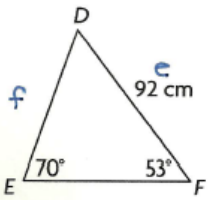
Foundations of Math 11 - Chapter 3 and Chapter 4 Exam Review

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.



$\frac{f}{\sin F} = \frac{e}{\sin E}$

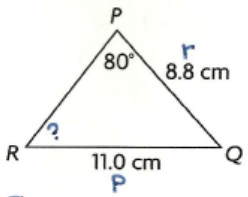
$\frac{f}{\sin 53^\circ} = \frac{92}{\sin 70^\circ}$

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

$f = 78.2 \text{ cm}$

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.



$\frac{\sin R}{r} = \frac{\sin P}{p}$

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

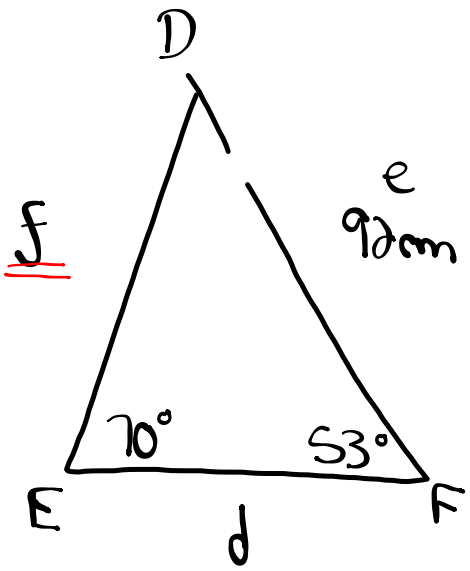
$\frac{11.0 \sin R}{11.0} = \frac{8.8 \sin 80^\circ}{11.0}$

$\sin R = 0.7878$

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

$R = 52^\circ$

(A) 52°
B) 54°
C) 50°
D) 56°



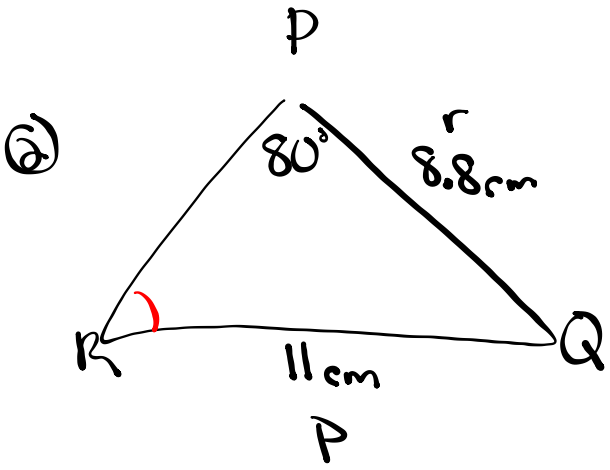
$$\frac{f}{\sin F} = \frac{e}{\sin E}$$

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

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

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

(2)



$$\frac{\sin R}{r} = \frac{\sin P}{p}$$

$$\frac{\sin R}{8.8} = \frac{\sin 80^\circ}{11}$$

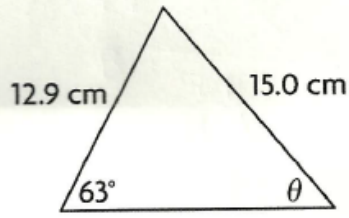
$$\frac{11 \sin R}{11} = \frac{8.8 \sin 80^\circ}{11}$$

$$\sin R = 0.7878$$

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

$$R = 52^\circ$$

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



$\frac{\sin\theta}{12.9} = \frac{\sin 63°}{15.0}$

$\frac{15.0\sin\theta}{15.0} = \frac{12.9\sin 63°}{15.0}$

$\sin\theta = 0.7663$

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

$\theta = 50°$

A) 30°
B) 60°
C) 40°
D) 50°

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

$\frac{e}{\sin E} = \frac{d}{\sin D}$

$\frac{e}{\sin 38°} = \frac{23.9}{\sin 61°}$

$\frac{e\sin 61°}{\sin 61°} = \frac{23.9\sin 38°}{\sin 61°}$

$e = 16.8$ cm

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

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

$\angle Y = 180° - 51° - 41°$

$\angle Y = 88°$

$\frac{y}{\sin Y} = \frac{x}{\sin X}$

$\frac{y}{\sin 88°} = \frac{7.0}{\sin 51°}$

$\frac{y\sin 51°}{\sin 51°} = \frac{7.0\sin 88°}{\sin 51°}$

$y = 9.0$ cm

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

A 6. In ΔQRS, $q = 10.0$ cm, $s = 9.0$ cm, and $\angle S = 61°$. Determine the measure of $\angle Q$ to the nearest degree.

(A) 76°
B) 75°
C) 78°
D) 77°

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

$$\frac{\sin Q}{10.0} = \frac{\sin 61°}{9.0}$$

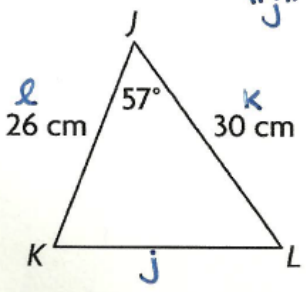
$$\frac{9.0 \sin Q}{9.0} = \frac{10.0 \sin 61°}{9.0}$$

$$\sin Q = 0.9718$$

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

$$Q = 76°$$

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



"j"

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

$$j^2 = k^2 + \ell^2 - 2k\ell \cos J$$

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

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

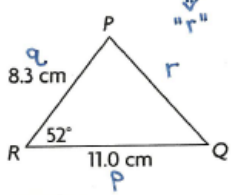
$$j^2 = 1576 - 849.5760$$

$$j^2 = 726.4240$$

$$j = \sqrt{726.4240}$$

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

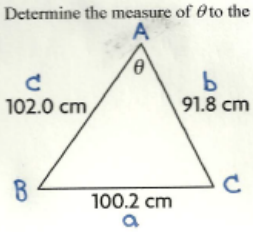
D 8. Determine the length of PQ to the nearest tenth of a centimeter.



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

$r^2 = p^2 + q^2 - 2pq\cos R$
$r^2 = (11.0)^2 + (8.3)^2 - 2(11.0)(8.3)\cos 52°$
$r^2 = 121 + 68.89 - 182.6(0.6157)$
$r^2 = 189.89 - 112.4268$
$r^2 = 77.4632$
$r = \sqrt{77.4632}$
$r = 8.8\text{ cm}$

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



A) 60°
B) 59°
C) 61°
(D) 62°

$\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$
$\cos A = \dfrac{(91.8)^2 + (102.0)^2 - (100.2)^2}{2(91.8)(102.0)}$
$\cos A = \dfrac{8427.24 + 10404 - 10040.04}{18\,727.2}$
$\cos A = \dfrac{8791.2}{18727.2}$
$\cos A = 0.4694$
$A = \cos^{-1}(0.4694)$
$A = 62°$

B 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 centimeter.

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

$f^2 = d^2 + e^2 - 2de\cos F$
$f^2 = (13.5)^2 + (18.2)^2 - 2(13.5)(18.2)\cos 60°$
$f^2 = 182.25 + 331.24 - 491.4(0.5000)$
$f^2 = 513.49 - 245.7$
$f^2 = 267.79$
$f = \sqrt{267.79}$
$f = 16.4\text{ cm}$

$\cos D = \frac{e^2+f^2-d^2}{2ef}$

$\cos D = \frac{(16.8)^2+(27.0)^2-(23.9)^2}{2(16.8)(27.0)}$

$\cos D = \frac{282.24+729-571.21}{907.2}$

$\cos D = \frac{440.03}{907.2}$

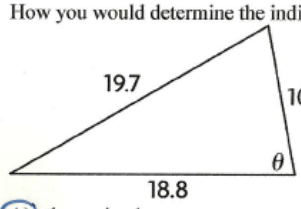
D 11. In ΔDEF, $d = 23.9$ cm, $e = 16.8$ cm, and $f = 27.0$ cm. Determine the measure of $\angle D$ to the nearest degree.

A) 54° B) 64° C) 58° (D) 61°

$\cos D = 0.4850$

$D = 61°$

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



* All 3 sides ⇒ Law of Cosines

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

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

* $\cos\theta = -\cos(180°-\theta)$

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

B 14. Calculate sin 16° to four decimal places. Predict another term that equals sin 16°.

A) −0.2756; sin 164°
(B) 0.2756 ; sin 164°
C) 0.2756; −sin 16°
D) none of the above

$\sin 16° = 0.2756$

$*\sin\theta = \sin(180°-\theta)$

$\sin 16° = \sin 164°$

A 15. Calculate tan 25° to four decimal places. Predict another term that equals tan 20°.

(A) 0.4663; –tan 155°
B) 0.4663; tan 155°
C) –0.4663; tan 155°
D) –0.4663; –tan 155°

$\tan 25° = 0.4663$

$* \tan\theta = -\tan(180° - \theta)$

$\tan 25° = -\tan 155°$

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

(A) $\angle A = 48°$, $a = 4.2$ m, $b = 5.0$ m
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

$h = b \sin A \quad h = 5.0 \sin 48° \quad h = 3.7$

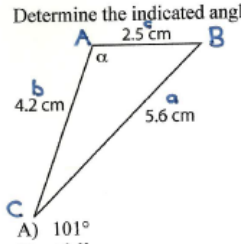
* since $h < a < b$
↳ 2 possible triangles.

A 17. In ΔPQR, $\angle P = 18°$, $q = 4.5$ 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°

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

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

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

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

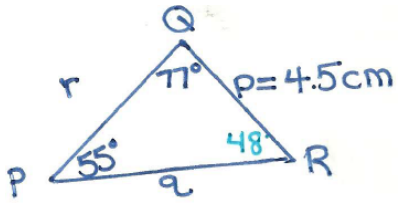
$\cos A = -0.3557$

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

$A = 111°$

Problem

19. In ΔPQR, $\angle P = 55°$, $\angle Q = 77°$, 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.



$\angle R = 180° - 55° - 77°$

$\angle R = 48°$

$\frac{q}{\sin Q} = \frac{p}{\sin P}$

$\frac{q}{\sin 77°} = \frac{4.5}{\sin 55°}$

$\frac{q \sin 55°}{\sin 55°} = \frac{4.5 \sin 77°}{\sin 55°}$

$q = 5.4\text{ cm}$

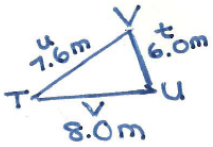
$\frac{r}{\sin R} = \frac{p}{\sin P}$

$\frac{r}{\sin 48°} = \frac{4.5}{\sin 55°}$

$\frac{r \sin 55°}{\sin 55°} = \frac{4.5 \sin 48°}{\sin 55°}$

$r = 4.1\text{ cm}$

20. In ΔTUV, $t = 6.0$ 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.



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

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

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

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

$\cos T = 0.7053$

$T = 45°$

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

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

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

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

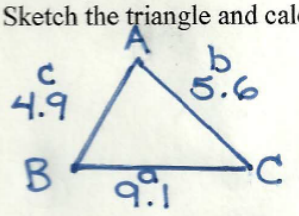
$\cos V = 0.3263$

$V = 71°$

$U = 180°-45°-71°$

$U = 64°$

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.

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

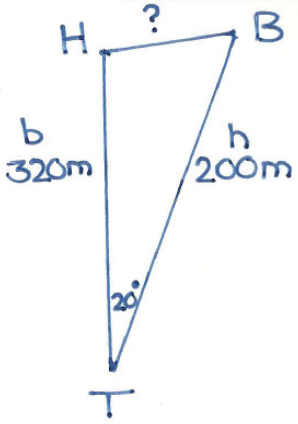
$$\cos A = \frac{(5.6)^2 + (4.9)^2 - (9.1)^2}{2(5.6)(4.9)}$$

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

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

$$\cos A = -0.5000 \qquad A = 120°$$

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.



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

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

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

$t^2 = 142400 - 120281.6$

$t^2 = 22118.4$

$t = \sqrt{22118.4}$

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

Valerie's ball is 149 m from the hole.