MATH 150 – TOPIC 12

EXACT VALUES OF SIN θ, COS θ, AND TAN θ

Review topics 9 and 11 discussed the right triangle and unit circle definitions of the trigonometric functions. (We emphasize that these definitions are equivalent!) In each topic, tables were presented which gave exact values of the trigonometric functions for various values of θ. The table below merely summarizes these earlier tables.

Because these values will often be used in calculus, it is important to know as many as possible. You could try to memorize them. An easier way is to study Figures 9b.2 and 9b.5. Using this information and the definitions in Review Topics 9a, 9d, and 11, you can quickly and easily fill in the blanks.

PRACTICE PROBLEM for Topic 12 – Exact Values of $\sin\theta$, $\cos\theta$, and $\tan\theta$

12.1 By memory, complete the following table.

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{3\pi}{2}$	2π
$\sin\theta$											
$\cos\theta$											
$\tan\theta$											
$\cot\theta$											
$\sec\theta$											
$\csc\theta$											

ANSWER to PRACTICE PROBLEM (Topic 12 – Exact Values of $\sin\theta$, $\cos\theta$, and $\tan\theta$)

12.1

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{3\pi}{2}$	2π
$\sin\theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	0	1
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	und	$-\sqrt{3}$	-1	$-\frac{1}{\sqrt{3}}$	0	und	0
$\cot\theta$	und	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	$-\frac{1}{\sqrt{3}}$	-1	$-\sqrt{3}$	und	0	und
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	und	-2	$-\sqrt{2}$	$-\frac{2}{\sqrt{3}}$	-1	und	1
$\csc\theta$	und	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	und	-1	und

"und" means undefined

Beginning of Topic Skills Assessment