e) The results observed in a), valid for any trigonometric point in the 1st quadrant, are generalized and bring us to the definition of the Cartesian coordinates of any trigonometric point P(t).

We have: P(t) = (cos t, sin t) where $0 \leqslant t \leqslant 2\pi$.

Calculate, using a calculator, the Cartesian coordinates of

1. P(100°) _**(–0.17, 0.98)**_   2. P(200°) _**(–0.94, –0.34)**_   3. P(300°) _**(0.5, –0.87)**_

CARTESIAN COORDINATES OF A TRIGONOMETRIC POINT

- Given a trigonometric point P(t). ($0 \leqslant t \leqslant 2\pi$)
  - the x-coordinate of P(t) is equal to **cos t**.
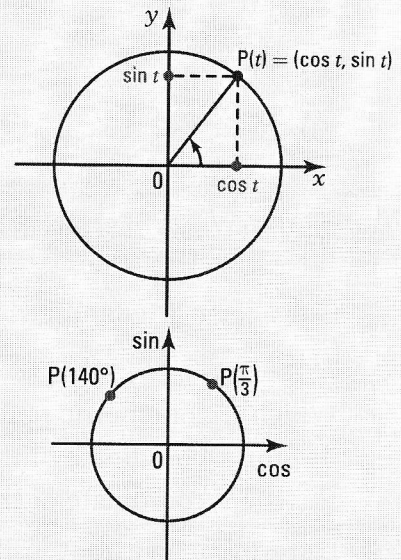 - the y-coordinate of P(t) is equal to **sin t**.
  Note that:

$$\boxed{P(t) = (\cos t, \sin t)}$$

By convention, we call the x-axis the **cosine axis**, and the y-axis the **sine axis**.

Ex.: $P\left(\dfrac{\pi}{3}\right) = \left(\cos\dfrac{\pi}{3}, \sin\dfrac{\pi}{3}\right) = \left(\dfrac{1}{2}, \dfrac{\sqrt{3}}{2}\right)$

P(140°) = (cos 140°, sin 140°) = (–0.7660, 0.6428)

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9. For each of the following trigonometric points P(t), indicate
1. the quadrant in which the trigonometric point is located.
2. the sign of cos t and the sign of sin t.

a) P(160°)
1. _**II**_
2. _**(–, +)**_

b) P(350°)
1. _**IV**_
2. _**(+, –)**_

c) P(–150°)
1. _**III**_
2. _**(–, –)**_

d) P(750°)
1. _**I**_
2. _**(+, +)**_

e) $P\left(\dfrac{5\pi}{6}\right)$
1. _**II**_
2. _**(–, +)**_

f) $P\left(\dfrac{5\pi}{3}\right)$
1. _**IV**_
2. _**(+, –)**_

g) $P\left(-\dfrac{2\pi}{3}\right)$
1. _**III**_
2. _**(–, –)**_

h) $P\left(\dfrac{10\pi}{3}\right)$
1. _**III**_
2. _**(–, –)**_

10. Using a calculator, determine the coordinates of the following trigonometric points to the nearest thousandth.

a) P(175°) _**(–0.996, 0.087)**_

b) P(625°) _**(–0.087, –0.996)**_

c) $P\left(\dfrac{11\pi}{5}\right)$ _**(0.809, 0.588)**_

d) $P\left(-\dfrac{29\pi}{6}\right)$ _**(–0.866, –0.5)**_

11. Knowing that $P(t) = \left(\dfrac{3}{5}, \dfrac{-4}{5}\right)$ is a trigonometric point, determine

a) $\cos t = \dfrac{3}{5}$

b) $\sin t = -\dfrac{4}{5}$

c) $\tan t = -\dfrac{4}{3}$

d) $\sec t = \dfrac{5}{3}$

e) $\csc t = -\dfrac{5}{4}$

f) $\cotan t = -\dfrac{3}{4}$