

TRIG AND EXPONENTIAL FUNCTIONS

February 01, 2017

Math 1110
Spring 2017

(1) Fill in the following table with *exact* values.

θ (degrees)	θ (radians $0 \leq \theta \leq 2\pi$)	$\sin \theta$	$\cos \theta$	$\tan \theta$
0°				
30°				
45°				
60°				
90°				
120°				
135°				
150°				
180°				
210°				
225°				
240°				
270°				
300°				
315°				
330°				

(2) What are the period and amplitude of each of the following functions?
Sketch a graph.

(a) $\cos\left(x - \frac{\pi}{2}\right)$

(b) $2 \sin(x + \pi) - 1$

(c) $-\frac{2}{\pi} \sin\left(\frac{\pi}{2}x\right)$

- (3) Match the left-hand side of each of the following trigonometric identities with the correct right-hand side.

(A) $\sec^2 \theta$	(I) $\frac{1-\cos 2\theta}{2}$
(B) $\csc^2 \theta$	(II) $2 \sin \theta \cos \theta$
(C) $\cos(\theta + \phi)$	(III) $\cos \theta \cos \phi - \sin \theta \sin \phi$
(D) $\sin(\theta + \phi)$	(IV) $\sin \theta \cos \phi + \cos \theta \sin \phi$
(E) $\cos(2\theta)$	(V) $1 + \tan^2 \theta$
(F) $\sin(2\theta)$	(VI) $\cos^2 \theta - \sin^2 \theta$
(G) $\cos^2 \theta$	(VII) $1 + \cot^2 \theta$
(H) $\sin^2 \theta$	(VIII) $\frac{1+\cos 2\theta}{2}$

- (4) Find exact values for the following expressions:

- (a) $\tan \theta$ when $\sin \theta = 4/5$.
 (b) $\sin\left(\frac{\pi}{12}\right)$

- (5) Simplify the following expressions.

- (a) $\frac{x^2(x^3)^4}{x^4}$
 (b) $9^{\frac{1}{3}} \cdot 9^{\frac{1}{6}}$
 (c) $\left(\sqrt{3}\right)^{\frac{1}{2}} \cdot \left(\sqrt{12}\right)^{\frac{1}{2}}$

- (6) What are the domain and range of each of the following functions?

- (a) $f(x) = \frac{1}{2 + e^x}$
 (b) $g(x) = \sqrt{1 + 3^{-x}}$

- (7) The half-life of phosphorus-32 is about 14 days. If there are 6.6 grams present initially, express the amount of phosphorus-32 remaining as a function of time t . When will there be 1 gram remaining?