

Math 42 Midterm 2 Review

[0]

$x =$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$
$\sin^{-1} x =$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$-\frac{\pi}{6}$	$-\frac{\pi}{4}$	$-\frac{\pi}{3}$	$-\frac{\pi}{2}$	NC	DNE	NC	DNE
$\cos^{-1} x =$	$\frac{\pi}{2}$	$\frac{\pi}{3}$	$\frac{\pi}{4}$	$\frac{\pi}{6}$	0	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	NC	DNE	NC	DNE
$\tan^{-1} x =$	0	NC	NC	NC	$\frac{\pi}{4}$	NC	NC	NC	$-\frac{\pi}{4}$	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$-\frac{\pi}{6}$	$-\frac{\pi}{3}$

NC = needs calculator DNE = does not exist

[1]

	[a]	[b]	[c]	[d]
Middle value	-3	-4	1	2
Amplitude	2	3	5	4
Period	4π	$\frac{8}{3}$	$\frac{6}{5}$	$\frac{2\pi}{3}$
Phase shift	$\frac{5\pi}{2}$	$\frac{2}{3}$	$-\frac{2}{15}$	$-\frac{5\pi}{9}$
Points	$(\frac{5\pi}{2}, -3)$	$(\frac{2}{3}, -7)$	$(-\frac{4}{30}, 1)$	$(-\frac{10\pi}{18}, 6)$
	$(\frac{7\pi}{2}, -1)$	$(\frac{4}{3}, -4)$	$(-\frac{5}{30}, -4)$	$(-\frac{7\pi}{18}, 2)$
	$(\frac{9\pi}{2}, -3)$	$(\frac{6}{3}, -1)$	$(-\frac{14}{30}, 1)$	$(-\frac{4\pi}{18}, -2)$
	$(\frac{11\pi}{2}, -5)$	$(\frac{8}{3}, -4)$	$(-\frac{23}{30}, 6)$	$(-\frac{\pi}{18}, 2)$
	$(\frac{13\pi}{2}, -3)$	$(\frac{10}{3}, -7)$	$(-\frac{32}{30}, 1)$	$(-\frac{2\pi}{18}, 6)$
	$(\frac{15\pi}{2}, -1)$	$(\frac{12}{3}, -4)$	$(-\frac{41}{30}, -4)$	$(-\frac{5\pi}{18}, 2)$
	$(\frac{17\pi}{2}, -3)$	$(\frac{14}{3}, -1)$	$(-\frac{50}{30}, 1)$	$(-\frac{8\pi}{18}, -2)$
	$(\frac{19\pi}{2}, -5)$	$(\frac{16}{3}, -4)$	$(-\frac{59}{30}, 6)$	$(-\frac{11\pi}{18}, 2)$
	$(\frac{21\pi}{2}, -3)$	$(\frac{18}{3}, -7)$	$(-\frac{68}{30}, 1)$	$(-\frac{14\pi}{18}, 6)$

Reciprocal function

[a] $y = 2\csc(\frac{1}{2}x - \frac{5\pi}{4}) - 3$

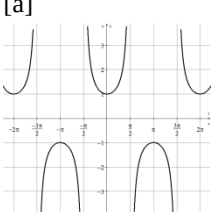
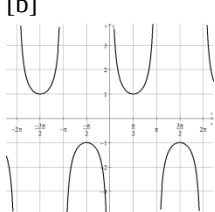
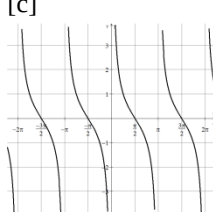
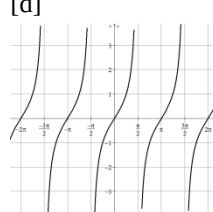
[b] $y = -3\sec(\frac{3\pi}{4}x - \frac{\pi}{2}) - 4$

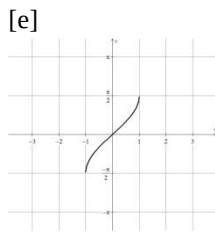
[c] $y = -5\csc(\frac{5\pi}{3}x + \frac{2\pi}{9}) + 1$

[d] $y = 4\sec(3x + \frac{5\pi}{3}) + 2$

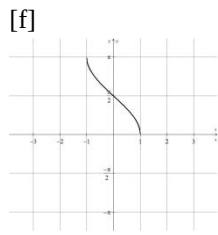
[2]

In all answers, n takes on all integer values

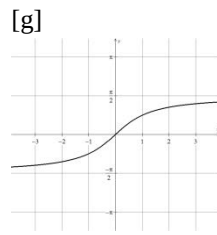
	[a]	[b]	[c]	[d]
				
Domain	$\{x \neq \frac{\pi}{2} + n\pi\}$	$\{x \neq n\pi\}$	$\{x \neq n\pi\}$	$\{x \neq \frac{\pi}{2} + n\pi\}$
Range	$(-\infty, 1] \cup [1, \infty)$	$(-\infty, 1] \cup [1, \infty)$	$(-\infty, \infty)$	$(-\infty, \infty)$
Asymptotes	$x = \frac{\pi}{2} + n\pi$	$x = n\pi$	$x = n\pi$	$x = \frac{\pi}{2} + n\pi$



Domain $[-1, 1]$
 Range $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 Asymptotes



Domain $[-1, 1]$
 Range $[0, \pi]$



Domain $(-\infty, \infty)$
 Range $(-\frac{\pi}{2}, \frac{\pi}{2})$
 Asymptotes $y = \pm \frac{\pi}{2}$

- [3] [a] $\infty, -\infty$ [b] 0 [c] $-\infty, \infty$ [d] $\frac{\pi}{2}$
 [e] $-\infty, \infty$ [f] $-\frac{\pi}{2}$ [g] $-\infty, -\infty$ [h] $-\infty, -\infty$
 [i] π [j] ∞, ∞ [k] $-\frac{\pi}{2}$ [l] ∞, ∞
 [m] $\frac{\pi}{2}$ [n] $\infty, -\infty$
- [4] [a] $\frac{2}{3}$ [b] $\frac{\pi}{6}$ [c] $\frac{\pi}{3}$ [d] $-\frac{\pi}{4}$ [e] $\frac{5\pi}{6}$ [f] $\frac{\pi}{3}$ [g] $-\frac{5}{4}$ [h] **DNE**
 [i] $\frac{4}{5}$ [j] $-\frac{3}{4}$ [k] **DNE** [l] $\frac{\pi}{4}$
- [5] [a] $\frac{2\sqrt{13}}{13}$ [b] $\frac{4\sqrt{7}}{7}$ [c] **DNE** [d] $\frac{3}{5}$ [e] $2\sqrt{2}$ [f] **DNE** [g] $-\frac{\sqrt{5}}{2}$ [h] $-\frac{2\sqrt{21}}{21}$
- [6] [a] $\frac{x+1}{\sqrt{-x^2-2x}}$ ⚠ [b] $\frac{2}{\sqrt{t^2+4}}$ [c] $\frac{\sqrt{y+3}}{2}$
 ⚠ This answer may look wrong because of all the negatives inside the square root.
 However, the original question only makes sense for certain values of x , which would also make the radicand positive.
- [7] ⚠ [a] $y = \frac{21}{2}\cos(\frac{5\pi}{3}(x + \frac{4}{5})) + \frac{9}{2}$ OR $y = \frac{21}{2}\cos(\frac{5\pi}{3}(x - \frac{2}{5})) + \frac{9}{2}$ OR
 $y = 10\cos(\frac{2}{3}(x + \frac{\pi}{2})) - 15$ OR $y = -\frac{21}{2}\cos(\frac{5\pi}{3}(x - 1)) + \frac{9}{2}$...
 [b] $y = 10\cos(\frac{2}{3}(x + \frac{\pi}{2})) - 15$ OR $y = 10\cos(\frac{2}{3}(x - \frac{5\pi}{2})) - 15$ OR
 $y = -10\cos(\frac{2}{3}(x + 2\pi)) - 15$ OR $y = -10\cos(\frac{2}{3}(x - \pi)) - 15$...
 ⚠ There are infinitely many answers to each question, including infinitely many which use sine instead of cosine.
 These answers did not use sine, because it was harder to determine at which x values the functions reach their middle values.
- [8] [a] $y = \frac{15}{4}\cos(\frac{\pi}{16}(t - 16)) + \frac{23}{4}$ or $y = -\frac{15}{4}\cos(\frac{\pi}{16}(t - 32)) + \frac{23}{4}$
 [b] 8.9 if this is not a leap year, 9.2 if this is a leap year
- [9] [a] first building = 645 meters, second building = 471 meters, distance between buildings = 200 meters
 [b] 73°
- [10] [a] 28° [b] 62°
- [11] [a] $\frac{1}{16}$ cycle per second [b] $y = -65\cos\frac{\pi}{8}t$ [c] $y = -65\sin\frac{\pi}{8}t$
- [12] [a] 15.5 miles north, 79.5 miles west [b] 13 miles south, 79.5 miles west
 [c] 80.6 miles on a bearing of 261° [d] 4:07pm