

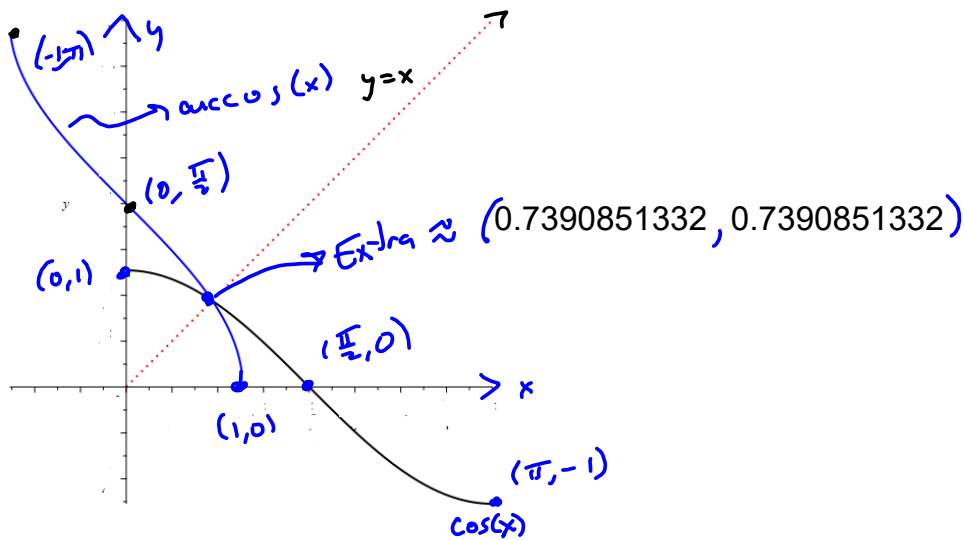
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WEEK 4 SOL'NS

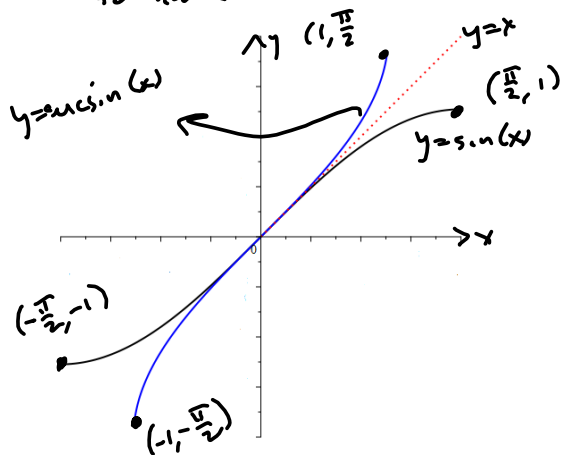
H. MILLS

① We sketch the graphs of...

② (Spts)  $y = \cos(x)$  with the standard restriction to make it 1-to-1 and  $\arccos(x) = y$

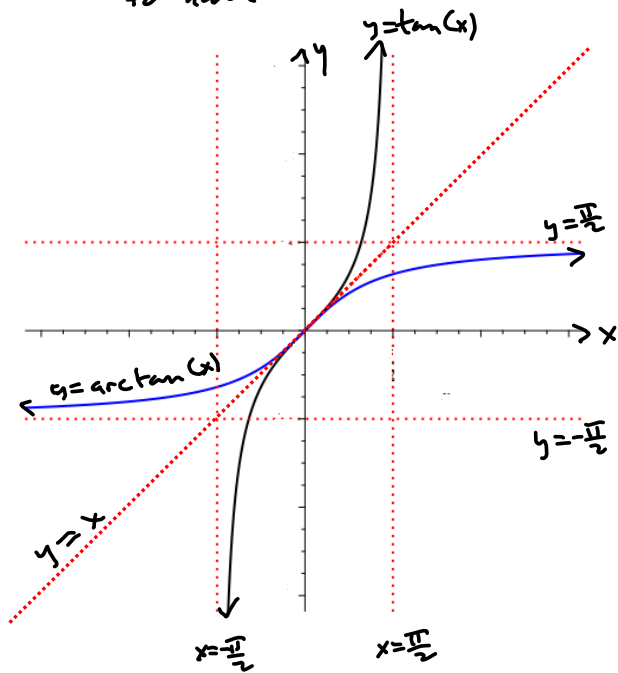


③ (Spts)  $y = \sin(x)$  with the standard restriction to make it 1-to-1 and  $\arcsin(x) = y$



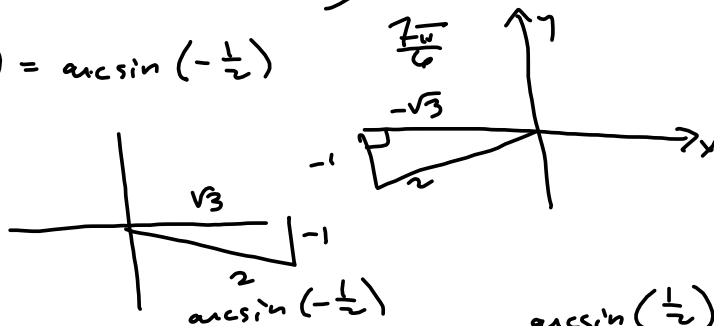
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(c) (Spts)  $y = \tan(x)$  with the standard restriction to make it 1-to-1 and  $\arctan(x) = y$

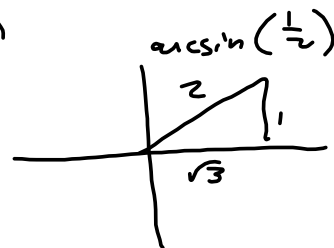


(2) we find the exact value of the following

(a) (Spts)  $\arcsin\left(\sin\left(\frac{7\pi}{6}\right)\right) = \arcsin\left(-\frac{1}{2}\right)$   
 $= \boxed{-\frac{\pi}{6}}$



(b) (Spts)  $\sec\left(\arcsin\left(\frac{1}{2}\right)\right) = \sec\left(\frac{\pi}{6}\right)$   
 $= \frac{1}{\cos\left(\frac{\pi}{6}\right)} = \frac{1}{\frac{\sqrt{3}}{2}} = \boxed{\frac{2}{\sqrt{3}}}$

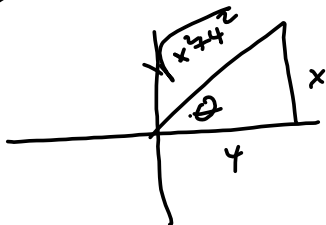


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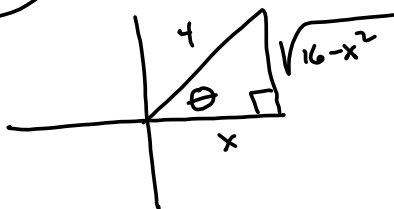
MILLS

③ we draw the picture in QI and write an equivalent expression.

② (5pts)  $\cos(\arctan(\frac{x}{4})) = \cos \theta = \frac{4}{\sqrt{x^2+16}}$



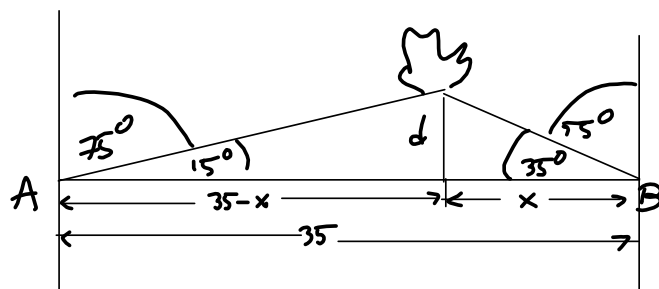
⑤ (5pts)  $\tan(\arccos(\frac{x}{4})) = \tan \theta = \frac{\sqrt{16-x^2}}{x}$



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 (4) 5pts

MILLS

Fire tower  $A$  is 35 miles due west of fire tower  $B$ . A fire is spotted from the towers, and the bearings from  $A$  and  $B$  are  $\theta = 75^\circ$  &  $\phi = 55^\circ$ , respectively. We find the distance  $d$  of the fire from the line segment  $AB$ .



Let  $d$  = distance from  $\overline{AB}$  to the fire, in miles.

Let  $x$  be as shown in the diagram, also in miles.

$$\text{Then } \frac{d}{35-x} = \tan 15^\circ \quad \& \quad \frac{d}{x} = \tan 35^\circ$$

$$\Rightarrow (35-x)\tan 15^\circ = d = x \tan 35^\circ \Rightarrow$$

$$(35-x)a = x \cdot b, \text{ where } a = \tan 15^\circ, b = \tan 35^\circ \Rightarrow$$

$$35a - ax = bx \Rightarrow$$

$$-ax - bx = -35a \Rightarrow$$

$$ax + bx = (a+b)x = 35a$$

$$\Rightarrow x = \frac{35a}{a+b} = \frac{35 \tan 15^\circ}{\tan 15^\circ + \tan 35^\circ} \approx 9.68667720657 \quad xx$$

$$\Rightarrow d = x \tan 35^\circ \approx 9.68667720657 \tan 35^\circ \approx$$

$$\approx \boxed{6.78268440024 \text{ mi} \approx d}$$