

Calculus 1

Name: _____ Date: _____

Classwork

When using a calculator, make sure it is in degree mode.

Law of Sines

In $\triangle ABC$, side a is opposite $\angle A$, side b is opposite $\angle B$, and side c is opposite $\angle C$.

$$\frac{\text{side opposite } \angle A}{\sin A} = \frac{\text{side opposite } \angle B}{\sin B} = \frac{\text{side opposite } \angle C}{\sin C}$$

Use the Law of Sines when you know a side and its opposite angle.

1. In $\triangle ABC$, $A = 30^\circ$, $B = 45^\circ$, and $a = 4$. Find b and c .
2. In $\triangle ABC$, $A = 45^\circ$, $a = \sqrt{2}$, and $B = 60^\circ$. Find b and c .
3. In $\triangle ABC$, $A = 35^\circ$, $B = 65^\circ$, and $a = 12$. Find b and c .
4. In $\triangle ABC$, $C = 54^\circ$, $c = 21$, and $A = 47^\circ$. Find a and b .
5. In $\triangle ABC$, $A = 71^\circ$, $B = 38^\circ$, and $b = 14$. Find a and c .

Calculus 1

Name: _____ Date: _____

HW A

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

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

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

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

Calculus 1

Name: _____ Date: _____

Classwork

Law of Sines — SSA

If $\sin(\text{unknown angle}) > 1$, there is no triangle.

If $0 < \sin(\text{unknown angle}) < 1$, check the supplementary angle.

1. In $\triangle ABC$, $A = 30^\circ$, $a = 4$, and $b = 4$. Find all possible triangles.
2. In $\triangle ABC$, $A = 30^\circ$, $a = 10$, and $b = 15$. Find all possible triangles.
3. In $\triangle ABC$, $A = 50^\circ$, $a = 18$, and $b = 12$. Find all possible triangles.
4. In $\triangle ABC$, $A = 35^\circ$, $a = 8$, and $b = 15$. Determine whether a triangle exists.
5. In $\triangle ABC$, $A = 40^\circ$, $a = 15$, and $b = 21$. Find all possible triangles.

Calculus 1

Name: _____ Date: _____

HW B

1. In $\triangle ABC$, $A = 120^\circ$, $a = 16$, and $b = 10$. Find B , C , and c . Explain why there cannot be a second triangle.
2. In $\triangle ABC$, $A = 42^\circ$, $a = 12$, and $b = 16$. Find all possible triangles.
3. In $\triangle ABC$, $A = 60^\circ$, $a = 18$, and $b = 20$. Find all possible triangles.
4. In $\triangle ABC$, $A = 45^\circ$, $a = \sqrt{2}$, and $b = 1$. Find B , C , and c .

Calculus 1

Name: _____ Date: _____

Classwork

Law of Cosines

$$c^2 =$$

Use the Law of Cosines when you know SAS or SSS.

1. In $\triangle ABC$, $a = 5$, $b = 8$, and $C = 60^\circ$. Find c .
2. In $\triangle ABC$, $a = 6$, $b = 6$, and $C = 120^\circ$. Find c .
3. In $\triangle ABC$, $a = 7$, $b = 9$, and $C = 60^\circ$. Find c .
4. In $\triangle ABC$, $a = 8$, $b = 11$, and $C = 43^\circ$. Find c , A , and B .
5. In $\triangle ABC$, $a = 18$, $b = 24$, and $C = 110^\circ$. Find c , A , and B .

Calculus 1

Name: _____ Date: _____

HW C

1. In $\triangle ABC$, $a = 6$, $b = 10$, and $C = 120^\circ$. Find c .
2. In $\triangle ABC$, $a = 9$, $b = 12$, and $C = 60^\circ$. Find c .
3. In $\triangle ABC$, $a = 10$, $b = 14$, and $C = 45^\circ$. Find c , A , and B .
4. In $\triangle ABC$, $a = 9$, $b = 12$, and $C = 120^\circ$. Find c .

Calculus 1

Name: _____ Date: _____

Classwork

Law of Cosines — SSS and Area

Area = _____ = _____

1. In $\triangle ABC$, $a = 5$, $b = 5$, and $c = 5\sqrt{3}$. Find all three angles.
2. In $\triangle ABC$, $a = 5$, $b = 8$, and $C = 60^\circ$. Find c and the area.
3. In $\triangle ABC$, $a = 5$, $b = 7$, and $c = 8$. Find C .
4. In $\triangle ABC$, $a = 9$, $b = 12$, and $c = 15$. Find all three angles.
5. A triangular lot has side lengths 13 m, 17 m, and 20 m.
 - a. Find the largest angle.
 - b. Find the area of the lot.

Calculus 1

Name: _____ Date: _____

HW D

1. In $\triangle ABC$, $A = 45^\circ$, $a = 10$, and $B = 65^\circ$. Find b and c .
2. In $\triangle ABC$, $a = 7$, $b = 9$, and $C = 60^\circ$. Find c , A , and B .
3. In $\triangle ABC$, $a = 5$, $b = 7$, and $c = 8$. Find C and the area of the triangle.
4. In $\triangle ABC$, $a = 12$, $b = 15$, and $C = 60^\circ$. Find c and the area of the triangle.