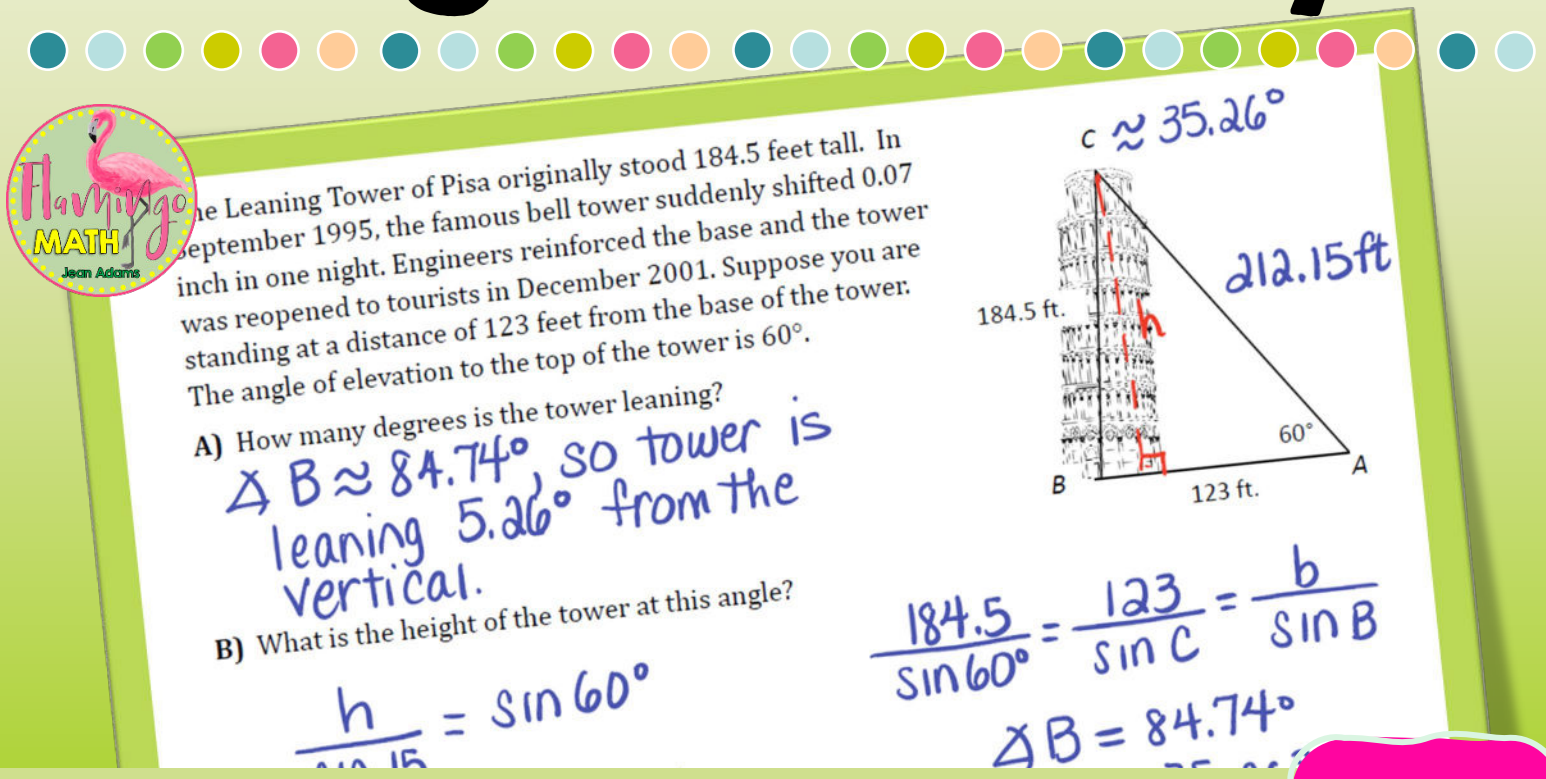
Precalculus Honors

Analytic Trigonometry



Homework 5

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PRECALCULUS CURRICULUM

Scope and Sequence

Unit 5: Analytic Trigonometry

Lesson	Skills & Learning Objectives
[5.1] Fundamental Identities	❑ Use fundamental identities to simplify expressions ❑ Solve trigonometric equations using identities
[5.2] Proving Trigonometric Identities	❑ Prove identities analytically
[5.3] Sum and Difference Formulas	❑ Apply identities for sum and difference formulas
[5.4] Multiple Angle Identities	❑ Apply identities for multiple angles
[5.5] Law of Sines	❑ Use computational application of Law of Sines ❑ Solve real-world applications using Law of Sines ❑ Find area of a triangle given two sides and an angle
[5.6] Law of Cosines	❑ Use computational application of Law of Cosines ❑ Use Law of Cosines to solve application problems ❑ Find area of triangles using Heron's formula in terms of the sides
[5.7] Solving Trigonometric Equations	❑ Solve trigonometric equations for specified domains and general solutions

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UNIT 5 :
ANALYTIC TRIGONOMETRY
Standards Alignment

	Lesson Topic	STANDARDS
1	Fundamental Identities	**BEST:** MAFS.912.F-TF.1.2; MAFS.912.F-TF.1.1 **CCSS:** HSA-SSE.A.2, HSA-SSE.B.3; HSF-TF.C.8 **TEKS:** TEKS.MA.9-12.P.1.D; TEKS.MA.9-12.P.5.M
2	Proving Trigonometric Identities	**BEST:** MAFS.912.F-TF.3.8, MAFS.912.A-SSE.2.3, MAFS.912.A-SSE.1.2 **CCSS:** HSA-SSE.A.2; HAS-SSE.B.3; HSF-TF.C.8 **TEKS:** TEKS.MA.9-12.P.1.D; TEKS.MA.9-12.P.5.M
3	Sum and Difference Formulas	**BEST:** MAFS.912.F-TF.3.8; MAFS.912.A-SSE.2.3; MAFS.912.F-TF.3.9 **CCSS:** HSF-TF.C.8, HSF-TF.C.9, HAS-SSE.B.3 **TEKS:** TEKS.MA.9-12.P.5.N
4	Multiple Angle Identities	**BEST:** MAFS.912.A-SSE.2.3, MAFS.912.A-SSE.1.2 **CCSS:** HAS-SSE.A.2, HAS-SSE.B.3 **TEKS:** TEKS.MA.9-12.P.5.N
5	Law of Sines	**BEST:** MAFS.912.A-SSE.2.3; MAFS.912.A-SSE1.2 **CCSS:** HSA-SSE.A.2; HSA-SSE.B.3 TEKS.MA.9-12.P.2.P; TEKS.MA.9-12.P.4.G
6	Law of Cosines	**BEST:** MAFS.912.A-SSE.2.3; MAFS.912.A-SSE.1.2 **CCSS:** HAS-SSE.A.2, HAS-SSE.B.3 **TEKS:** TEKS.MA.9-12.P.2.P; TEKS.MA.9-12.P.4.H
7	Solving Trigonometric Equations	**BEST:** MAFS.912.A-SSE.2.3; MAFS.912.A-SSE.1.2; MAFS.912.F-TF.2.7 **CCSS:** HAS-SSE.A.2, HAS-SSE.B.3, HSF-TF.B.7 **TEKS:** TEKS.MA.9-12.P.2.I

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5.1 Fundamental Trigonometric Identities Homework

Name _____

Date _____ Period _____

Problems 1 – 4, Use Identities to evaluate or find the value of the expression.

1. Find $\sin\theta$ and $\cos\theta$ if $\tan\theta = \frac{4}{3}$ and

2. Find $\sin\theta$ and $\tan\theta$ if $\cos\theta = 0.8$ and $\tan\theta < 0$.

3. If $\sin\theta = 0.65$, find $\cos\left(\frac{\pi}{2} - \theta\right)$

4. If $\sin\left(\theta - \frac{\pi}{2}\right) = 0.54$, find $\cos(-\theta)$

Problems 5 – 10, Use basic identities to simplify each expression.

5. $\frac{\cos\theta}{1-\sin^2\theta}$

6. $\frac{1-\cos^2\theta}{1-\sin^2\theta}$

7. $\cot x \sin x$

8. $\cos y \sec y$

9. $\sin x \csc(-x)$

10. $\tan x \cos x$

5.2 Proving Trigonometric Identities Homework

Name _____

Date _____ Period _____

Problems 1 – 4, Write the expression in terms of sine and cosine only.

1. $\tan\theta \cdot \csc\theta$

2. $\cot\theta \cdot \csc\theta$

3. $\sec\theta \cdot \cot\theta$

4. $\dfrac{\cot\theta}{\csc\theta}$

Problems 5 – 6, Multiply each expression by the indicated fraction and simplify.

5. $\dfrac{\tan\theta}{\sec\theta-1}$ by $\dfrac{\sec\theta+1}{\sec\theta+1}$

6. $\dfrac{\cot\theta}{1+\csc\theta}$ by $\dfrac{1-\csc\theta}{1-\csc\theta}$

Problems 7 – 9, Tell whether the statement is an identity or not.

7. $\dfrac{\sin^2 x+\cos^2 x}{\csc x}=\sin x$

8. $\sin x \sec x = \cot x$

9. $\dfrac{\tan x}{\sec x}=\sin x$

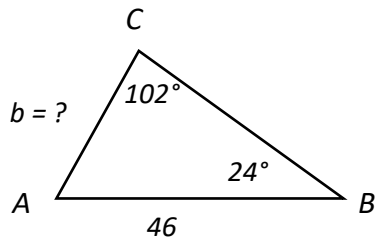
5.5 Law of Sines Homework

Name _____

Date _____ Period _____

Problems 1 – 8, Solve each triangle for the indicated side. Express your answer to nearest hundredth.

1.



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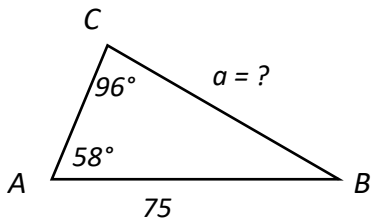

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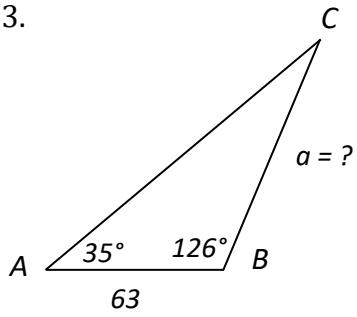

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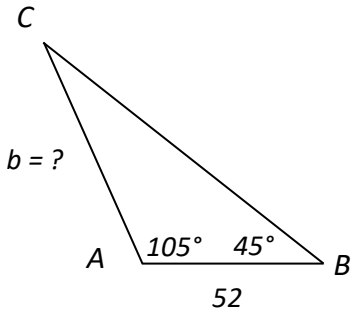


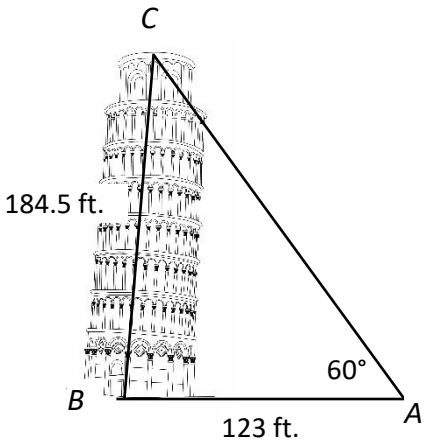
5. $\angle A = 42°$, $\angle B = 39°$, $c = 48$; find a.

6. $\angle B = 72°$, $\angle C = 31°$, $a = 103$; find b.

7. $\angle A = 128°$, $\angle B = 19°$, $a = 46$; find c.

8. $\angle A = 47.6°$, $\angle B = 40.3°$, $b = 29$; find a.

18. The Leaning Tower of Pisa originally stood 184.5 feet tall. In September 1995, the famous bell tower suddenly shifted 0.07 inch in one night. Engineers reinforced the base and the tower was reopened to tourists in December 2001. Suppose you are standing at a distance of 123 feet from the base of the tower. The angle of elevation to the top of the tower is 60°.



A) How many degrees is the tower leaning?

B) What is the height of the tower at this angle?

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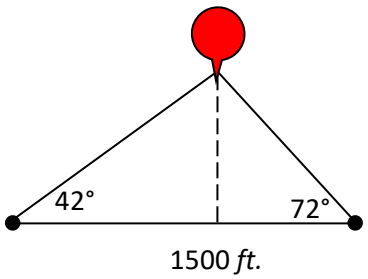
19. A used car lot has a large SALE balloon tied down to stakes 1500 feet apart. The angle of elevation from the stake at the west end of the lot to the balloon is 42°, and the angle of elevation from the stake at the east end of the lot to the balloon is 72°. What is the altitude of the balloon?



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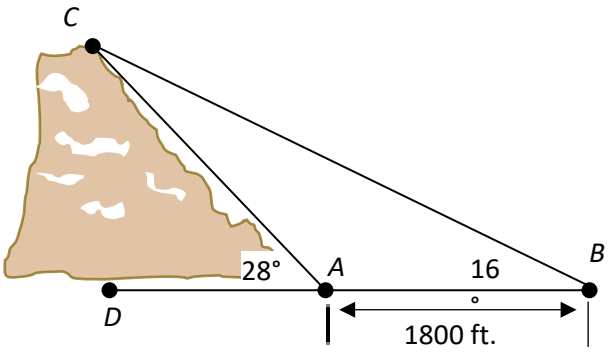
20. An engineering firm is surveying a winter ski resort to build a new lift from A to C. The survey crew measures ∠CAD to be 28°. Then they move a distance of 1800 feet to point B and measure the angle to the top of the mountain to be 16°. Find the length of the new ski lift, AC.



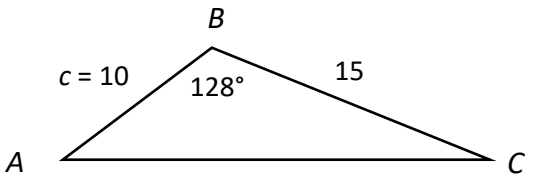
5.6 Law of Cosines Homework

Name _____

Date _____ Period _____

Problems 1 – 8, Solve each triangle, if possible. Express your answer to nearest hundredth.

1.



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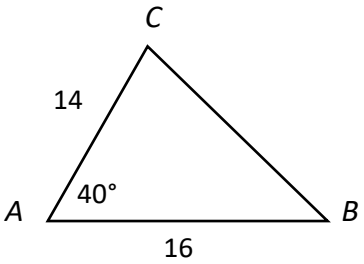

3. $\angle A = 56°$, $b = 15$, $c = 8$

4. $\angle B = 34°$, $a = 40$, $c = 17$

5. $a = 12$, $b = 20$, $\angle C = 92°$

6. $a = 2$, $b = 6$, $c = 4$

5.7 Solving Trigonometric Equations Homework

Name _____

Date _____ Period _____

Problems 1 – 8, Solve each equation on the interval $0 \le \theta \le 2\pi$.

1. $1 - \cos\theta = \frac{1}{2}$

2. $4\cos^2\theta = 1$

3. $4\sin^2\theta - 3 = 0$

4. $\sqrt{3}\cot\theta + 1 = 0$

5. $\cos(2\theta) = -\frac{1}{2}$

6. $\tan\frac{\theta}{2} = \sqrt{3}$