

Calculus 1 — Answer Key

Tuesday, September 8 — Law of Sines

Classwork

1. $A=30^\circ$, $B=45^\circ$, $a=4$. Find b, c .

$$b=4\sqrt{2}; c=2\sqrt{6}+2\sqrt{2}.$$

2. $A=45^\circ$, $a=\sqrt{2}$, $B=60^\circ$. Find b, c .

$$C=75^\circ; b=\sqrt{3}; c=(\sqrt{6}+\sqrt{2})/2.$$

3. $A=35^\circ$, $B=65^\circ$, $a=12$. Find b, c .

$$C=80^\circ; b\approx 19.0; c\approx 20.6.$$

4. $C=54^\circ$, $c=21$, $A=47^\circ$. Find a, b .

$$B=79^\circ; a\approx 19.0; b\approx 25.5.$$

5. $A=71^\circ$, $B=38^\circ$, $b=14$. Find a, c .

$$C=71^\circ; a\approx 21.5; c\approx 21.5.$$

HW A

1. $A=55^\circ$, $B=70^\circ$, $a=16$. Find b, c .

$$C=55^\circ; b\approx 18.3; c=16.$$

2. $A=28^\circ$, $a=14$, $B=65^\circ$. Find b, c .

$$C=87^\circ; b\approx 27.0; c\approx 29.8.$$

3. $B=52^\circ$, $b=18$, $C=71^\circ$. Find a, c .

$$A=57^\circ; a\approx 19.2; c\approx 21.6.$$

4. $A=48^\circ$, $a=20$, $B=62^\circ$. Find b, c .

$$C=70^\circ; b\approx 23.8; c\approx 25.3.$$

Wednesday, September 9 — Law of Sines: SSA

Classwork

1. $A=30^\circ$, $a=4$, $b=4$.

$B=30^\circ$, $C=120^\circ$, $c=4\sqrt{3}$; $B=150^\circ$ is invalid.

2. $A=30^\circ$, $a=10$, $b=15$.

$B\approx 48.6^\circ$, $C\approx 101.4^\circ$, $c\approx 19.6$; or $B\approx 131.4^\circ$, $C\approx 18.6^\circ$, $c\approx 6.4$.

3. $A=50^\circ$, $a=18$, $b=12$.

$B\approx 30.7^\circ$, $C\approx 99.3^\circ$, $c\approx 23.2$.

4. $A=35^\circ$, $a=8$, $b=15$.

$\sin B\approx 1.08>1$, so no triangle.

5. $A=40^\circ$, $a=15$, $b=21$.

$B\approx 64.1^\circ$, $C\approx 75.9^\circ$, $c\approx 22.7$; or $B\approx 115.9^\circ$, $C\approx 24.1^\circ$, $c\approx 9.6$.

HW B

1. $A=120^\circ$, $a=16$, $b=10$.

$B\approx 32.8^\circ$, $C\approx 27.2^\circ$, $c\approx 8.5$; supplement invalid because angle sum exceeds 180° .

2. $A=42^\circ$, $a=12$, $b=16$.

$B\approx 63.0^\circ$, $C\approx 75.0^\circ$, $c\approx 17.3$; or $B\approx 117.0^\circ$, $C\approx 21.0^\circ$, $c\approx 6.4$.

3. $A=60^\circ$, $a=18$, $b=20$.

$B\approx 74.2^\circ$, $C\approx 45.8^\circ$, $c\approx 14.9$; or $B\approx 105.8^\circ$, $C\approx 14.2^\circ$, $c\approx 5.1$.

4. $A=45^\circ$, $a=\sqrt{2}$, $b=1$.

$B=30^\circ$, $C=105^\circ$, $c=(\sqrt{6}+\sqrt{2})/2$.

Thursday, September 10 — Law of Cosines: SAS

Classwork

1. $a=5, b=8, C=60^\circ$.

$$c=7.$$

2. $a=6, b=6, C=120^\circ$.

$$c=6\sqrt{3}.$$

3. $a=7, b=9, C=60^\circ$.

$$c=\sqrt{67}\approx 8.2.$$

4. $a=8, b=11, C=43^\circ$.

$$c\approx 7.5; A\approx 46.6^\circ; B\approx 90.4^\circ.$$

5. $a=18, b=24, C=110^\circ$.

$$c\approx 34.6; A\approx 29.3^\circ; B\approx 40.7^\circ.$$

HW C

1. $a=9, b=12, C=60^\circ$.

$$c=\sqrt{117}\approx 10.8.$$

2. $a=10, b=14, C=45^\circ$.

$$c\approx 9.9; A\approx 45.6^\circ; B\approx 89.4^\circ.$$

3. Sides 32 and 45; included angle 58° .

$$\text{third side}\approx 39.0 \text{ miles.}$$

4. $a=9, b=12, C=120^\circ$.

$$c=\sqrt{333}\approx 18.2.$$

Friday, September 11 — Law of Cosines: SSS and Area

Classwork

1. $a=5, b=5, c=5\sqrt{3}$.

$C=120^\circ; A=B=30^\circ$.

2. $a=5, b=8, C=60^\circ$.

$c=7; \text{Area}=10\sqrt{3}$.

3. $a=5, b=7, c=8$.

$C\approx 81.8^\circ$.

4. $a=9, b=12, c=15$.

$C=90^\circ; A\approx 36.9^\circ; B\approx 53.1^\circ$.

5. Sides 13 m, 17 m, 20 m.

$\text{largest angle}\approx 82.5^\circ; \text{area}\approx 109.5 \text{ m}^2$.

HW D

1. $A=45^\circ, a=10, B=65^\circ$.

$C=70^\circ; b\approx 12.8; c\approx 13.3$.

2. $a=7, b=9, C=60^\circ$.

$c\approx 8.2; A\approx 47.7^\circ; B\approx 72.3^\circ$.

3. $a=5, b=7, c=8$.

$C\approx 81.8^\circ; \text{Area}\approx 17.3 \text{ square units}$.

4. $a=12, b=15, C=60^\circ$.

$c=3\sqrt{21}\approx 13.7; \text{Area}=45\sqrt{3}\approx 77.9 \text{ square units}$.