

Math 112 Exam #2 Review

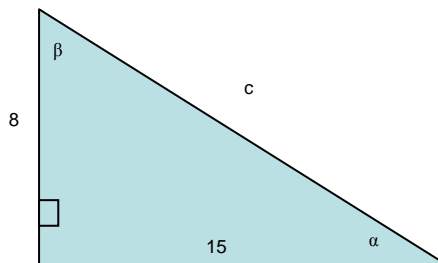
6.6 Inverse Trigonometric Functions:

Definitions/ identities:

Know the definition, domain, and range for all of the inverse trig functions:

Practice Problems:

- 1) Completely solve the following right triangle:



- 2) Evaluate the given expressions:

a) $\cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right) =$

b) $\cos(\sin^{-1} u) =$

- 3) Solve the trigonometric equation for the acute angle θ , approximate to the nearest tenth of a degree.

$$3\sin\theta = 4/5$$

7.1 Fundamental Identities

Definitions/ identities:

Know or be able to quickly derive all of the identities on pg. 591

Practice Problems:

1) Fill in the blanks:

- a) $\sin(x)$ is an _____ (even/odd) function. This means that $\sin(-x) = \underline{\hspace{2cm}}$.
b) $\cos(x)$ is an _____ (even/odd) function. This means that $\cos(-x) = \underline{\hspace{2cm}}$.

2) Determine the quadrant that contains θ .

- a) $\tan\theta > 0$ and $\cos\theta < 0$
b) $\csc\theta > 0$ and $\tan\theta > 0$

3) Find the other trigonometric functions of θ .

$$\csc\theta = \sqrt{3} \quad \text{and} \quad \cos\theta < 0$$

4) Starting from the Pythagorean identity prove $1 + \tan^2(\theta) = \sec^2(\theta)$

7.2 Verifying Identities:

Be able to verify all the identities 31-66 pg. 601. (You will be asked to verify at least two)

7.3 Trigonometric Equations

Definitions/ identities:

Know and be able to use the definition for reference angles on page. 602, 603

Practice Problems:

1) Find the reference angle for

a) $\theta = 43^\circ$

b) $\theta = -\frac{\pi}{6}$

c) $\theta = 125^\circ$

2) Solve the trigonometric equations for $0^\circ \leq \theta \leq 360^\circ$

a) $\cos^2 \theta - \cos \theta = 0$

b) $2 \sin^2 \theta + 3 \sin \theta = -1$

c) $\sin \theta \cos \theta = \cos \theta$

d) $\sec^2 \theta = 2 \tan \theta$

3) Find all solutions for the previous equations.

7.4 Sum and difference identities

Definitions/ identities:

Know and be able to use the sum and difference formulas for sine and cosine
Be able to use the sum and difference formulas for tangent.

Example Problems:

1) Use the sum and difference formulas to verify the identity :

$$\text{a) } \cos\left(\frac{\pi}{2} - t\right) = \sin(t)$$

$$\text{b) } \sin\left(\frac{\pi}{2} - t\right) = \cos(t)$$

$$\text{c) } \cos(\theta + \theta) = 1 - 2\sin^2 \theta$$

2) Let $\sin\alpha = -8/17$ and $\cos\beta = 11/61$, where α is in quadrant 3, and β is in quadrant 1

- a) find $\sin(\alpha + \beta)$
- b) find $\cos(\alpha + \beta)$
- c) find $\tan(\alpha + \beta)$

7.5 Multiple Angle Identities:

Identities: Know the half angle, and double angle formulas for Sine and cosine (pg. 640)

Example Problems:

1) Using the sum and difference identities prove:

$$\text{a) } \cos(\alpha)\cos(\beta) = \frac{1}{2}(\cos(\alpha - \beta) + \cos(\alpha + \beta))$$

$$\text{b) } \sin(\alpha)\sin(\beta) = \frac{1}{2}(\sin(\alpha - \beta) - \sin(\alpha + \beta))$$

2) Use an identity to evaluate the expression

a) $\sin(2 \cos^{-1} 1)$

b) $\cos(2 \sin^{-1} \frac{1}{2})$

3) Find $\sin(2\theta)$, $\cos(2\theta)$ when $\cos\theta=4/5$ and $\sin\theta=3/5$

4) Use half angle formulas to find exact values of the expression

a) $\cos(15^\circ)$

b) $\sin(67.5^\circ)$