

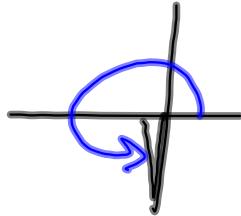
S².3 questions?

45, 63

$$y = \sin\left(\frac{\pi}{2}x\right) + 1 \stackrel{SET}{=} 0$$

$$\sin\left(\frac{\pi}{2}x\right) = -1$$

$$\frac{\pi}{2}x = \frac{3\pi}{2} + 2n\pi$$



$$x = \frac{3\pi}{2} \cdot \frac{2}{\pi} + \frac{2n\pi}{1} \cdot \frac{2}{\pi} = 3 + 4n$$

63

$$\tan^2 x + \tan x - 12 = 0$$

$$u^2 + u - 12 = 0$$

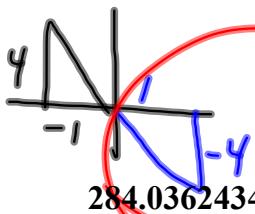
$$(u+4)(u-3) = 0$$

$$u = -4$$

$$u = 3$$

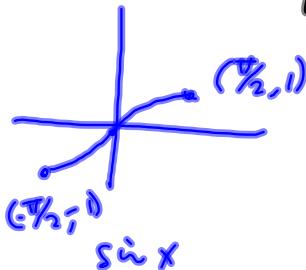
$$\tan x = -4$$

$$x \in [0, 2\pi]$$



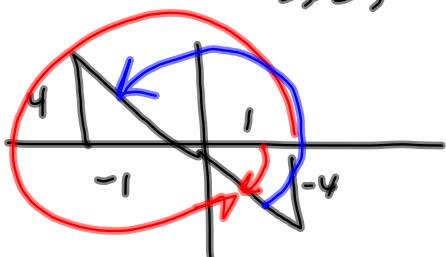
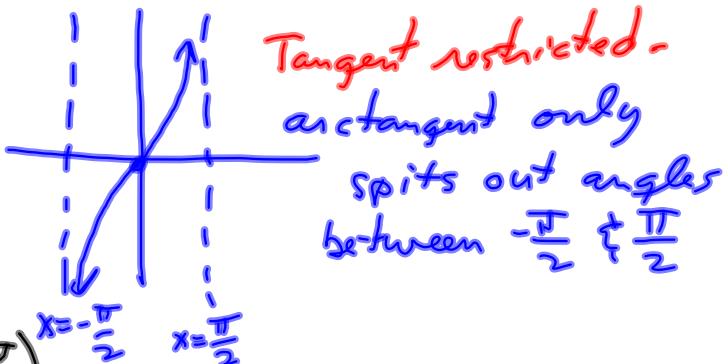
This is
the one
your
calculator
reports.

You have to know the
restricted graphs of sine, cosine and tangent.



$$D = \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \Rightarrow$$

$$R(\arcsin(x)) = \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

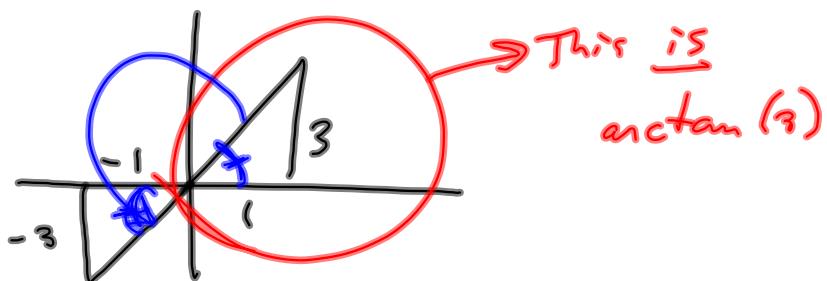


$\arctan(-4)$ isn't even
in $[0, 2\pi]$!

$\arctan(-4) + 2\pi$,
 $\arctan(-4) + \pi$

$$\tan x = 3$$

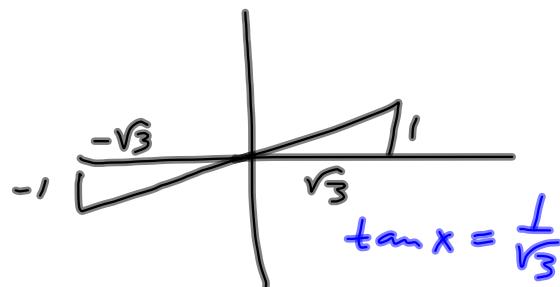
$$x = \arctan(3), \arctan(3) + \pi^-$$



$$3\tan^2 x = 1$$

$$\tan^2 x = \frac{1}{3}$$

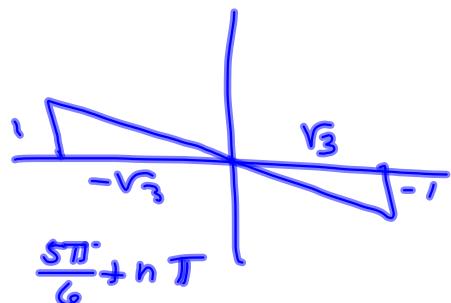
$$\tan x = \pm \frac{1}{\sqrt{3}}$$



$$\tan x = \frac{1}{\sqrt{3}}$$

Find All Solutions

$$x = \frac{\pi}{6} + n\pi$$



$$S'_{2.4} \quad u + (-v)$$

$$\sin(u+v) = \sin u \cos v + \cos u \sin v$$

$$\sin(2u) = \sin u \cos u + \cos u \sin u$$



$$u = \frac{\pi}{4}, v = \frac{\pi}{3} \quad = 2 \sin u \cos u$$

$$\sin\left(\frac{7\pi}{12}\right) = \sin\left(\frac{\pi}{4} + \frac{\pi}{3}\right) = \sin\frac{\pi}{4} \cos\frac{\pi}{3} + \cos\frac{\pi}{4} \sin\frac{\pi}{3}$$

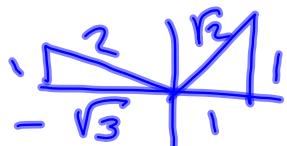
$$\frac{7\pi}{12} = \frac{3\pi}{12} + \frac{4\pi}{12} = \frac{\pi}{4} + \frac{\pi}{3} = \frac{1}{\sqrt{2}} \cdot \frac{1}{2} + \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2}$$

$$= \frac{\sqrt{3} + 1}{2\sqrt{2}}$$

$$\sin\left(\frac{\pi}{4} + \frac{\pi}{3}\right)$$

$$\frac{7\pi}{12} = \frac{10\pi}{12} - \frac{3\pi}{12} = \frac{5\pi}{6} - \frac{\pi}{4}$$

$$\sin(u-v) = \sin u \cos v - \cos u \sin v$$



$$= \sin\left(\frac{5\pi}{6}\right) \cos\frac{\pi}{4} - \cos\frac{5\pi}{6} \sin\frac{\pi}{4}$$

$$\frac{1}{2} \cdot \frac{1}{\sqrt{2}} - \left(-\frac{\sqrt{3}}{2}\right) \left(\frac{1}{\sqrt{2}}\right)$$

$$= \boxed{\frac{1+\sqrt{3}}{2\sqrt{2}}}$$

S2.4 #36

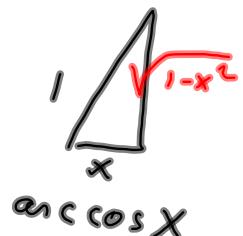
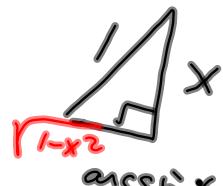
$$\frac{\pi}{16} + \frac{3\pi}{16} = \frac{4\pi}{16} \text{ Sweet!}$$

$$\cos \frac{\pi}{16} \cos \frac{3\pi}{16} - \sin \frac{\pi}{16} \sin \frac{3\pi}{16} = \cos \frac{\pi}{4} = \frac{1}{\sqrt{2}}$$

$$\cos(u+v) = \cos u \cos v - \sin u \sin v$$

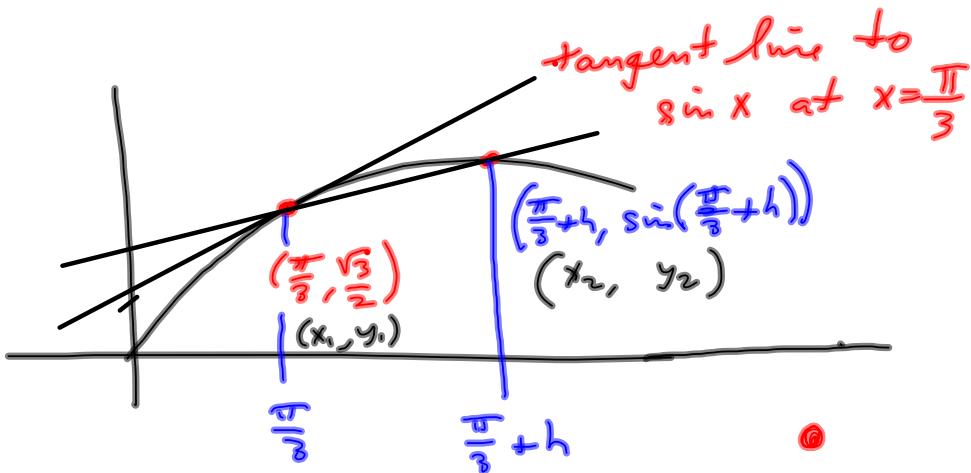
$$\sin(\arcsin x + \arccos x)$$

$$\sin(u+v) = \sin u \cos v + \cos u \sin v$$



$$= \underline{\sin(\arcsin x)} \cos(\arccos x) + \cos(\arcsin x) \sin(\arccos x)$$
$$x \quad \cdot \quad x \quad + \sqrt{1-x^2} \quad \cdot \quad \sqrt{1-x^2}$$

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



Slope of the secant line =
average slope of the curve

$$\begin{aligned}
 &= \frac{y_2 - y_1}{x_2 - x_1} = \frac{\sin\left(\frac{\pi}{3} + h\right) - \sin\frac{\pi}{3}}{\frac{\pi}{3} + h - \frac{\pi}{3}} = \\
 &= \frac{\sin\left(\frac{\pi}{3} + h\right) - \sin\frac{\pi}{3}}{h} \\
 &= \frac{\sin\frac{\pi}{3}\cos h + \cos\frac{\pi}{3}\sin h - \sin\frac{\pi}{3}}{h} \\
 &= \frac{\sin\frac{\pi}{3}(\cos h - 1) + \cos\frac{\pi}{3}\sin h}{h} \\
 &= \left(\sin x\right)\left(\frac{\cos h - 1}{h}\right) + \boxed{\left(\cos\right)} \left(\frac{\sin h}{h}\right) = f(h)
 \end{aligned}$$

$$h \quad f(h)$$

- .5
- .2
- .1
- .05
- .02
- .01