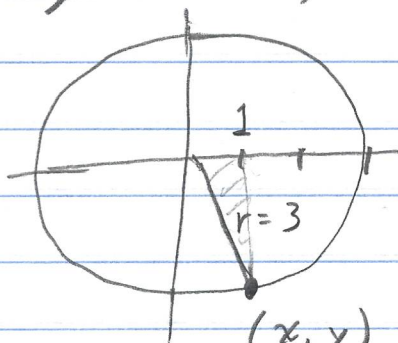


1.3 #9

If $\cos \theta = \frac{1}{3}$ and $\theta \in \left[-\frac{\pi}{2}, 0\right]$ then
 $\sin \theta = ?$ and $\tan \theta = ?$

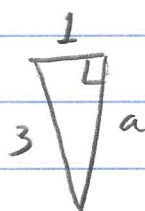
Solution

Well, we have $\cos \theta = x/r$ (see Figure 1.40). With $\theta \in \left[-\frac{\pi}{2}, 0\right]$ we have:



$$(x, y) = (1, -2\sqrt{2})$$

We take $x = 1$ and $r = 3$.



We have here

$$(1)^2 + (a)^2 = 3^2$$

$$\text{or } a^2 = 8.$$

$$\text{or } \sqrt{a^2} = \sqrt{8} \text{ or}$$

$$|a| = 2\sqrt{2} \text{ or } a = \pm 2\sqrt{2}.$$

Since $y < 0$ (point (x, y) is in quadrant IV) then $y = -2\sqrt{2}$.

Hence

$$\sin \theta = \frac{y}{r} = \frac{-2\sqrt{2}}{3}$$

$$\tan \theta = \frac{y}{x} = \frac{-2\sqrt{2}}{1} = -2\sqrt{2}$$

□