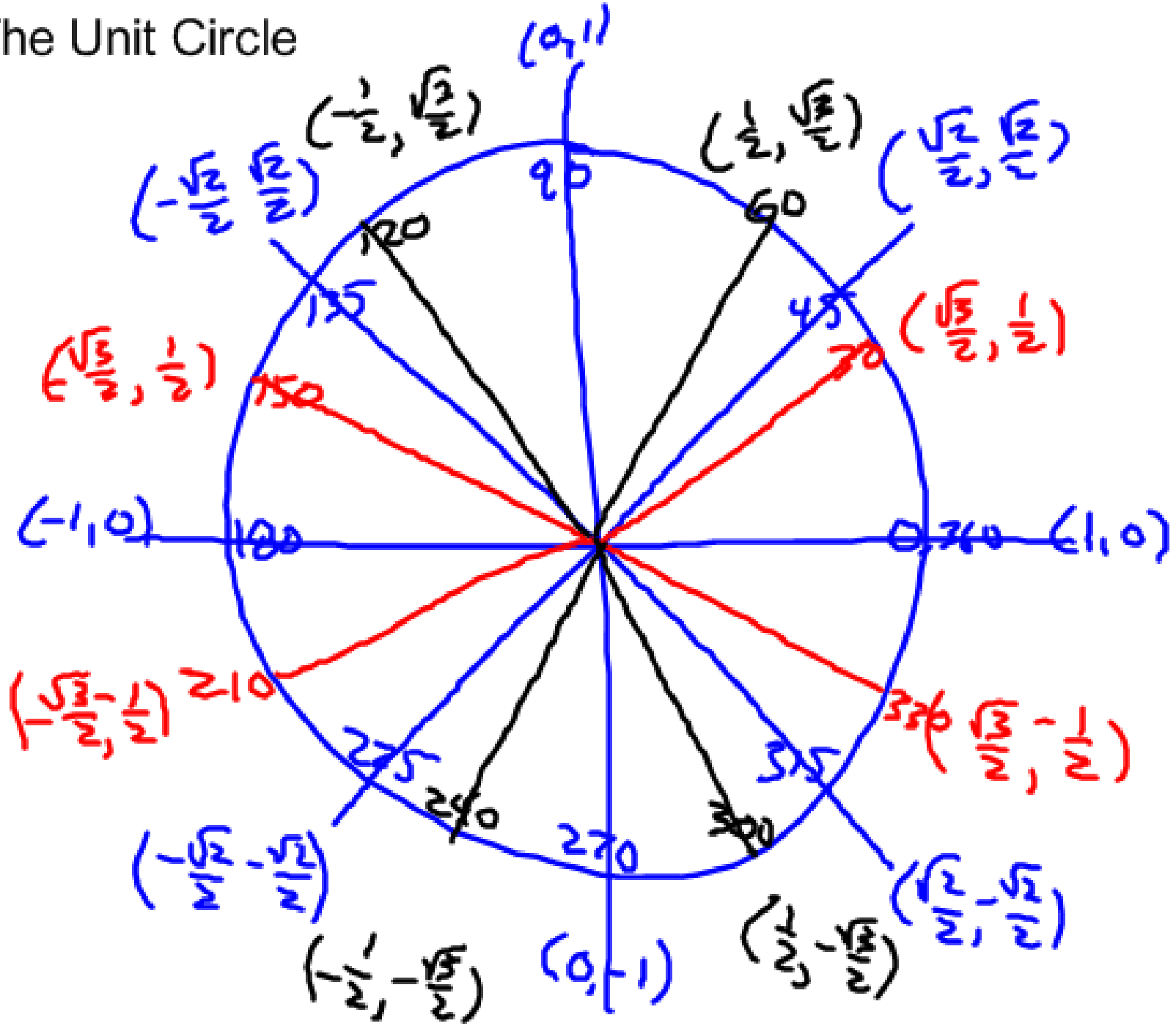
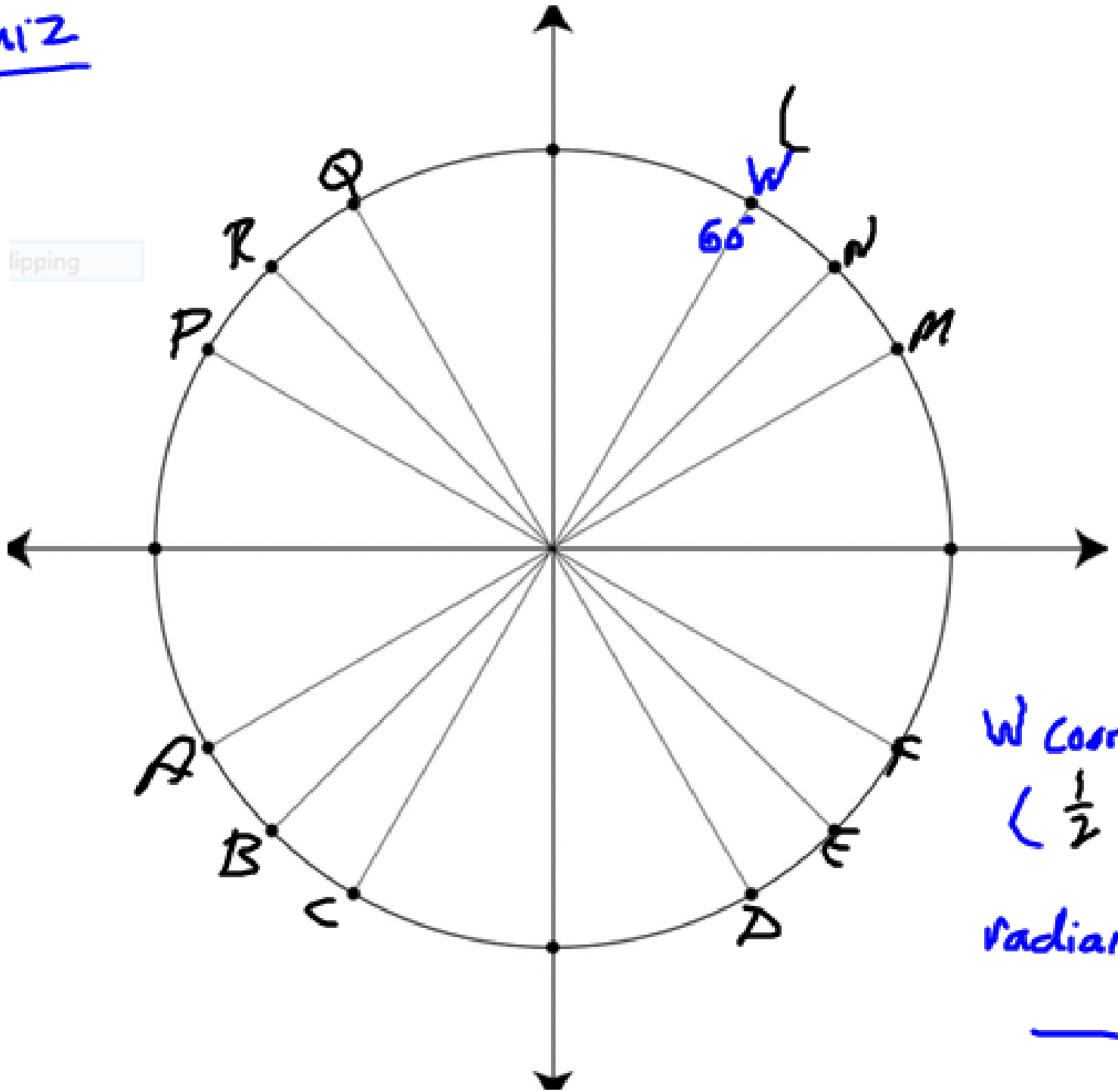
The Unit Circle

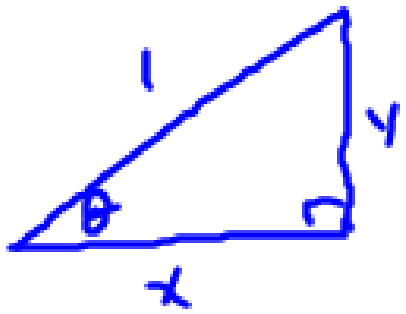


Quiz



W coordinates $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

radians $\pi/3$



$x^2+y^2=1$

$\cos\theta=\frac{x}{1}$ $\quad x=\cos\theta$

$\sin\theta=\frac{y}{1}$ $\quad y=\sin\theta$

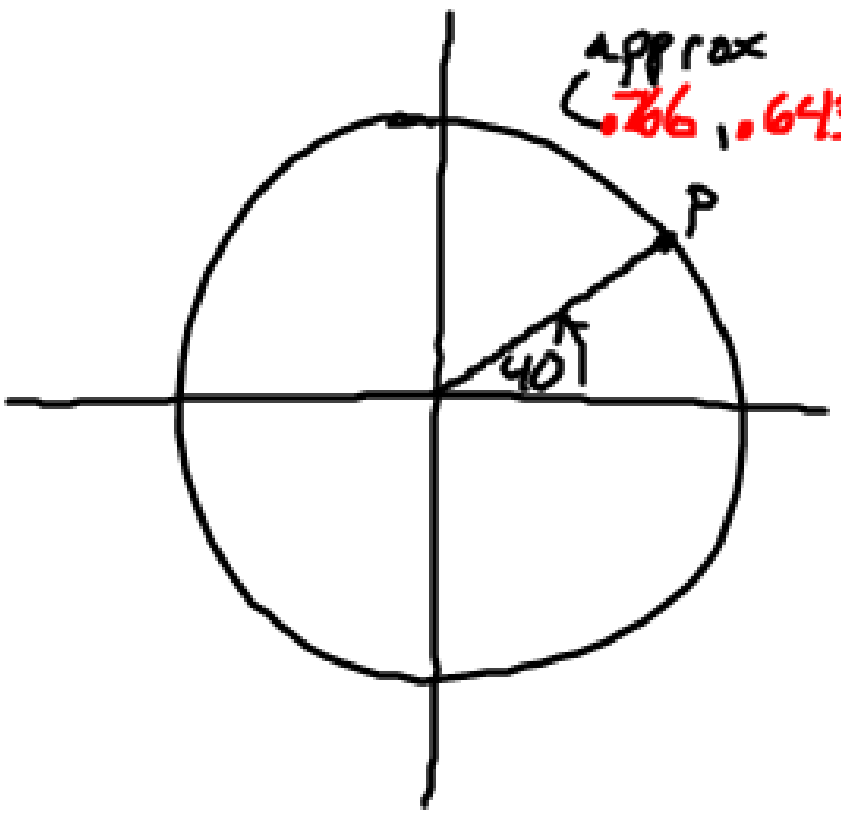
$\therefore \boxed{\sin^2\theta+\cos^2\theta=1}$ Pythagorean Identity

$\tan\theta=\frac{y}{x}$

$\therefore \boxed{\tan\theta=\frac{\sin\theta}{\cos\theta}}$

exact Point P $(\cos 40^\circ, \sin 40^\circ)$

approx $(.766, .643)$



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$x^2+y^2=1$

$r=1$

center $(0,0)$

2. Is each point on the unit circle? How do you know?

a) $\left(-\frac{3}{4}, \frac{1}{4}\right)$

b) $\left(\frac{\sqrt{5}}{8}, \frac{7}{8}\right)$

c) $\left(-\frac{5}{13}, \frac{12}{13}\right)$

d) $\left(\frac{4}{5}, -\frac{3}{5}\right)$ → $\frac{16}{25}+\frac{9}{25}$ ✓

a) $\left(-\frac{3}{4}\right)^2+\left(\frac{1}{4}\right)^2=\frac{10}{16}$ Not

b) $\frac{5}{64}+\frac{49}{64}=\frac{54}{64}$ No

c) $\frac{25}{169}+\frac{144}{169}=\frac{169}{169}$ Yes.

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3. Determine the missing coordinate(s) for all points on the unit circle satisfying the given conditions. Draw a diagram to support your answer.

a) $\left(\frac{1}{4}, y\right)$ in quadrant I

b) $\left(x, \frac{2}{3}\right)$ in quadrant II

c) $\left(-\frac{7}{8}, y\right)$ in quadrant III

$x^2+y^2=1$

a) $x=\frac{1}{4}$

$\left(\frac{1}{4}\right)^2+y^2=1$

$\frac{1}{16}+y^2=1$

$y^2=\frac{15}{16}$

$y=\pm\sqrt{\frac{15}{16}}=\frac{\pm\sqrt{15}}{4}$

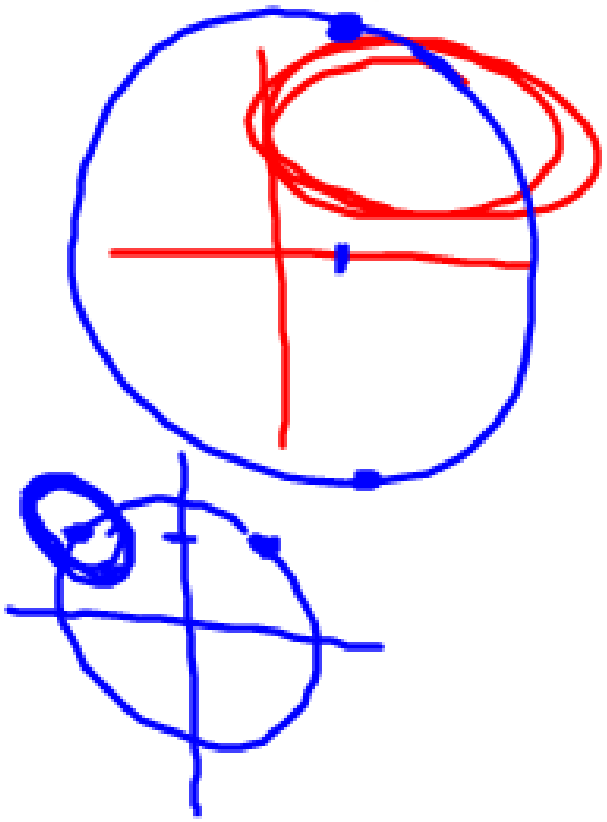
quad I $\therefore \frac{\sqrt{15}}{4}$

$\left(-\frac{7}{8}\right)^2+y^2=1$

$\frac{49}{64}+y^2=1$

$y^2=\frac{15}{64}$

$y=-\frac{\sqrt{15}}{8}$



b) $y=\frac{2}{3}$

$x^2+\left(\frac{2}{3}\right)^2=1$

$x^2+\frac{4}{9}=1$

$x^2=\frac{5}{9}$ $x=\pm\sqrt{\frac{5}{9}}=\pm\frac{\sqrt{5}}{3}$ quad II $\therefore x=-\frac{\sqrt{5}}{3}$

4. If P(θ) is the point at the intersection of the terminal arm of angle θ and the unit circle, determine the exact coordinates of each of the following.

a) $P(\pi)$ $(-1,0)$

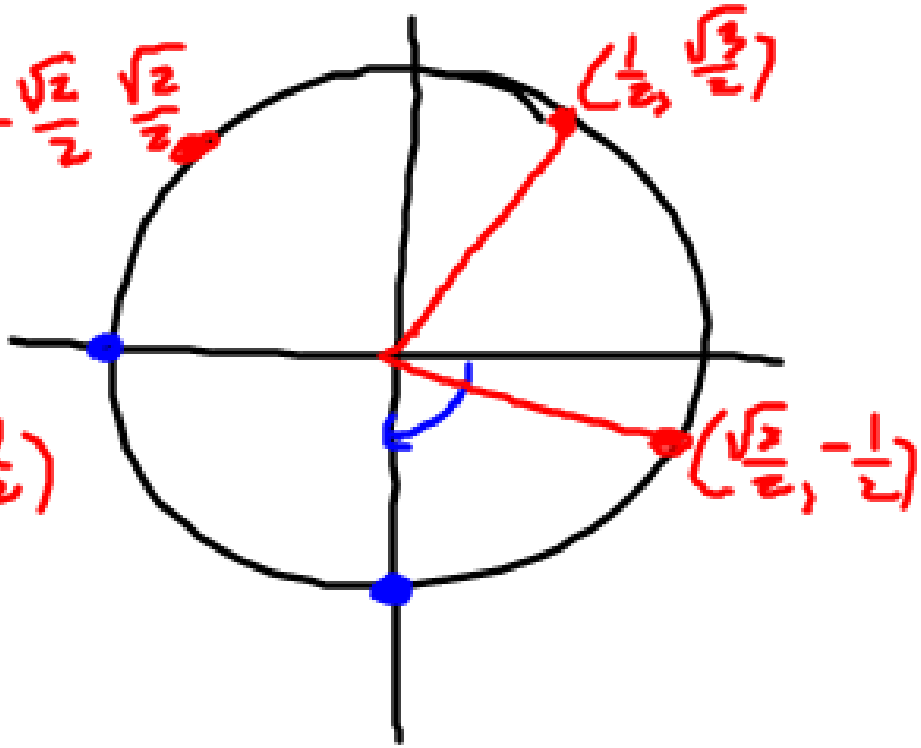
b) $P\left(-\frac{\pi}{2}\right)$ $(0,-1)$

c) $P\left(\frac{\pi}{3}\right)$ $\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$

d) $P\left(-\frac{\pi}{6}\right)$ $\left(\frac{\sqrt{3}}{2},-\frac{1}{2}\right)$

$-30°$

e) $P\left(\frac{3\pi}{4}\right)$ $\left(-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$



$\frac{3\pi}{4}\cdot\frac{180^\circ}{\pi}=\frac{540}{4}=135^\circ$

$0 \leq \theta \leq 2\pi$

5. Identify a measure for the central angle θ in the interval $0 \leq \theta < 2\pi$ such that $P(\theta)$ is the given point.

a) $(0, -1)$ $\frac{3\pi}{2}$

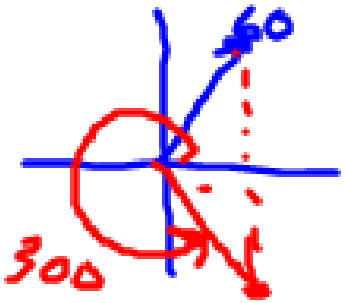
b) $(1, 0)$ 0

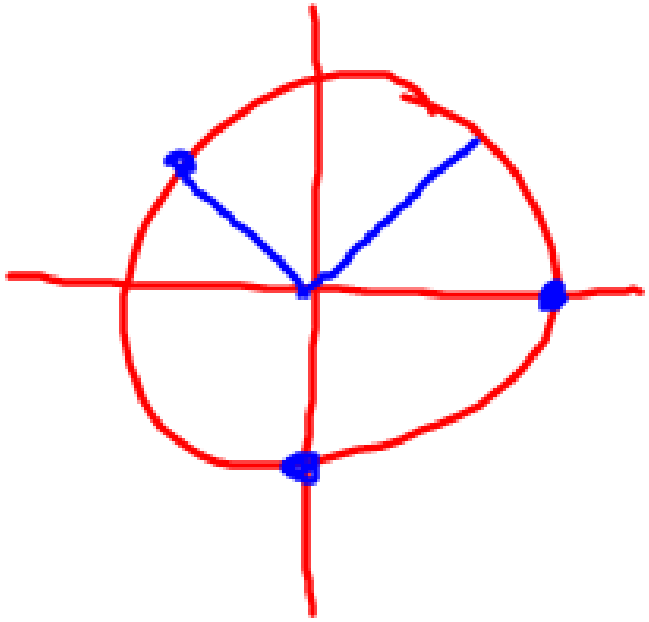
c) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $\frac{\pi}{4}$

d) $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ $\frac{3\pi}{4}$

e) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ $\frac{\pi}{3}$

f) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $\frac{5\pi}{3}$





$\sqrt{\frac{1}{2}}$

$\frac{1}{\sqrt{2}}$

$\frac{\sqrt{2}}{2}$

6. Determine one positive and one negative measure for θ if $P(\theta) = \left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$.

150°

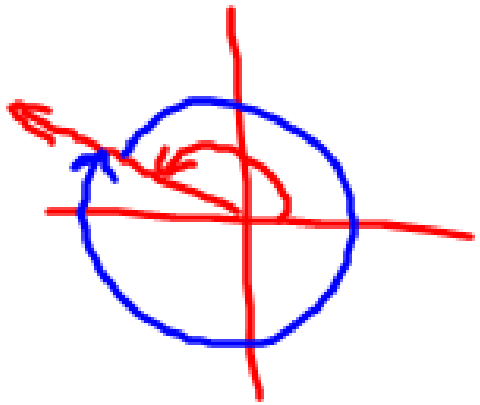
$-360°$

$-210°$

$\frac{5\pi}{6}$

$-\frac{7\pi}{6}$

$-\frac{12\pi}{6}$



finish 2-16, pgs.186-189 (skip 11,14)