

SOLUTIONS \Rightarrow Chapter 4-Chapter Test (WORKBOOK)

MULTIPLE CHOICE

1. Which of the following equations is true?

A. $\sin 60^\circ = \sin 120^\circ$

C. $\sin 45^\circ = -\sin 135^\circ$

B. $\sin 80^\circ = -\sin 80^\circ$

D. all of these

2. Calculate $\tan 78^\circ$ to four decimal places.
Predict another expression that equals $\tan 78^\circ$.

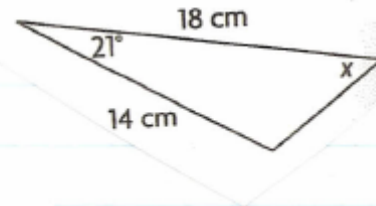
A. $-4.7046; \tan 102^\circ$

C. $4.7046; -\tan 78^\circ$

B. $4.7046; -\tan 102^\circ$

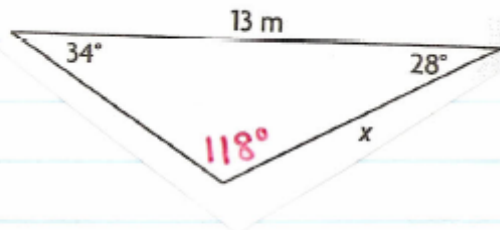
D. none of these

3. Which law or combination of laws would you use to determine the measure of x in this triangle?



- A. the cosine law, once
- B. the sine law, twice
- C. both the sine law and the cosine law
- D. neither the sine law nor the cosine law

4. Determine the length of x , to the nearest meter.



$$\frac{x}{\sin 34^\circ} = \frac{13}{\sin 118^\circ}$$

$$\frac{x \sin 118^\circ}{\sin 118^\circ} = \frac{13 \sin 34^\circ}{\sin 118^\circ}$$

$$x = 8.2 \text{ m or } 8 \text{ m}$$

- A. 118 m
- B. 15 m
- C. 11 m
- D. 8 m

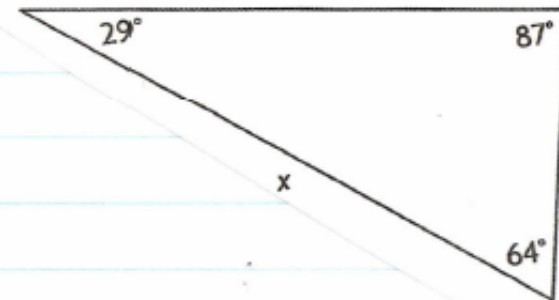
6. In $\triangle RST$, $\angle R = 29^\circ$, $s = 5.4$ m, and $t = 5.8$ m.

Which statement is true for this set of measurements?

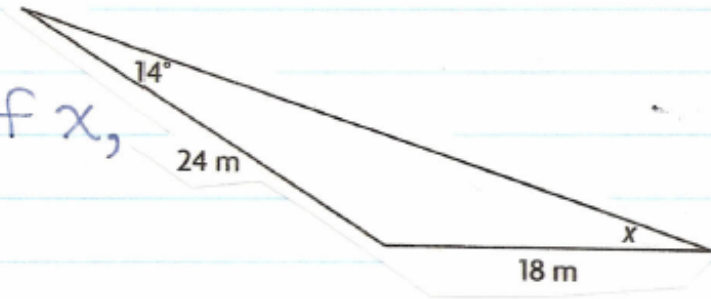
- A. This is an SSA situation; no triangle is possible.
- B. This is an SSA situation; only one triangle is possible.
- C. This is an SSA situation; two triangles are possible.
- D. This is not an SSA situation; only one triangle is possible. *missing "r"!

7. Which would you use to determine the length of x ?

- A. the primary trigonometric ratios
- B. the sine law
- C. the cosine law
- D. None of the above; x cannot be determined.



8. Determine the measure of x , to the nearest degree.



$$\frac{\sin x}{24} = \frac{\sin 14^\circ}{18}$$

$$\frac{18 \sin x}{18} = \frac{24 \sin 14^\circ}{18}$$

$$\sin x = 0.3226$$

$$x = \sin^{-1}(0.3226)$$

$$x = 19^\circ$$

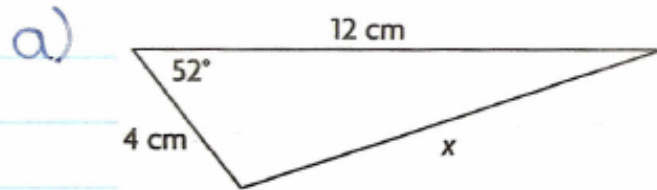
A. 10°

B. 19°

C. 11°

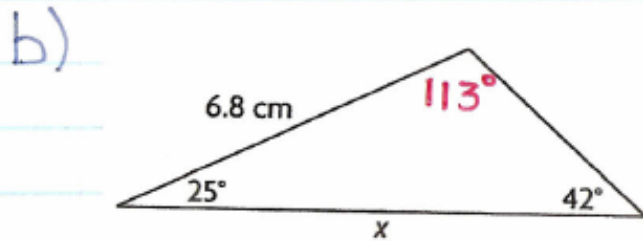
D. None of these;
 x cannot be determined.

9. Determine the length of x , to the nearest tenth of a centimeter.



$$x = \underline{10.0} \text{ cm}$$

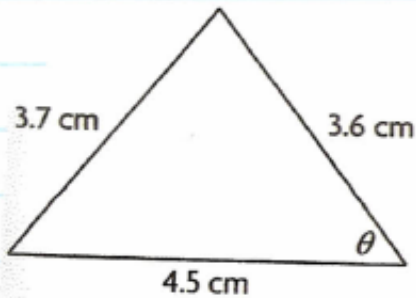
$$\begin{aligned} x^2 &= (4)^2 + (12)^2 - 2(4)(12)\cos 52^\circ \\ x^2 &= 16 + 144 - 96(0.6157) \\ x^2 &= 160 - 59.1072 \\ x^2 &= 100.8928 \\ x &= \sqrt{100.8928} \\ x &= 10.0 \text{ cm} \end{aligned}$$



$$x = \underline{9.4} \text{ cm}$$

$$\begin{aligned} \frac{x}{\sin 42^\circ} &= \frac{6.8}{\sin 113^\circ} \\ x \sin 113^\circ &= 6.8 \sin 42^\circ \\ x &= \frac{6.8 \sin 42^\circ}{\sin 113^\circ} \\ x &= 9.4 \text{ cm} \end{aligned}$$

10. Determine the measure of θ , to the nearest degree.



$$\theta = 53^\circ$$

$$\cos \theta = \frac{(4.5)^2 + (3.6)^2 - (3.7)^2}{2(4.5)(3.6)}$$

$$\cos \theta = \frac{20.25 + 12.96 - 13.69}{32.4}$$

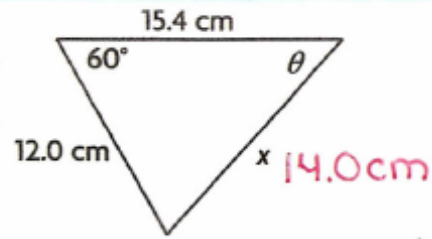
$$\cos \theta = \frac{19.52}{32.4}$$

$$\cos \theta = 0.6025$$

$$\theta = \cos^{-1}(0.6025)$$

$$\theta = 53^\circ$$

11. Determine the length of x to the nearest tenth of a centimeter and the measure of θ to the nearest degree.



$$x = \underline{14.0} \text{ cm} \quad \theta = \underline{48}^\circ$$

$$\begin{aligned} x^2 &= (12.0)^2 + (15.4)^2 - 2(12.0)(15.4)\cos 60^\circ \\ x^2 &= 144 + 237.16 - 369.6(0.5) \\ x^2 &= 381.16 - 184.8 \\ x^2 &= 196.36 \\ x &= \sqrt{196.36} \\ x &= 14.0 \text{ cm} \end{aligned}$$

$$\frac{\sin \theta}{12.0} = \frac{\sin 60^\circ}{14.0}$$

$$\frac{14.0 \sin \theta}{14.0} = \frac{12.0 \sin 60^\circ}{14.0}$$

$$\sin \theta = 0.7423$$

$$\theta = \sin^{-1}(0.7423)$$

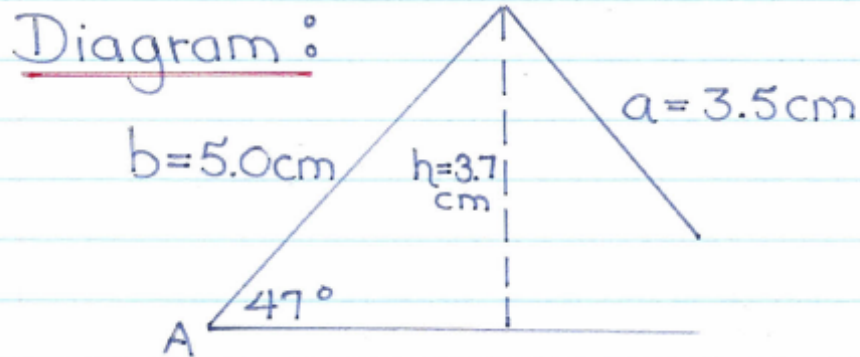
$$\theta = 48^\circ$$

12. In $\triangle ABC$, $\angle A = 47^\circ$, $a = 3.5\text{cm}$, and $b = 5.0\text{cm}$. Determine the number of triangles (zero, one, or two) that are possible. Draw a diagram to support your answer.

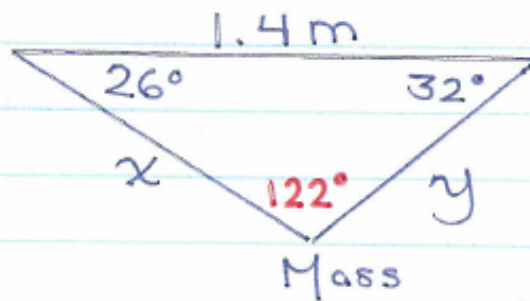
Since $\angle A$ is acute and $a < b$, I need to check the height "h".

$$\begin{aligned} \hookrightarrow h &= b \sin A \\ h &= 5.0 \sin 47^\circ \\ h &= 3.7\text{cm} \end{aligned}$$

* $a < h$, therefore no triangle is possible.



13. A mass is suspended on a length of a cord. The ends of the cord are attached to the ceiling 1.4 m apart. The angles formed by the ceiling and the cord are 26° and 32° . Determine the length of the cord, to the nearest tenth of a meter.



$$\frac{x}{\sin 32^\circ} = \frac{1.4}{\sin 122^\circ}$$

$$\frac{x \sin 122^\circ}{\sin 122^\circ} = \frac{1.4 \sin 32^\circ}{\sin 122^\circ}$$

$$x = 0.9 \text{ m}$$

$$\frac{y}{\sin 26^\circ} = \frac{1.4}{\sin 122^\circ}$$

$$\frac{y \sin 122^\circ}{\sin 122^\circ} = \frac{1.4 \sin 26^\circ}{\sin 122^\circ}$$

$$y = 0.7 \text{ m}$$

Total length
of cord:

$$0.9 \text{ m} + 0.7 \text{ m} = 1.6 \text{ m.}$$