~~Homework~~ MTH30

Section 4.7/35, 41, 47, 53, 57

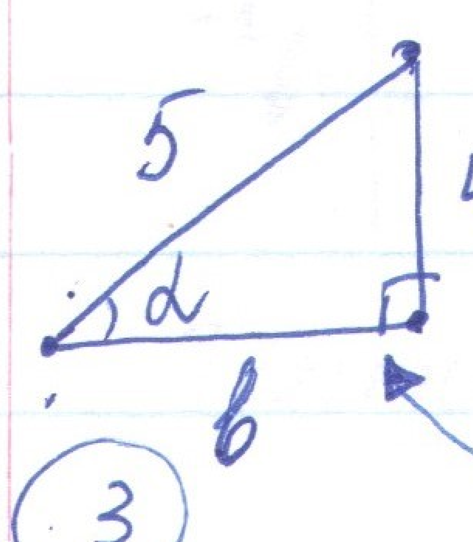
#35 $\sin^{-1}\left(\sin\frac{5\pi}{6}\right) = \sin^{-1}\left(\frac{1}{2}\right) = \boxed{\frac{\pi}{6}}$

cannot say $\frac{5\pi}{6}$ is the answer, because it is out of range of $\sin^{-1}$; hence, we'll evaluate $\sin\frac{5\pi}{6}$ first.

#41 $\tan^{-1}\left(\tan\frac{2\pi}{3}\right) = \tan^{-1}\left(-\sqrt{3}\right) = \boxed{-\frac{\pi}{3}}$

cannot say that $\frac{2\pi}{3}$ is the answer, since it is out of the range of $\tan^{-1}$; therefore, we'll evaluate $\tan\frac{2\pi}{3}$ first.

#47 $\cos\left(\sin^{-1}\frac{4}{5}\right) = \boxed{\frac{3}{5}}$



from $\sin^{-1}\frac{4}{5}$ we realize that

$\sin\alpha = \frac{4}{5} = \frac{\text{opposite}}{\text{hypotenuse}}$

so we'll draw a sketch of a right triangle

Let's find the missing side, and use it to find cos.

$5^2 = b^2 + 4^2 \qquad b^2 = 25 - 16 = 9 \qquad \boxed{b = 3}$

So, $\cos\alpha = \frac{\text{adjacent}}{\text{hypotenuse}} = \boxed{\frac{3}{5}}$

#5 $\sin^{-1}\left(-\frac{1}{2}\right) = \boxed{-\frac{\pi}{6}}$

#17 $\tan^{-1}(-\sqrt{3}) = -\tan^{-1}(\sqrt{3}) = \boxed{-\frac{\pi}{3}}$

(odd function)

#53 $\sin\left(\cos^{-1}\frac{\sqrt{2}}{2}\right) = \sin\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$

comment: sketch is not needed here, since we have $\frac{\sqrt{2}}{2}$ in the table

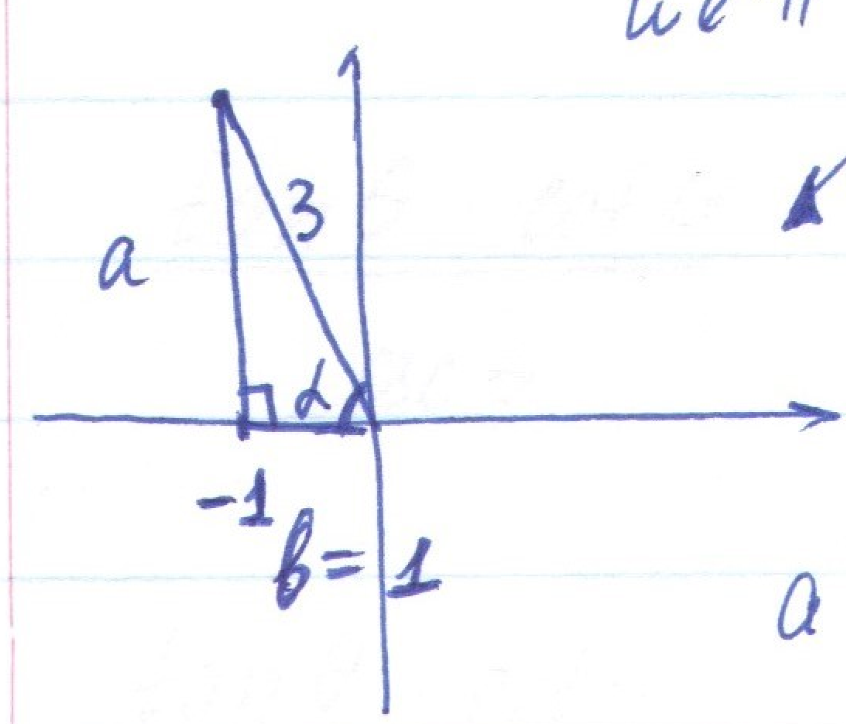
#57 $\tan\left(\cos^{-1}\left(-\frac{1}{3}\right)\right) = \boxed{2\sqrt{2}}$

$\cos^{-1}\left(-\frac{1}{3}\right)$ means that there is an angle α, such that $\cos\alpha = -\frac{1}{3} = \frac{\text{opposite}}{\text{adjacent}}$

"–" means that it is either in the II or III quadrant.

−	+
−	+

Since $\cos^{-1}$ ~~domain~~ range is $[0, \pi]$ we'll restrict ourselves to the II quadrant.



$\tan\alpha = \frac{\text{opposite}}{\text{adjacent}}$ ← need to find / ← know.

$a^2 + 1^2 = 3^2$ $\quad a^2 = 9 - 1 = 8$ $\quad a = 2\sqrt{2}$

Therefore $\tan\alpha = \frac{2\sqrt{2}}{1} = \boxed{2\sqrt{2}}$