




$\tan^2(45) - \cos(30) = \left(\frac{1}{1}\right)^2 - \frac{\sqrt{3}}{2} = \frac{1}{1} - \frac{\sqrt{3}}{2} = \frac{2-\sqrt{3}}{2}$ (common denom)

5. For the angle $\theta = 150°$ moving counter-clockwise in standard position, determine which primary trigonometric ratio is positive.

   a. sine
   b. cosine
   c. tangent
   d. none are positive



150° is a quadrant 2 angle

⇒ sine is positive!

6. Use the trigonometric ratio $\sin\theta = -0.2761$ to determine which of the following is the correct value of θ to the nearest degree if $0° \le \theta \le 360°$.

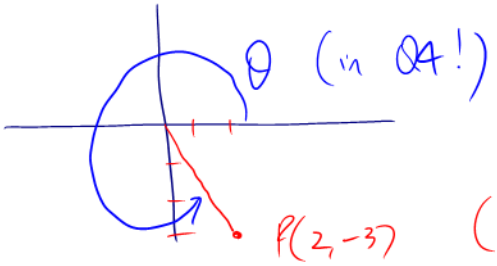
a. 164°
b. 82°
c. 16°
d. 344°

Note: no need to calculate for this one: Sine is negative in Q3 or Q4

a) is Q2, b) is Q1, c) is Q1, d is Q4

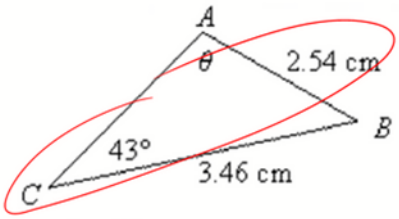
7. $P(2,-3)$ lies on the terminal arm of an angle in standard position. What is the value of the principal angle θ to the nearest degree?

a. 56° Q1
b. 146° Q2
c. 236° Q3
d. 304° Q4



d. 304° is the only option for Q4.

8. Determine the measure of the angle θ to the nearest degree.



BOOM SINE LAW

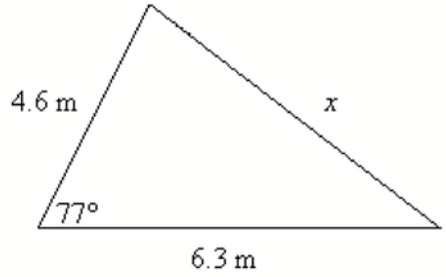
$$\frac{\sin(\theta)}{3.46} = \frac{\sin(43)}{2.54}$$

$$\Rightarrow \theta = \sin^{-1}\left(\frac{(3.46)(\sin(43))}{2.54}\right)$$

$$\doteq 68°$$

a. $\theta = 62°$
b. $\theta = 64°$
c. $\theta = 66°$
d. $\theta = 68°$

9. Determine x to the nearest tenth of a metre.



Not a right Δ ⇒ NOT SOH CAH TOA
No corresponding pair ⇒ NOT SINE LAW
} BOOM: COSINE LAW

$$x^2 = 6.3^2 + 4.6^2 - 2(6.3)(4.6)\cos(77)$$

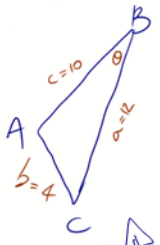
$$\Rightarrow x = \sqrt{\quad}$$

$$\doteq 6.9 \text{ m}$$

a. 7.5 m
b. 7.9 m
c. 6.2 m
d. 6.9 m

10. A woman has a triangular garden with side lengths of 10 m, 12 m, and 4 m. Determine the angle between the side lengths of 10 m and 12 m to the nearest degree.

a. 15°
b. 16°
c. 17°
d. 18°



No SOH CAH TOA
No SINE LAW
Boom: COSINE LAW (for angles!)

The cosine law - rearranged to isolate the angle.

$$\cos(B) = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\Rightarrow \cos(B) = \frac{12^2 + 10^2 - 4^2}{2(12)(10)}$$

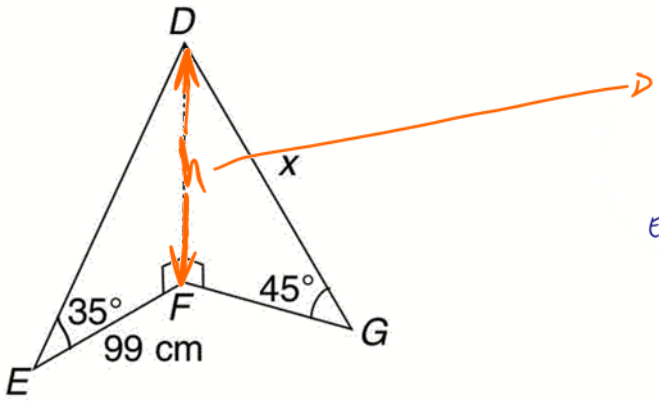
$$\Rightarrow B = \cos^{-1}\left(\frac{12^2 + 10^2 - 4^2}{2(12)(10)}\right) \doteq 18°$$

11. If 3 sides are known for a triangle, what piece of information can be found and what method is used?

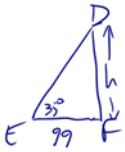
a. side, sine law
b. side, cosine law
c. angle, sine law
d. angle, cosine law

We found an angle in #10 above

12. Determine the value of x to the nearest cm.



Note: DF is common to both Δs! ⇒ Find it!



$$\tan(35) = \frac{h}{99}$$

$$\Rightarrow h = (99)(\tan(35)) \doteq 69.3$$

$$\sin(45) = \frac{69.3}{x}$$

$$\Rightarrow x = \frac{69.3}{\sin(45)} = 98 \text{ cm}$$

a. 47 cm
b. 68 cm
c. 74 cm
d. 98 cm