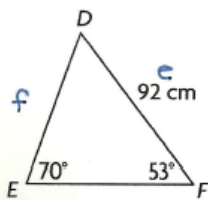


Foundations of Math 11 - Chapter 3 and Chapter 4 Exam Review

Multiple Choice

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

- D 1. Determine the length of f to the nearest tenth of a centimeter.



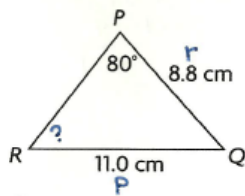
$$\frac{f}{\sin 53^\circ} = \frac{92}{\sin 70^\circ}$$

$$f \sin 70^\circ = 92 \sin 53^\circ$$

$$f = 78.2 \text{ cm}$$

- A) 78.6 cm
 B) 79.0 cm
 C) 79.4 cm
D) 78.2 cm

- A 2. Determine the measure of $\angle R$ to the nearest degree.



$$\frac{\sin R}{8.8} = \frac{\sin 80^\circ}{11.0}$$

$$4.0 \sin R = 8.8 \sin 80^\circ$$

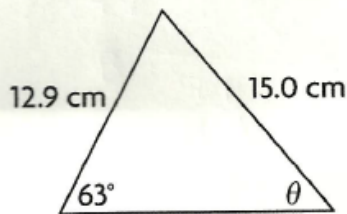
$$\sin R = 0.7878$$

$$R = \sin^{-1}(0.7878)$$

$$R = 52^\circ$$

- A) 52°
 B) 54°
 C) 50°
 D) 56°

- D 3. Determine the measure of θ to the nearest degree.



$$\frac{\sin \theta}{12.9} = \frac{\sin 63^\circ}{15.0}$$

$$\frac{15.0 \sin \theta}{15.0} = \frac{12.9 \sin 63^\circ}{15.0}$$

$$\sin \theta = 0.7663$$

$$\theta = \sin^{-1}(0.7663)$$

$$\theta = 50^\circ$$

- A) 30°
 B) 60°
 C) 40°
D) 50°

- A 4. In $\triangle DEF$, $\angle D = 61^\circ$, $d = 23.9$ cm, and $\angle E = 38^\circ$. Determine the length of side e to the nearest tenth of a centimeter.

- A) 16.8 cm
 B) 16.0 cm
 C) 17.6 cm
 D) 18.4 cm

$$\frac{e}{\sin 38^\circ} = \frac{d}{\sin 61^\circ}$$

$$\frac{e}{\sin 38^\circ} = \frac{23.9}{\sin 61^\circ}$$

$$e \sin 61^\circ = \frac{23.9 \sin 38^\circ}{\sin 61^\circ}$$

$$e = 16.8 \text{ cm}$$

- C 5. In $\triangle XYZ$, $\angle X = 51^\circ$, $x = 7.0$ cm, and $\angle Z = 41^\circ$. Determine the length of side y to the nearest tenth of a centimeter.

- A) 11.0 cm
 B) 10.0 cm
C) 9.0 cm
 D) 8.0 cm

$$\angle Y = 180^\circ - 51^\circ - 41^\circ$$

$$\angle Y = 88^\circ$$

$$\frac{y}{\sin 51^\circ} = \frac{x}{\sin 88^\circ}$$

$$\frac{y}{\sin 51^\circ} = \frac{7.0}{\sin 88^\circ}$$

$$y \sin 88^\circ = \frac{7.0 \sin 51^\circ}{\sin 88^\circ}$$

$$y = 9.0 \text{ cm}$$

- A 6. In $\triangle QRS$, $q = 10.0$ cm, $s = 9.0$ cm, and $\angle S = 61^\circ$. Determine the measure of $\angle Q$ to the nearest degree.
- (A) 76°
 B) 75°
 C) 78°
 D) 77°

$$\frac{\sin Q}{q} = \frac{\sin S}{s}$$

$$\frac{\sin Q}{10.0} = \frac{\sin 61^\circ}{9.0}$$

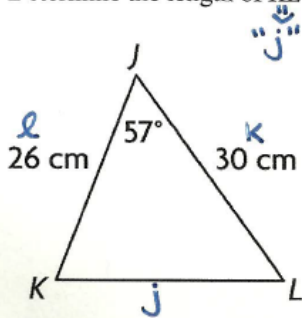
$$\frac{9.0 \sin Q}{9.0} = \frac{10.0 \sin 61^\circ}{9.0}$$

$$\sin Q = 0.9718$$

$$Q = \sin^{-1}(0.9718)$$

$$Q = 76^\circ$$

- A 7. Determine the length of KL to the nearest centimeter.



- (A) 27 cm
 B) 26 cm
 C) 34 cm
 D) 33 cm

$$j^2 = k^2 + l^2 - 2kl \cos J$$

$$j^2 = (30)^2 + (26)^2 - 2(30)(26) \cos 57^\circ$$

$$j^2 = 900 + 676 - 1560(0.5446)$$

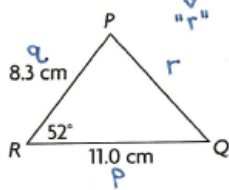
$$j^2 = 1576 - 849.5760$$

$$j^2 = 726.4240$$

$$j = \sqrt{726.4240}$$

$$j = 27.0 \text{ cm}$$

- D 8. Determine the length of PQ to the nearest tenth of a centimeter.



- A) 9.4 cm
 B) 9.1 cm
 C) 8.5 cm
D) 8.8 cm

$$r^2 = p^2 + q^2 - 2pq \cos R$$

$$r^2 = (11.0)^2 + (8.3)^2 - 2(11.0)(8.3) \cos 52^\circ$$

$$r^2 = 121 + 68.89 - 182.6(0.6157)$$

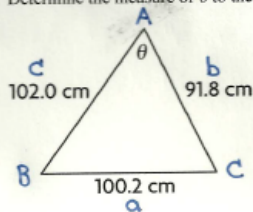
$$r^2 = 189.89 - 112.4268$$

$$r^2 = 77.4632$$

$$r = \sqrt{77.4632}$$

$$r = 8.8 \text{ cm}$$

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



- A) 60°
 B) 59°
 C) 61°
D) 62°

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos A = \frac{(91.8)^2 + (102.0)^2 - (100.2)^2}{2(91.8)(102.0)}$$

$$\cos A = \frac{8427.24 + 10404 - 10040.04}{18727.2}$$

$$\cos A = \frac{8791.2}{18727.2}$$

$$\cos A = 0.4694$$

$$A = \cos^{-1}(0.4694)$$

$$A = 62^\circ$$

- B 10. In $\triangle DEF$, $d = 13.5$ cm, $e = 18.2$ cm, and $\angle F = 60^\circ$. Determine the measure of f to the nearest tenth of a centimeter.

- A) 17.0 cm
B) 16.4 cm
 C) 16.6 cm
 D) 16.8 cm

$$f^2 = d^2 + e^2 - 2de \cos F$$

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

$$f^2 = 182.25 + 331.24 - 491.4(0.5000)$$

$$f^2 = 513.49 - 245.7$$

$$f^2 = 267.79$$

$$f = \sqrt{267.79}$$

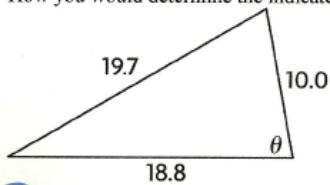
$$f = 16.4 \text{ cm}$$

- D 11. In $\triangle DEF$, $d = 23.9$ cm, $e = 16.8$ cm, and $f = 27.0$ cm. Determine the measure of $\angle D$ to the nearest degree.

- A) 54° B) 64° C) 58°

$$\begin{aligned} \cos D &= \frac{e^2 + f^2 - d^2}{2ef} \\ \cos D &= \frac{(16.8)^2 + (27.0)^2 - (23.9)^2}{2(16.8)(27.0)} \\ \cos D &= \frac{282.24 + 729 - 571.21}{907.2} \\ \cos D &= \frac{440.03}{907.2} \\ \cos D &= 0.4850 \\ D &= 61^\circ \end{aligned}$$

- A 12. How you would determine the indicated angle measure, if it is possible?



- A) the cosine law
 B) not possible
 C) primary trigonometric ratios
 D) the sine law

* All 3 sides \Rightarrow Law of Cosines

- A 13. Which one of the following equations is valid?

- A) $\cos 36^\circ = -\cos 144^\circ$
 B) $\cos 36^\circ = -\cos 36^\circ$
 C) $\cos 36^\circ = \cos 144^\circ$
 D) none of the above

* $\cos \theta = -\cos (180^\circ - \theta)$

- B 14. Calculate $\sin 16^\circ$ to four decimal places. Predict another term that equals $\sin 16^\circ$.

- A) -0.2756 ; $\sin 164^\circ$
 B) 0.2756 ; $\sin 164^\circ$
 C) 0.2756 ; $-\sin 16^\circ$
 D) none of the above

$\sin 16^\circ = 0.2756$
 * $\sin \theta = \sin (180^\circ - \theta)$
 $\sin 16^\circ = \sin 164^\circ$

- A** 15. Calculate $\tan 25^\circ$ to four decimal places. Predict another term that equals $\tan 20^\circ$.

- A) 0.4663; $-\tan 155^\circ$
 B) 0.4663; $\tan 155^\circ$
 C) -0.4663 ; $\tan 155^\circ$
 D) -0.4663 ; $-\tan 155^\circ$

$$\tan 25^\circ = 0.4663$$

$$* \tan \theta = -\tan(180^\circ - \theta)$$

$$\tan 25^\circ = -\tan 155^\circ$$

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

- A) $\angle A = 48^\circ$, $a = 4.2$ m, $b = 5.0$ m
 B) $\angle A = 48^\circ$, $a = 8.2$ m, $b = 13.0$ m
 C) $\angle A = 48^\circ$, $a = 5.2$ m, $b = 7.0$ m
 D) $\angle A = 35^\circ$, $a = 10.8$ m, $b = 8.0$ m

$$h = b \sin A \quad h = 5.0 \sin 48^\circ \quad h = 3.7$$

$$* \text{Since } h < a < b$$

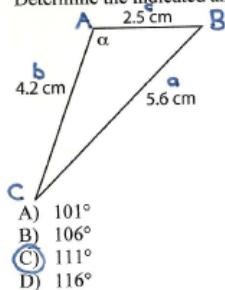
$$\hookrightarrow 2 \text{ possible triangles.}$$

- A** 17. In $\triangle PQR$, $\angle P = 18^\circ$, $q = 4.5$ m, and $r = 6.0$ 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.

* No "matching pair"

- C** 18. Determine the indicated angle measure to the nearest degree.



- A) 101°
 B) 106°
 C) 111°
 D) 116°

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos A = \frac{(4.2)^2 + (2.5)^2 - (5.6)^2}{2(4.2)(2.5)}$$

$$\cos A = \frac{17.64 + 6.25 - 31.36}{21}$$

$$\cos A = \frac{-7.47}{21}$$

$$\cos A = -0.3557$$

$$A = \cos^{-1}(-0.3557)$$

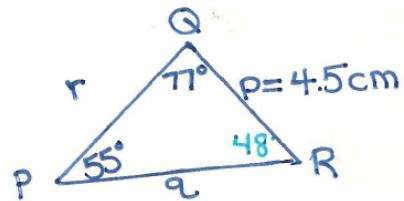
$$A = 111^\circ$$

Problem

19. In $\triangle PQR$, $\angle P = 55^\circ$, $\angle Q = 77^\circ$, and $p = 4.5$ cm.

Solve the triangle. Round angles to the nearest degree and sides to the nearest tenth of a centimeter.

Show your work.



$$\angle R = 180^\circ - 55^\circ - 77^\circ$$

$$\angle R = 48^\circ$$

$$\frac{q}{\sin 77^\circ} = \frac{p}{\sin 55^\circ}$$

$$\frac{q}{\sin 77^\circ} = \frac{4.5}{\sin 55^\circ}$$

$$q \sin 55^\circ = \frac{4.5 \sin 77^\circ}{\sin 55^\circ}$$

$$q = 5.4 \text{ cm}$$

$$\frac{r}{\sin 48^\circ} = \frac{p}{\sin 55^\circ}$$

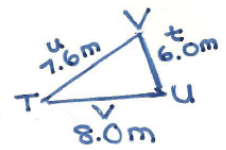
$$\frac{r}{\sin 48^\circ} = \frac{4.5}{\sin 55^\circ}$$

$$r \sin 55^\circ = \frac{4.5 \sin 48^\circ}{\sin 55^\circ}$$

$$r = 4.1 \text{ cm}$$

20. In $\triangle TUV$, $t = 6.0$ m, $u = 7.6$ m, and $v = 8.0$ m.

Solve the triangle. Round angles to the nearest degree and sides to the nearest tenth of a meter.
Show your work.



$$\cos T = \frac{u^2 + v^2 - t^2}{2uv}$$

$$\cos T = \frac{(7.6)^2 + (8.0)^2 - (6.0)^2}{2(7.6)(8.0)}$$

$$\cos T = \frac{57.76 + 64.0 - 36.0}{121.6}$$

$$\cos T = \frac{85.76}{121.6}$$

$$\cos T = 0.7053$$

$$T = 45^\circ$$

$$\cos V = \frac{t^2 + u^2 - v^2}{2tu}$$

$$\cos V = \frac{(6.0)^2 + (7.6)^2 - (8.0)^2}{2(6.0)(7.6)}$$

$$\cos V = \frac{36.0 + 57.76 - 64.0}{91.2}$$

$$\cos V = \frac{29.76}{91.2}$$

$$\cos V = 0.3263$$

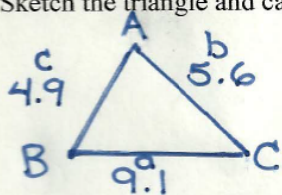
$$V = 71^\circ$$

$$U = 180^\circ - 45^\circ - 71^\circ$$

$$U = 64^\circ$$

21. A triangle has side lengths of 4.9 cm, 5.6 cm, and 9.1 cm.

Sketch the triangle and calculate the measure of the largest angle to the nearest degree. Show your work.



* Largest Angle is opposite largest Side.

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

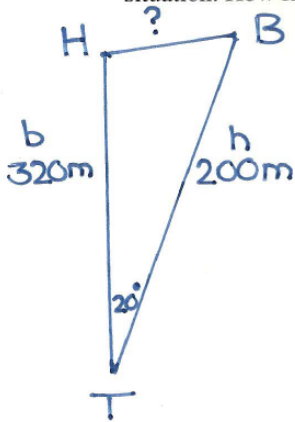
$$\cos A = \frac{(5.6)^2 + (4.9)^2 - (9.1)^2}{2(5.6)(4.9)}$$

$$\cos A = \frac{31.36 + 24.01 - 82.81}{54.88}$$

$$\cos A = \frac{-27.44}{54.88}$$

$$\cos A = -0.5000 \quad A = 120^\circ$$

22. While golfing, Valerie hits a tee shot from point T toward a hole at H . However, the ball veers 20° and lands at B . The scorecard says that H is 320 m from T . Valerie walks 200 m to her ball. Sketch a diagram of this situation. How far, to the nearest meter, is her ball from the hole? Show your work.



$$t^2 = b^2 + h^2 - 2bh \cos T$$

$$t^2 = (320)^2 + (200)^2 - 2(320)(200) \cos 20^\circ$$

$$t^2 = 102400 + 40000 - 128000(0.9397)$$

$$t^2 = 142400 - 120281.6$$

$$t^2 = 22118.4$$

$$t = \sqrt{22118.4}$$

$$t = 148.7\text{m} \Rightarrow 149\text{m}$$

Valerie's ball is 149 m from the hole.