

Section 7.6 – Practice Questions

Solve each Law of Cosines for the unknown part. Leave answer to 2 decimal places.

1. $a^2 = 5^2 + 3^2 - 2(5)(3)\cos 43^\circ$

$$a^2 = 25 + 9 - 30\cos 43$$

$$a^2 = 34 - 30\cos 43$$

$$a^2 = 12.06$$

$$a = 3.47$$

2. $b^2 = 7^2 + 8^2 - 2(7)(8)\cos 115^\circ$

$$b^2 = 49 + 64 - 112\cos 115$$

$$b^2 = 113 - 112\cos 115$$

$$b^2 = 160.3$$

$$b = 12.46$$

3. $c^2 = 4^2 + 6^2 - 2(4)(6)\cos 90^\circ$

$$c^2 = 16 + 36 - 48\cos 90$$

$$c^2 = 52 - 0$$

$$c^2 = 52$$

$$c = 7.21$$

4. $7^2 = 3^2 + 6^2 - 2(3)(6)\cos A^\circ$

$$49 = 9 + 36 - 36\cos A$$

$$49 = 45 - 36\cos A$$

$$4 = -36\cos A$$

$$\frac{-4}{36} = \cos A$$

$$A = \cos^{-1}\left(-\frac{1}{9}\right)$$

$$\angle A = 96.38^\circ$$

5. $5.3^2 = 2.7^2 + 4.6^2 - 2(2.7)(4.6)\cos B^\circ$

$$28.09 = 7.29 + 21.16 - 24.84\cos B$$

$$28.09 = 28.45 - 24.84\cos B$$

$$-0.36 = -24.84\cos B$$

$$0.01449 = \cos B$$

$$\angle B = \cos^{-1}(0.01449) = 89.17^\circ$$

6. $9.3^2 = 6.2^2 + 4.5^2 - 2(6.2)(4.5)\cos C^\circ$

$$86.49 = 38.44 + 20.25 - 55.8\cos C$$

$$86.49 = 58.69 - 55.8\cos C$$

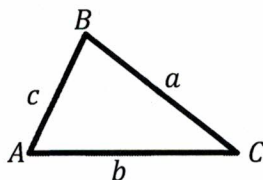
$$27.8 = -55.8\cos C$$

$$-0.4982 = \cos C$$

$$\angle C = \cos^{-1}(-0.4982) = 119.88^\circ$$

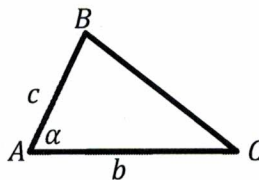
Given the following triangles, what angle should be solved for first, and which formula do you use?

7.



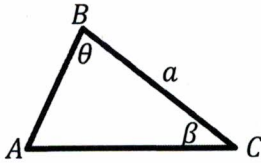
$\angle B$ first is the largest
using cosine law SSS

8.



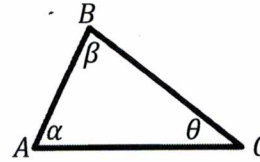
SAS Find α
using Law of cosines

9.



LA first using sum of angles theorem

10.



Nothing can be solved, not enough information

Solve $\triangle ABC$. Round answers to the 1 decimal place.

11. $\angle A = 50^\circ, b = 10, c = 15$

$$a^2 = 10^2 + 15^2 - 2(10)(15)\cos 50$$

$$a^2 = 100 + 225 - 300\cos 50$$

$$a^2 = 132.16 \quad \boxed{a = 11.5}$$

$$\frac{\sin B}{10} = \frac{\sin 50}{11.5}$$

$$\angle C = 180 - 41.8 - 50$$

$$= \boxed{88.2^\circ}$$

$$\sin B = \frac{10(\sin 50)}{11.5}$$

$$B = 41.8^\circ$$

13. $\angle C = 60^\circ, b = 4, a = 8$

$$c^2 = 16 + 64 - 2(32)\cos 60$$

$$c^2 = 80 - 64\cos 60$$

$$c^2 = 48 \quad \boxed{c = 6.9}$$

$$\frac{\sin 60}{6.9} = \frac{\sin B}{4} \quad \boxed{\angle B = 30.1^\circ}$$

$$\boxed{\angle A = 89.9^\circ}$$

12. $\angle B = 36^\circ, a = 4, c = 10$

$$b^2 = 4^2 + 10^2 - 2(4)(10)\cos 36$$

$$b^2 = 51.28 \quad \boxed{b = 7.2}$$

$$\frac{\sin 36}{7.2} = \frac{\sin A}{4}$$

$$\sin A = 0.3265$$

$$\boxed{\angle A = 19.2^\circ}$$

$$\angle C = 180 - 36 - 19.2$$

$$\boxed{\angle C = 124.8^\circ}$$

14. $a = 7, b = 24, c = 25$

$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$25^2 = 7^2 + 24^2 - 2(7)(24)\cos C$$

$$625 = 625 - 336\cos C$$

$$0 = \cos C \quad \boxed{\angle C = 90^\circ}$$

$$\frac{\sin 90}{25} = \frac{\sin B}{24}$$

$$\sin B = 0.96$$

$$\boxed{\angle B = 73.7^\circ}$$

$$\boxed{\angle A = 16.3^\circ}$$

15. $a = 6, b = 7, c = 13$ SSS biggest 1st

$$13^2 = 36 + 49 - 2(42)\cos C$$

$$169 = 85 - 84\cos C \rightarrow -1 = \cos C$$

$$84 = -84\cos C \rightarrow \angle C = 180^\circ$$

if $\angle C$ is 180° no triangle can be formed

16. $\angle A = 120^\circ, b = 4, c = 1$

$$a^2 = 17 - 8\cos 120$$

$$a^2 = 21 \quad \boxed{a = 4.6}$$

$$\frac{\sin C}{1} = \frac{\sin 120}{4.6}$$

$$\sin C = 0.1803$$

$$\boxed{\angle C = 10.9^\circ}$$

$$\angle B = 180 - 10.9 - 120$$

$$\boxed{\angle B = 49.1^\circ}$$

Solve $\triangle ABC$, using either the Law of Sines or Cosines to begin the answer.

17. $\angle A = 126^\circ, b = 9, c = 12.2$ SAS cosines

$$a^2 = 81 + 148.84 - 219.6\cos 126$$

$$a^2 = 358.9 \quad \boxed{a = 18.9}$$

b 1st

$$\frac{\sin B}{9} = \frac{\sin 126}{18.9}$$

$$\sin B = 0.3852$$

$$\boxed{\angle B = 22.6^\circ}$$

$$\boxed{\angle C = 31.4^\circ}$$

18. $\angle A = 28^\circ, \angle B = 42^\circ, c = 18.2$

ASA
Sine law

$$\angle C = 180 - 28 - 42$$

$$\boxed{\angle C = 110^\circ}$$

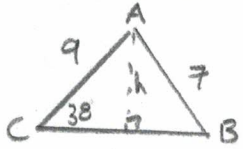
$$\frac{a}{\sin 28} = \frac{18.2}{\sin 110}$$

$$\boxed{a = 9.1}$$

$$\frac{b}{\sin 42} = \frac{18.2}{\sin 110}$$

$$\boxed{b = 13.0}$$

19. $\angle C = 38^\circ, b = 9, c = 7$



$$\sin 38 = \frac{h}{9}$$

$$h = 5.5$$

$$5.5 < 7 < 9 \quad 2\Delta's$$

ASS
test ambiguous

$$\frac{\sin B}{9} = \frac{\sin 38}{7}$$

$$\sin B = 0.7916$$

$$\angle B = 52.3^\circ$$

or

$$\angle B' = 127.7^\circ$$

$$\angle A = 89.7^\circ$$

$$\angle A' = 14.3^\circ$$

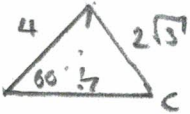
$$\frac{a}{\sin 89.7} = \frac{7}{\sin 38}$$

$$a = 11.4$$

$$\frac{a'}{\sin 14.3} = \frac{7}{\sin 38}$$

$$a' = 2.8$$

21. $\angle A = 60^\circ, a = 2\sqrt{3}, c = 4$



$$h = 3.46 = a$$

Right angle Δ

$$\angle A = 60^\circ$$

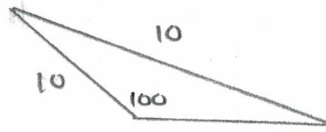
$$\angle C = 90^\circ$$

$$\angle B = 30^\circ$$

$$\frac{b}{\sin 30} = \frac{2\sqrt{3}}{\sin 60}$$

$$b = 2$$

20. $\angle C = 100^\circ, a = 10, c = 10$



Triangle makes no sense

NO SOLUTION

22. $a = 12.3, b = 9.6, c = 8.9$

SSS a 1st

$$12.3^2 = 9.6^2 + 8.9^2 - 2(9.6)(8.9)\cos A$$

$$\cos A = 0.1175$$

$$\angle A = 83.3^\circ$$

$$\frac{\sin C}{8.9} = \frac{\sin 83.3}{12.3}$$

$$\angle C = 45.9^\circ$$

$$\angle B = 180 - 45.9 - 83.3$$

$$\angle B = 50.8^\circ$$

Answer Key – Section 7.6

1. 3.47
2. 12.66
3. 7.21
4. 96.38°
5. 89.17°
6. 119.88°
7. Find $\angle B$ by Law of Cosines
8. Find a by Law of Cosines
9. Find $\angle A$ by Sum of Angles Law
10. Nothing can be determined
11. $\angle B = 41.8^\circ, \angle C = 88.2^\circ, a = 11.5$
12. $\angle A = 19.2^\circ, \angle C = 124.8^\circ, b = 7.2$
13. $\angle A = 90^\circ, \angle B = 30^\circ, c = 6.9$
14. $\angle A = 16.3^\circ, \angle B = 73.7^\circ, \angle C = 90^\circ$
15. <i>No Solution</i>
16. $\angle B = 49.1^\circ, \angle C = 10.9^\circ, a = 4.6$
17. $\angle B = 22.6^\circ, \angle C = 31.4^\circ, a = 18.9$
18. $\angle C = 110^\circ, a = 9.1, b = 13.0$
19. $\angle A = 89.7^\circ$ or 14.3° $\angle B = 52.3^\circ$ or $127.7^\circ, a = 11.4$ or 2.8
20. <i>No Solution</i>
21. $\angle B = 30^\circ, \angle C = 90^\circ, b = 2$
22. $\angle A = 83.3^\circ, \angle B = 50.8^\circ, \angle C = 45.9^\circ$

Extra Work Space