Math 42 Midterm 1 Review Answers

[0]

$\theta =$	$\sin\theta =$	$\cos\theta =$	$\tan\theta =$	$\csc\theta =$	$\sec\theta =$	$\cot\theta =$
0	0	1	0	UNDEFINED	1	UNDEFINED
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{2}$	1	0	UNDEFINED	1	UNDEFINED	0
$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	-2	$-\frac{\sqrt{3}}{3}$
$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	2	$-\frac{2\sqrt{3}}{3}$	$-\sqrt{3}$
π	0	-1	0	UNDEFINED	-1	UNDEFINED
$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	-2	$-\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	$-\sqrt{2}$	$-\sqrt{2}$	1
$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$	$-\frac{2\sqrt{3}}{3}$	-2	$\frac{\sqrt{3}}{3}$
$\frac{3\pi}{2}$	-1	0	UNDEFINED	-1	UNDEFINED	0
$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$	$-\frac{2\sqrt{3}}{3}$	2	$-\frac{\sqrt{3}}{3}$
$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	-2	$\frac{2\sqrt{3}}{3}$	$-\sqrt{3}$

[1]

	[a]	[b]	[c]	[d]	[e]	[f]
Complement	N/A	$\frac{2\pi}{7}$	0.11	N/A	N/A	18°
Supplement	76°	$\frac{11\pi}{14}$	1.68	$\frac{2\pi}{5}$	0.23	108°

[2]

	[a]	[b]	[c]	[d]	[e]	[f]
[i]	-1.5	-325°	$-\frac{4\pi}{7}$	-3.49	-93°	$-\frac{13\pi}{9}$
	11.06	395°	$\frac{24\pi}{7}$	9.07	627°	$\frac{23\pi}{9}$
	4.78	35°	$\frac{10\pi}{7}$	2.79	267°	$\frac{5\pi}{9}$
[ii]	4	1	3	2	3	2

[3] [a] 84° [b] $\frac{6\pi}{5}$ [c] 291.21°

[4] [a] 3 [b] 3 [c] 12 [d] $\sqrt{6}$ [e] 36 [f] 3

[5] [a] angular speed = 24π radians/minute, radius = 7.96 feet
[b] angular speed = 2π radians/year (or 0.0007164 radians/hour), linear speed = 66626 miles/hour
[c] angular speed = 2.64 radians/minute, 2.38 minutes to complete one cycle
[d] angular speed = $\frac{3\pi}{2}$ radians/second, linear speed = $\frac{21\pi}{2}$ inches/second

[6] [a] -0.4577 [b] 0.6561 [c] -0.8391 [d] 1.0946 [e] -0.1906 [f] 1.1887

[7] [a] $-\frac{7}{25}$ [b] $\frac{25}{7}$ [c] $\frac{24}{7}$ [d] $-\frac{24}{25}$ [e] $\frac{24}{7}$ [f] $\frac{7}{25}$
[g] $-\frac{25}{24}$ [h] $-\frac{7}{24}$

[8] [a] $\frac{3\sqrt{2}}{4}$ [b] $2\sqrt{2}$ [c] $\frac{2\sqrt{2}}{3}$ [d] $\frac{\sqrt{2}}{4}$ [e] $\frac{1}{3}$

[9] [a] $3\sqrt{7}$ [b] $-5\sqrt{2}$ [c] $-\sqrt{65}$ [d] 0.6 [e] $4\sqrt{3}$

[10] [a] $\frac{5\sqrt{29}}{29}$ [b] $-\frac{\sqrt{29}}{2}$ [c] $-\frac{2}{5}$ [d] $-\frac{2\sqrt{29}}{29}$ [e] $-\frac{5}{2}$

[11] [a] you = 139.49 feet above ground, your friend = 9.75 feet from base of elevator
[b] funicular's track = 919 meters, top of hill = 553 meters higher than base
[c] $\$23$ on Jan 1, $\$29.61$ on Mar 1, $\$39.39$ on Sep 22

[12] [a] 49° [b] $\frac{2\pi}{9}$ [c] 74° [d] $\frac{5\pi}{12}$ [e] 65° [f] $\frac{3\pi}{10}$
[g] $\frac{2\pi}{5}$ [h] 68° [i] $\frac{2\pi}{7}$ [j] 34° [k] $\frac{3\pi}{8}$ [l] 51°

[13]

	$\theta_{REF} =$	Quadrant	$\sin\theta =$	$\cos\theta =$	$\tan\theta =$	$\csc\theta =$	$\sec\theta =$	$\cot\theta =$
[a]	$\frac{\pi}{4}$	4	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
[b]	$\frac{\pi}{3}$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$
[c]	$\frac{\pi}{4}$	2	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
[d]	$\frac{\pi}{3}$	3	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$	$-\frac{2\sqrt{3}}{3}$	-2	$\frac{\sqrt{3}}{3}$
[e]	$\frac{\pi}{6}$	3	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	-2	$-\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
[f]	$\frac{\pi}{6}$	2	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	2	$-\frac{2\sqrt{3}}{3}$	$-\sqrt{3}$

[14] [a] $(\cos t - \sin t)(\cos t + \sin t)$

$= \cos^2 t - \sin^2 t$

$= (1 - \sin^2 t) - \sin^2 t$

$= 1 - 2\sin^2 t$

[b] $\dfrac{\csc\theta}{\cos\theta\tan\theta} - \dfrac{\cos\theta}{\sin\theta\tan\theta}$

$= \dfrac{\frac{1}{\sin\theta}}{\cos\theta\frac{\sin\theta}{\cos\theta}} - \dfrac{\cos\theta}{\sin\theta\frac{\sin\theta}{\cos\theta}}$

$= \dfrac{\frac{1}{\sin\theta}}{\sin\theta} - \dfrac{\cos\theta}{\frac{\sin^2\theta}{\cos\theta}}$

$= \dfrac{1}{\sin\theta}\dfrac{1}{\sin\theta} - \cos\theta\dfrac{\cos\theta}{\sin^2\theta}$

$= \dfrac{1}{\sin^2\theta} - \dfrac{\cos^2\theta}{\sin^2\theta}$

$= \dfrac{1-\cos^2\theta}{\sin^2\theta}$

$= \dfrac{\sin^2\theta}{\sin^2\theta}$

$= 1$

[15] [a] $\dfrac{5\pi}{6}, \dfrac{7\pi}{6}$ [b] $\dfrac{\pi}{3}, \dfrac{4\pi}{3}$ [c] $\dfrac{\pi}{4}, \dfrac{7\pi}{4}$ [d] $\dfrac{5\pi}{6}, \dfrac{11\pi}{6}$ [e] $\dfrac{\pi}{6}, \dfrac{5\pi}{6}$ [f] $\dfrac{4\pi}{3}, \dfrac{5\pi}{3}$