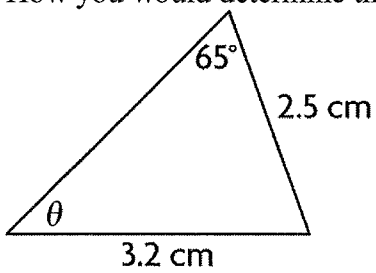
Unit 3 Practice Test Questions – Trigonometry

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How you would determine the indicated angle measure, if it is possible?

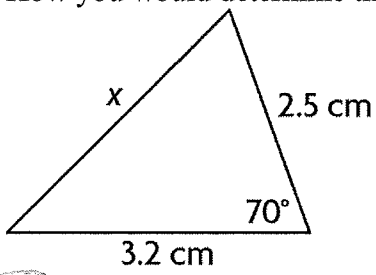


ASS = Sine law

$\frac{\sin\theta}{2.5} = \frac{\sin 65}{3.2}$

a. not possible
b. primary trigonometric ratios
c. the cosine law
d. the sine law

____ 2. How you would determine the indicated side length, if it is possible?



SAS = Cosine Law

$x^2 = 2.5^2 + 3.2^2 - 2(2.5)(3.2)\cos 70$

a. the cosine law
b. primary trigonometric ratios
c. not possible
d. the sine law

____ 3. Solve for the unknown side length. Round your answer to one decimal place.

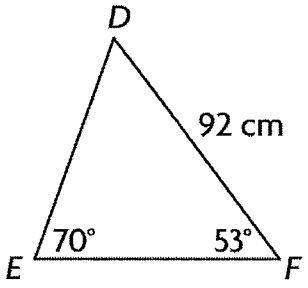
$\frac{q}{\sin 30°} = \frac{10.0}{\sin 80°}$

$\frac{10\sin 30}{\sin 80}$

a. 5.0
b. 5.1
c. 20.3
d. 0.5

$= 5.077$

____ 4. Determine the length of f to the nearest tenth of a centimetre.

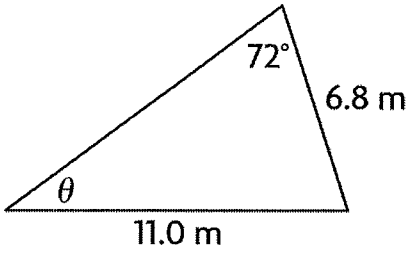


$$\frac{f}{\sin 53} = \frac{92}{\sin 70}$$

$$f = \frac{92 \sin 53}{\sin 70} = 78.2$$

a. 78.6 cm
b. 79.0 cm
c. 79.4 cm
d. 78.2 cm

____ 5. Determine the measure of θ to the nearest degree.



$$\frac{\sin\theta}{6.8} = \frac{\sin 72}{11.0}$$

$$\sin\theta = \frac{6.8 \sin 72}{11}$$

$$\sin\theta = .5879$$

$\theta = 36°$ OR $144°$ because 11 is longer than 6.8

a. 40°
b. 38°
c. 36°
d. 42°

____ 6. In ΔDEF, $d = 10.0$ cm, $e = 8.6$ cm, and $\angle E = 45°$.
Determine the measure of $\angle D$ to the nearest degree.

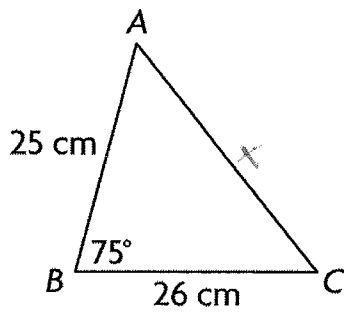
$$\frac{\sin D}{10} = \frac{\sin 45}{8.6} \qquad \sin D = \frac{10 \sin 45}{8.6}$$

a. 35°
b. 55°
c. 45°
d. 65°

____ 7. The proof of cosine law is based on which of the following

a. Angles in a Triangle Add to 180
b. Pythagorean Theorem
c. Slope (Rise over Run)
d. The Golden Ratio

8. Determine the length of AC to the nearest tenth of a centimetre.



$x^2 = 25^2 + 26^2 - 2(25)(26)\cos 75$

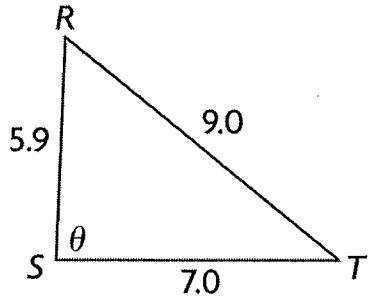
$x^2 = 964.5$

$x = 31.1$ cm

31.05696... rounds up!

a. 31.1 cm
b. 31.0 cm
c. 30.1 cm
d. 30.2 cm

9. Determine the measure of θ to the nearest degree.



$9^2 = 5.9^2 + 7^2 - 2(5.9)(7)\cos\theta$

$\frac{9^2 - 5.9^2 - 7^2}{-2(5.9)(7)} = \cos\theta$

$\theta = 88$

a. 88°
b. 86°
c. 84°
d. 90°

10. In ΔDEF, $d = 13.5$ cm, $e = 18.2$ cm, and $\angle F = 60°$.
Determine the measure of f to the nearest tenth of a centimetre.

$f^2 = 13.5^2 + 18.2^2 - 2(13.5)(18.2)\cos 60$

$f^2 = 267.79$

$f = 16.4$

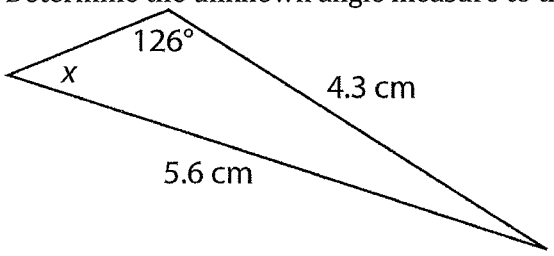
a. 17.0 cm
b. 16.4 cm
c. 16.6 cm
d. 16.8 cm

11. Which one of the following equations is valid?

.809

a. $\cos 36° = -\cos 144°$ .809 ✓
b. $\cos 36° = -\cos 36°$ -.809 ×
c. $\cos 36° = \cos 144°$ -.809 ×
d. none of the above

___ 12. Determine the unknown angle measure to the nearest degree.



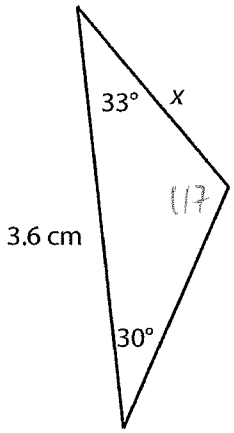
$\frac{\sin X}{4.3} = \frac{\sin 126}{5.6}$

$\sin X = \frac{4.3 \sin 126}{5.6}$

$X = 38°$ OR ~~142~~

a. 24°
b. 54°
c. 38°
d. none of these

___ 13. Determine the unknown side length to the nearest centimetre.



$\frac{x}{\sin 30} = \frac{3.6}{\sin 117}$

$x = 2.02$

a. 2.5 cm
b. 1.8 cm
c. 2.3 cm
d. 2.0 cm

___ 14. Which set of measurements will not produce a triangle?

a. $\angle A = 35°$, $a = 10.8$ m, $b = 8.0$ m
b. $\angle A = 35°$, $a = 3.5$ m, $b = 8.0$ m
c. $\angle A = 35°$, $a = 6.2$ m, $b = 8.0$ m
d. $\angle A = 35°$, $a = 4.6$ m, $b = 8.0$ m

8 / 35 ∴ h = 4.6

15. Which set of measurements will produce one right triangle with b as the hypotenuse?

a. $\angle A = 60°$, $a = 10.4$ m, $b = 12.0$ m
b. $\angle A = 60°$, $a = 11.6$ m, $b = 12.0$ m
c. $\angle A = 60°$, $a = 8.7$ m, $b = 12.0$ m
d. $\angle A = 60°$, $a = 14.5$ m, $b = 12.0$ m

12 / 60 ; $h = 10.4$

16. Which set of measurements can produce two possible triangles?

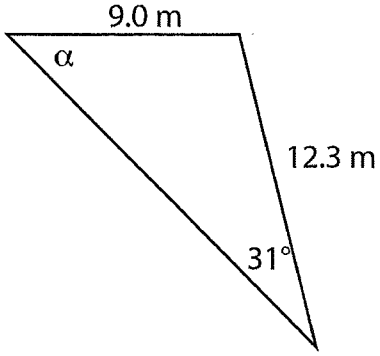
a. $\angle A = 48°$, $a = 4.2$ m, $b = 5.0$ m $h = 5 \sin 48 = 3.7$
b. $\angle A = 48°$, $a = 8.2$ m, $b = 13.0$ m
c. $\angle A = 48°$, $a = 5.2$ m, $b = 7.0$ m
d. $\angle A = 35°$, $a = 10.8$ m, $b = 8.0$ m

17. In $\angle EFG$, $\angle G = 32°$, $f = 9.5$ m, and $g = 12.5$ m.
Which statement is true for this set of measurements?

a. This is not a *SSA* situation.
b. This is a *SSA* situation; no triangle is possible.
c. This is a *SSA* situation; only one triangle is possible.
d. This is a *SSA* situation; two triangles are possible.

9.5 / 32 ; $h = 5$; 12.5

18. Determine the indicated angle measure to the nearest degree.



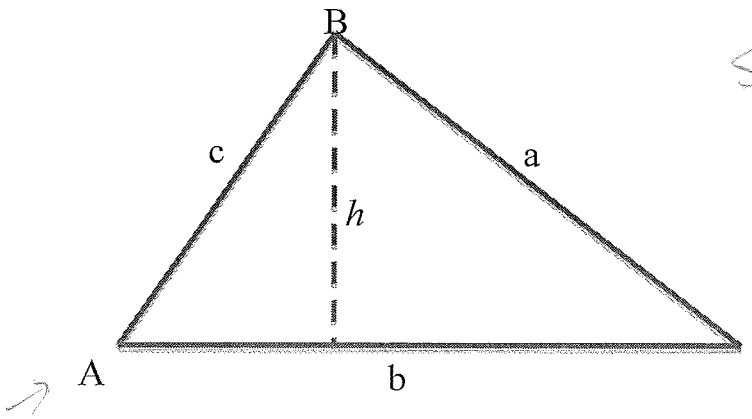
a. 45° or 135°
b. 35° or 145°
c. 31° or 149°
d. No possible answer

$$\frac{\sin \alpha}{12.3} = \frac{\sin 31}{9}$$

$$\sin \alpha = \frac{12.3 \sin 31}{9}$$

$\alpha = 44.7 \Rightarrow 45$ or $180 - 45 = 135$

1. Prove the Sine Law using the following triangle *(2 marks)*



$\sin A = \frac{h}{c}$ $\sin C = \frac{h}{a}$

$c\sin A = h$ $a\sin C = h$

$c\sin A = a\sin C$

$\frac{\sin A}{a} = \frac{\sin C}{c}$

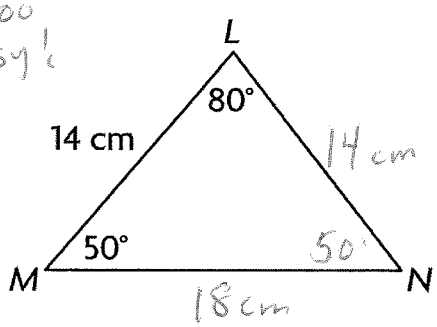
2. In ΔABC, $\angle A = 65°$, $a = 23.5$ cm, and $\angle C = 71°$. Determine the length of side c to the nearest tenth of a centimetre. *(2 marks)*

$\frac{c}{\sin 71} = \frac{23.5}{\sin 65}$

$c = 24.5\text{ cm}$

3. Solve the triangle (find all the missing sides and angles). Round angles to the nearest degree and sides to the nearest tenth of a centimetre. Show your work. *(3 marks)*

oops, too easy!



$l^2 = 14^2 + 14^2 - 2(14)(14)\cos 80$

$l = 18\text{ cm}$

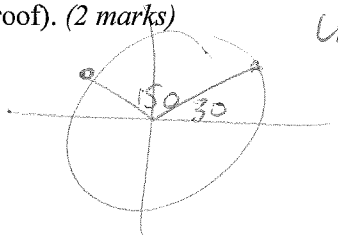
180-44

4. Write another sine ratio that is equivalent to sin 44°. *(1 mark)* sin136

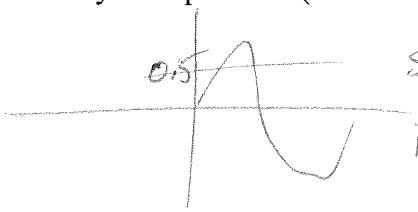
5. Determine two angles between 0° and 180° that have the sine ratio 0.8480. *(1 mark)*

58° 122°

6. Give a detailed explanation for **why** two different angles between 0° and 180° can have the same sine ratio and why that leads to ambiguous questions. Use pictures and words for your explanation (not a formal proof). *(2 marks)*

ex/ 

unit circle same heigh



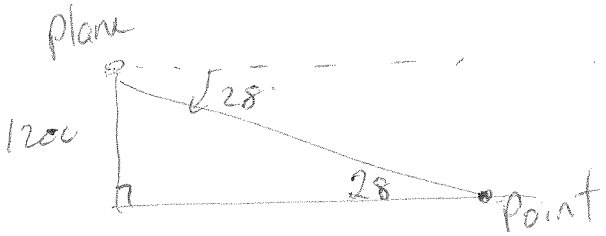
sine wave in cyclical

7. Determine if there are zero, one, or two possible triangles.

In ΔJKL, ∠J = 55, j =10.4km, k =11.6km.

∴ 2 possible triangles

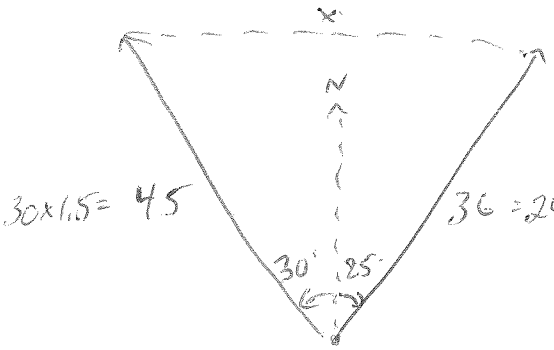
8. The pilot of an airplane in flight looks down at a point on the ground that is some distance away. The angle of depression is 28°, and the plane's altitude is 1200 meters. What is the distance from the pilot to the point on the ground?



$\frac{x}{\sin 90} = \frac{1200}{\sin 28}$

$x = 2556\text{ m}$

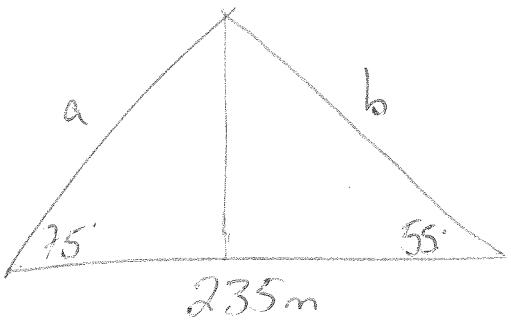
9. Two boats leave the dock at the same time. One is going an average of 30 km/h in the direction N30W, and the other is going an average of 24 km/h in the direction N25E. How far apart are the boats after 1.5 hours?



$x^2 = 45^2 + 36^2 - 2(45)(36)\cos 55$

$x = 38.2\text{ km}$

10. A radio tower is supported by two wires on opposite sides. On the ground, the ends of the wire are 235 m apart. One wire makes a 75° angle with the ground. The other makes a 55° angle with the ground. Draw a diagram of the situation. Then, determine the length of each wire to the nearest metre.



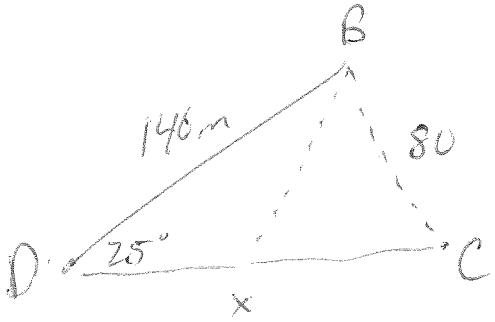
$$\frac{a}{\sin 55} = \frac{b}{\sin 75} = \frac{235}{\sin 50}$$

$a = 251$ m

$b = 296$ m

BONUS

11. A canoeist leaves the dock and paddles toward a buoy 140 m away. After reaching the buoy, she changes directions and paddles another 80 m. From the dock, the angle between the buoy and the canoeist's current position measures 25°. How far is the canoeist from the dock? Give two possible answers. Show your work.



$$\frac{\sin C}{140} = \frac{\sin 25}{80}$$

$C = 48°$ OR $132°$

Two Possible Answers

$$\frac{x}{\sin 107} = \frac{80}{\sin 25}$$

$x = 181$ m

OR

$$\frac{x}{\sin 23} = \frac{80}{\sin 25}$$

$x = 73$m