Quiz 7 (20 pts.)　　　　　　　Name: _KEY_

True or False (1 pt. each)

Answer the following by circling TRUE or FALSE. If the answer is false you must explain why in the space provided for full credit.

1.) **T** $\boxed{F}$ __$[-1,1]$__ The domain of $\sin^{-1} x$ is $(-1, 1)$.

2.) $\boxed{T}$ **F** _____ arctan x is defined when the domain of $\tan x$ is restricted to $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$
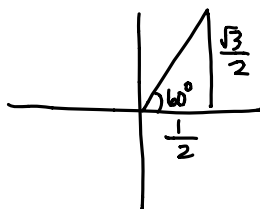
3.) $\boxed{T}$ **F** _____ The range of $\cos^{-1} x$ is $[0, \pi]$.

4.) **T** $\boxed{F}$ __all real numbers__ The domain of $\tan^{-1} x$ is $[-1, 1]$.

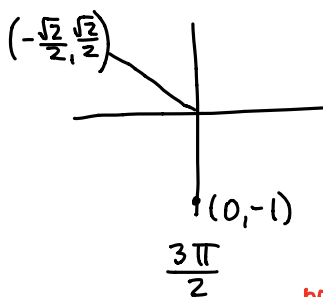5.) **T** $\boxed{F}$ _____ $\cos^{-1} x = \dfrac{1}{\cos x}$

Short Answer (4 pts. each)

11.) Find the exact value of the following:

(a.) $\cos^{-1}\left(\dfrac{1}{2} \right) = \boxed{60°}$

(b.) $\arcsin\left(\tan\left(\dfrac{3\pi}{4} \right) \right) = \arcsin\left(\dfrac{\left(\frac{\sqrt{2}}{2}\right)}{\left(-\frac{\sqrt{2}}{2}\right)} \right)$

$\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$(0, -1)$

$\dfrac{3\pi}{2}$

$= \arcsin\left(\dfrac{\sqrt{2}}{2} \cdot -\dfrac{2}{\sqrt{2}} \right)$

$= \arcsin(-1)$

not in range of arcsinx

$= \dfrac{3\pi}{2}$ or $\boxed{\dfrac{-\pi}{2}}$
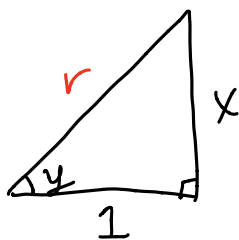
12.) Write $\cos(\arctan x)$ as an algebraic expression in x. (*Your answer should be free of trigonometric or inverse trigonometric functions.*)

$$\underbrace{\cos(\tan^{-1}x)}_{=\,y}$$

$$\Rightarrow \tan^{-1}x = y$$
$$\Rightarrow \tan y = x$$

r ⟋ x ⟍ y — 1

$r = \sqrt{x^2 + 1^2}$
$$= \sqrt{x^2 + 1}$$

$$\Rightarrow \cos(\tan^{-1}x) = \cos y$$

$$= \boxed{\dfrac{1}{\sqrt{x^2+1}}}$$

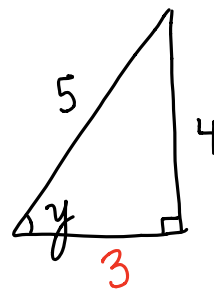13.) Find the exact value of $\sin\left(2\underbrace{\sin^{-1}\left(\frac{4}{5}\right)}_{\text{“}x\text{”}}\right)$.

$\lceil \sin 2x = 2\sin x \cos x \rfloor$

$$\sin\left(2\sin^{-1}\left(\tfrac{4}{5}\right)\right) = 2\sin\left(\sin^{-1}\left(\tfrac{4}{5}\right)\right)\cos\underbrace{\left(\sin^{-1}\left(\tfrac{4}{5}\right)\right)}_{\text{“}y\text{”}}$$

$$= 2\left(\tfrac{4}{5}\right)\left(\cos y\right)$$

$$= \tfrac{2}{1}\left(\tfrac{4}{5}\right)\left(\tfrac{3}{5}\right)$$

$$= \boxed{\dfrac{24}{25}}$$

Triangle: hypotenuse 5, side 4, base 3, angle y.

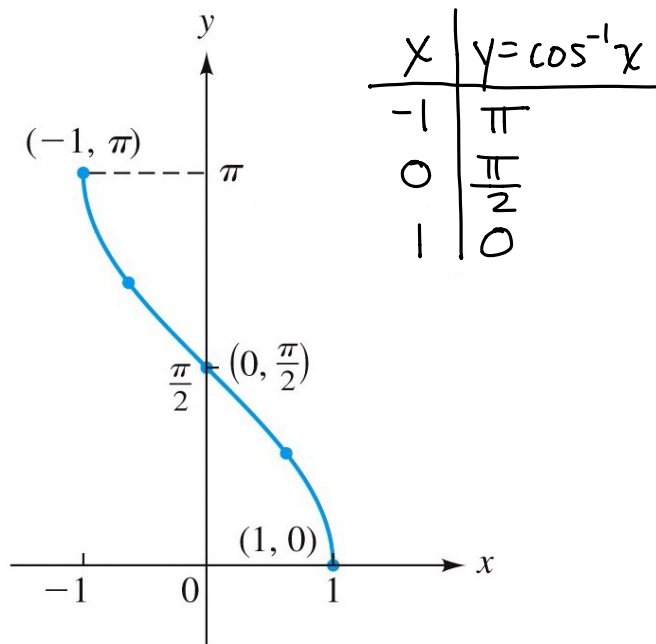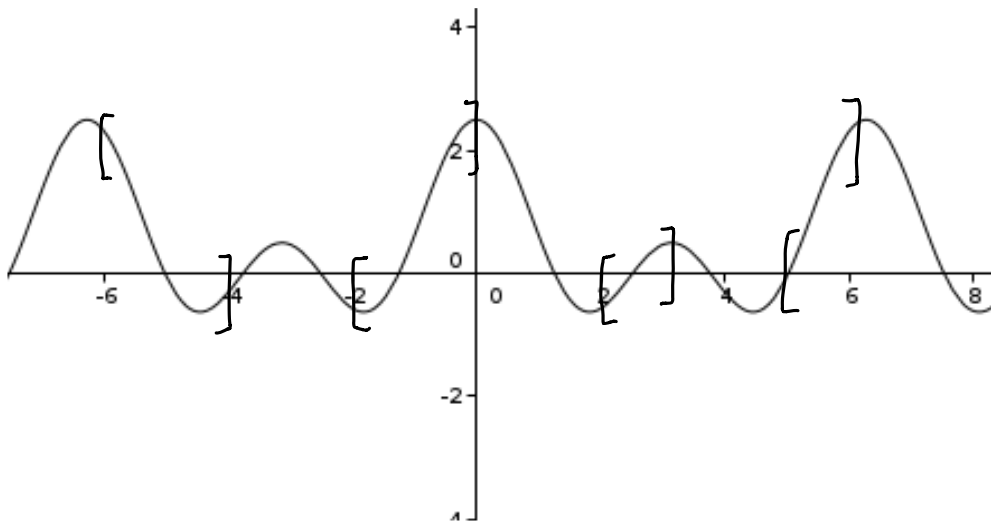**Multiple Choice** (1 pt. each)

1.) Which equation best describes the graph?

    (a) $y = \sin x$

    (b) $y = \cos x$

    (c) $y = \tan x$

    (d) $y = \sin^{-1} x$

    (e) $y = \cos^{-1} x$

    (f) $y = \tan^{-1} x$

x	$y = \cos^{-1} x$
-1	π
0	$\frac{\pi}{2}$
1	0

Graph labels: $(-1, \pi)$, $(0, \frac{\pi}{2})$, $(1, 0)$, $\frac{\pi}{2}$
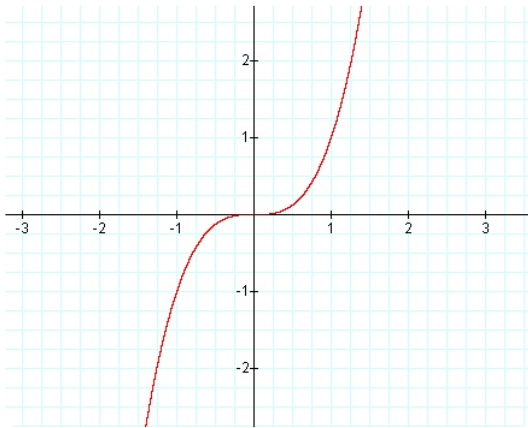
2.) The following graph is one-to-one on all of the following intervals except:
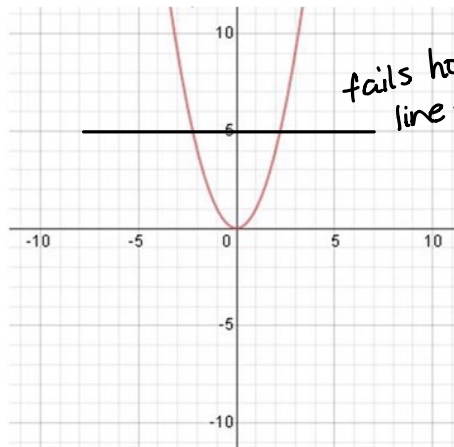
    (a) $[-2, 0]$

    (b) $[2, 3]$

    (c) $[-6, -4]$

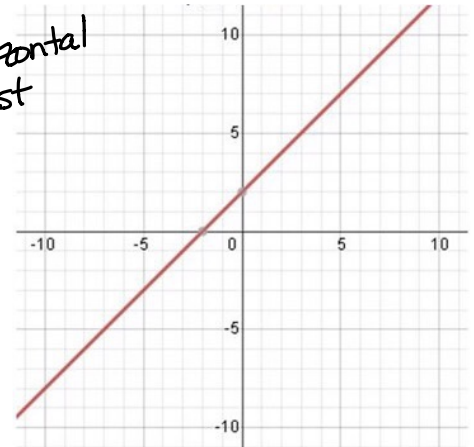   (d) $[5, 6]$

3.) Which of the following functions does not have an inverse?

Function A

fails horizontal line test

Function B

Function C

(a) Function A

(b) Function B

(c) Function C

(d) None of the above