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Ch 4 REVIEW: Oblique Triangle Trigonometry   /31
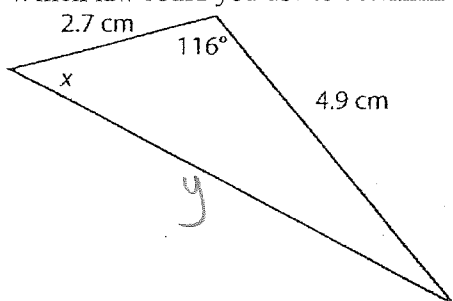
$$a^2 = b^2 + c^2 - 2bc\cos(A)$$

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

Multiple Choice: *Identify the choice that best completes the statement or answers the question.*
All work must be shown for full marks.

_____   **1.** (1 points)
Which law could you use to determine the unknown **side** in this triangle (most directly)?

2.7 cm   116° x 4.9 cm y

$y^2 = 2.7^2 + 4.9^2 - 2(2.7)(4.9)\cos 116°$
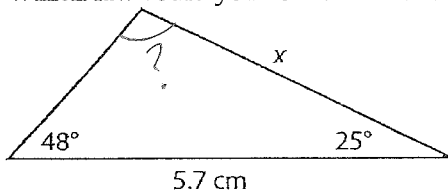
A. the sine law and the cosine law

B. the sine law only

C. neither the sine law nor the cosine law

D. the cosine law only

_____   **2.** (1 points)
Which law could you use to determine the unknown **angle measure** in this triangle, most directly?

? x 48°   25°   5.7 cm

just use 180° − 48° − 25°

A. neither the sine law nor the cosine law

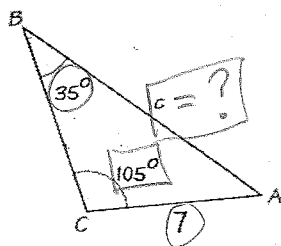**B.** the sine law only

C. the cosine law only

D. the sine law and the cosine law

_____   **3.** (2 points)
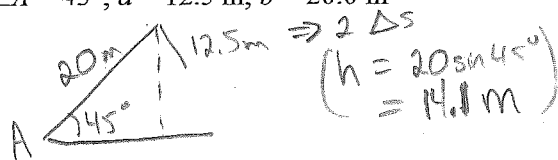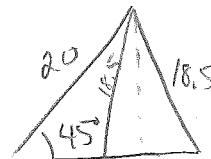Determine the unknown side length to the nearest centimetre. (is a multiple choice question on test)

→ next pg

$$\frac{c}{\sin 105°} = \frac{7}{\sin 35°}$$

$$c = \frac{7 \cdot \sin 105°}{\sin 35°} = \underline{12}$$

_____ **4.** (2 points)

Which set of measurements can produce only **one** possible triangle? Draw triangles to help you decide…

A. $\angle A = 45°$, $a = 12.5$ m, $b = 20.0$ m

$\Rightarrow 2\ \triangle s$

$\left(h = 20 \sin 45° = 14.1\, m \right)$

B. $\angle A = 45°$, $a = 14.1$ m, $b = 20.0$ m

$14.1 = h$

$\therefore\ 1\ \triangle$ (right angle)

C. $\angle A = 45°$, $a = 16.3$ m, $b = 20.0$ m

$2\ \triangle s$

D. $\angle A = 45°$, $a = 18.5$ m, $b = 20.0$ m

_____ **5.** (2 points)
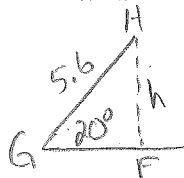
In $\triangle FGH$, $GH = 5.6$ cm and $G = 20°$.
What is the height of the triangle from <u>base</u> GF?

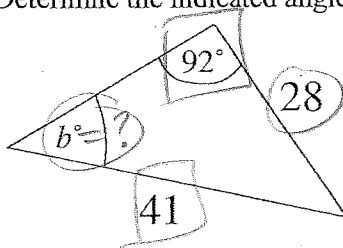**A.** 1.9 cm   **B.** 1.3 cm   **C.** 1.2 cm   **D.** 0.9 cm

$$h = 5.6 \sin 20° = 1.9$$

_____ **6.** (2 points)

Determine the indicated angle measure to the nearest degree.

$$\frac{\sin b}{28} = \frac{\sin 92°}{41}$$

$$b = \sin^{-1}\left(\frac{28 \sin 92°}{41}\right) = 43°$$

A. 32°   **B.** 43°   **C.** 102°   **D.** cannot be determined

Short Answer

7. (1 points)

Write another sine ratio that is equivalent to sin 78°.

$$180° - 78° = 102° \qquad = \sin(102°)$$

$$\sin 78° = 0.9781$$
$$\sin 102° = 0.9781$$

8. (2 points)

Calculate tan67° to four decimal places. Predict another angle that will have an equal or opposite trigonometric ratio.
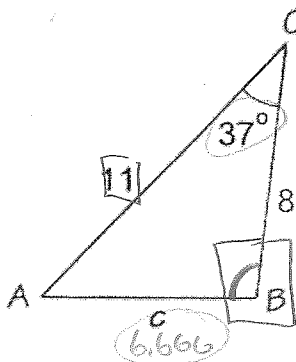
$$180° - 67° = 113°$$

$$\tan 113 = -2.3558$$

$$\frac{\tan 67°}{\cos 20°} = \underline{2.3558}$$

Another $< = \underline{113°}$

9. (2 points)

Determine angle B to the nearest degree.

$$c^2 = 11^2 + 8^2 - 2(11)(8)\cos 37°$$
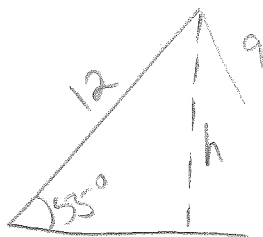
$$c = 6.666$$

$$\frac{\sin B}{11} = \frac{\sin 37°}{6.666}$$

$$B = 83.3°$$

10. (3 points)

In $\triangle ABC$, $\angle A = 55°$, $a = 9.0$ cm, and $b = 12.0$ cm. Determine the number of triangles (zero, one, or two) that are possible for these measurements. Draw the triangle(s) to support your answer.
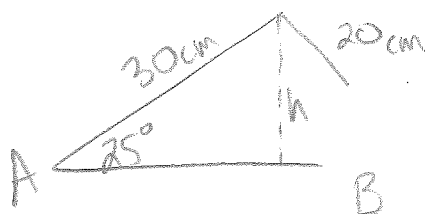

$$h = 12\sin 55$$
$$= 9.83 \text{ cm}$$

∴ zero △s since 9cm won't reach bottom (h ≥ 9.83cm)

11. (5 points)

In $\triangle ABC$, $\angle A = 25°$, $a = 20.0$ cm, and $b = 30.0$ cm. Determine the number of triangles (zero, one, or two) that are possible for these measurements. Draw the triangle(s) to support your answer. Calculate the length(s) of the 3rd side(s). Show your work.
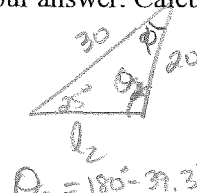

$$h = 30\sin 25°$$
$$= 12.68$$

∴ 2 △s   and

$$\phi = 180° - 25° - 140.7°$$
$$= 14.3°$$

$$\theta_2 = 180 - 39.3° = 140.7°$$

$$\frac{l_2}{\sin 14.3°} = \frac{20}{\sin 25}$$

$$l_2 = 11.7 \text{ cm}$$

$$\phi = 180 - 25 - 39.3 = 115.7$$

$$\frac{l_1}{\sin 115.7} = \frac{20}{\sin 25}$$

$$l_1 = 42.6 \text{ cm}$$

$$\frac{\sin \theta_1}{30} = \frac{\sin 25°}{20} \qquad \theta_1 = 39.3°$$

Number of triangles: $\underline{2}$

Length(s): $\underline{11.7\text{cm}, \ 42.6\text{cm}}$

Problems

12. (4 points)

In $\triangle QRS$, $q = 9.3$ m, $r = 3.2$ m, and $s = 7.1$ m. Solve $\triangle QRS$ by determining the measure of each angle to the nearest degree. Show your work and draw $\triangle QRS$.

$$9.3^2 = 7.1^2 + 3.2^2 - 2(7.1)(3.2)\cos Q$$

$$Q = 124.66 \rightarrow \underline{125°}$$
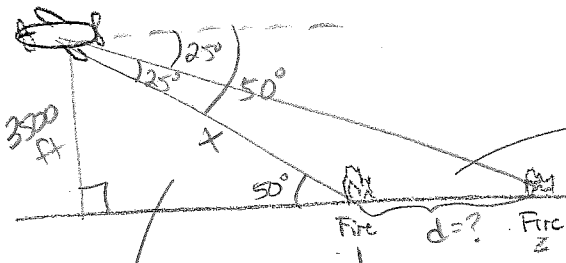
$$\frac{\sin R}{3.2} = \frac{\sin 124.66}{9.3}$$

$$R = 16.44°$$

$$\angle S = 180 - 125 - 16$$
$$= 39°$$

$\angle Q = \underline{125°}$

$\angle R = \underline{16°}$

$\angle S = \underline{39°}$

13. (4 points)
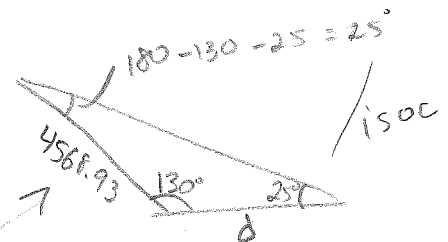
A pilot can see two forest fires through his windshield. From the airplane, the angle of depression to one fire is 50° and 25° to the other fire. The airplane is flying at an altitude of 3500 ft. What is the distance between the two fires to the nearest foot? Show your work.

$180 - 130 - 25 = 25°$

$$\sin 50° = \frac{3500}{x}$$

$$x = \frac{3500}{\sin 50}$$

$$x = 4568.93$$

$$\frac{d}{\sin 25} = \frac{4568.93}{\sin 25}$$

$$d = 4568.93$$

$$d = \underline{4568 \text{ ft}}$$