

section 7.3

7.3 L

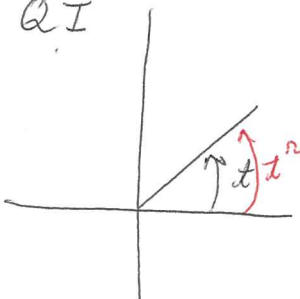
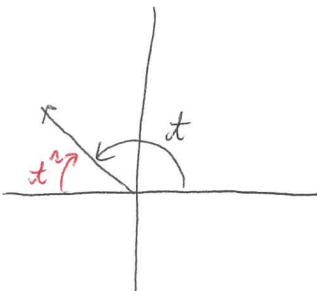
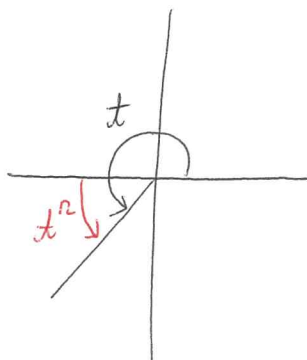
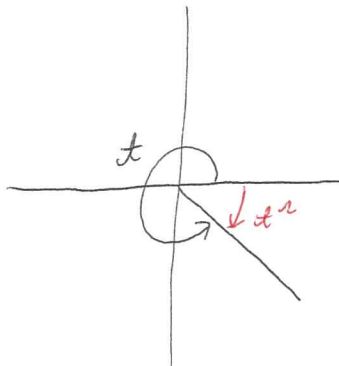
Q II	Q I
S: Sine trigonometric function is positive	A: All trigonometric function values are positive
T: Tangent trigonometric function is positive	C: Cosine trigonometric function is positive
Q III	Q IV

Pythagorean Identity in trigonometric form

$$\cos^2 t + \sin^2 t = 1 \quad (\cos t)^2 + (\sin t)^2 = 1$$

for $\sin(t)$ and $\cos(t)$ Domain: $(-\infty, \infty)$, Range: $[-1, 1]$

given an angle t and reference angle t^r

Q I	Q II	Q III	Q IV
			
$t^r = t$	$t^r = (\pi - t)$	$t^r = (t - \pi)$	$t^r = (2\pi - t)$

$$6) \sin(x) < 0 \text{ and } \cos(x) < 0 \rightarrow \underline{\underline{Q III}}$$

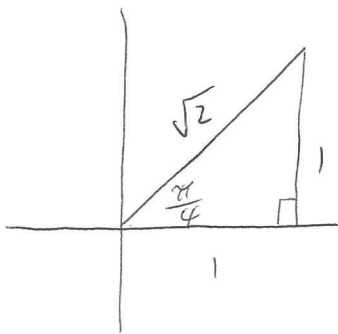
$$8) \sin(x) > 0 \text{ and } \cos(x) < 0 \rightarrow \underline{\underline{Q II}}$$

$$10) \underline{\underline{\sin\left(\frac{\pi}{2}\right) = 1}}$$

$$12) \underline{\underline{\cos\left(\frac{\pi}{2}\right) = 0}}$$

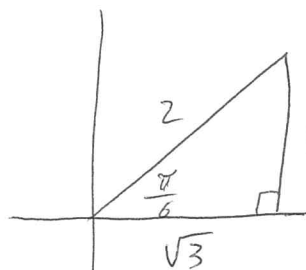
use special triangles on section 7.2

$$14) \sin\left(\frac{\pi}{4}\right)$$



$$\underline{\underline{\sin\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}}}$$

$$16) \sin\left(\frac{\pi}{6}\right)$$



$$\underline{\underline{\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}}}$$

$$18) \underline{\underline{\sin\left(\frac{3\pi}{2}\right) = -1}}$$

$$20) \underline{\underline{\cos(0) = 1}}$$

$$22) \underline{\underline{\sin(0) = 0}}$$

$$24) -170^\circ$$

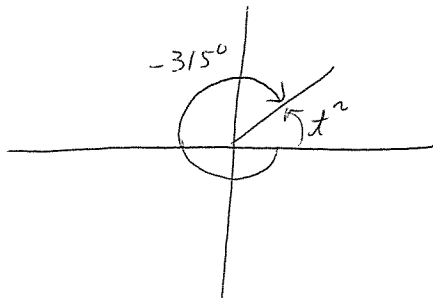
Q II



$$x^r = |180^\circ - 170^\circ|$$

$$\underline{\underline{x^r = 10^\circ}}$$

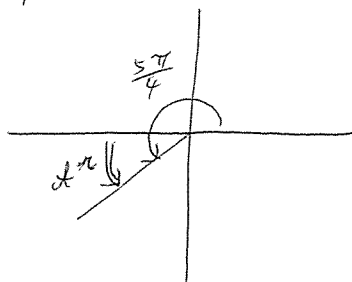
26) -315° QI



$$x^n = |360^\circ - 315^\circ|$$

$$\underline{\underline{x^n = 45^\circ}}$$

28) $\frac{5\pi}{4}$ QIII

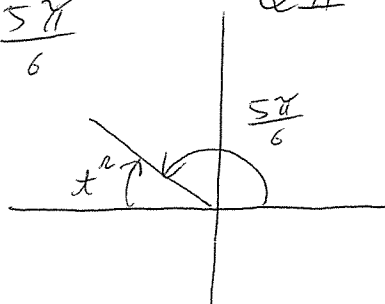


$$x^n = \left(\frac{5\pi}{4}\right) - \pi$$

$$x^n = \frac{5\pi}{4} - \frac{4\pi}{4}$$

$$\underline{\underline{x^n = \frac{\pi}{4}}}$$

30) $\frac{5\pi}{6}$ QII

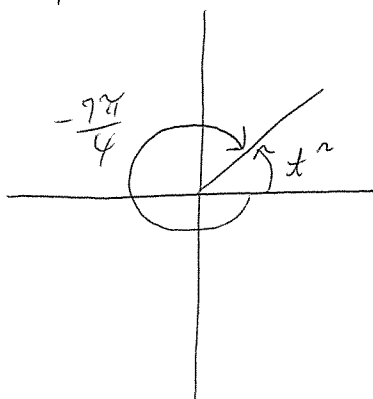


$$x^n = \pi - \left(\frac{5\pi}{6}\right)$$

$$x^n = \frac{6\pi}{6} - \frac{5\pi}{6}$$

$$\underline{\underline{x^n = \frac{\pi}{6}}}$$

32) $-\frac{7\pi}{4}$ QI



$$x^n = |2\pi - \frac{7\pi}{4}|$$

$$x^n = \left|\frac{8\pi}{4} - \frac{7\pi}{4}\right|$$

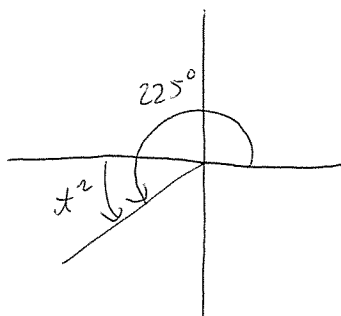
$$x^n = \left|\frac{\pi}{4}\right|$$

$$\underline{\underline{x^n = \frac{\pi}{4}}}$$

34) 225°

Q III

$$\theta^r = 225^\circ - 180^\circ = 45^\circ$$



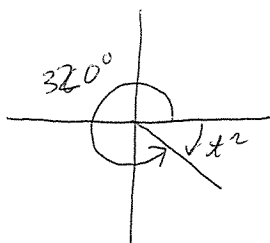
$$\sin(225^\circ) = -\sin(45^\circ) = -\left(\frac{1}{\sqrt{2}}\right) = \underline{\underline{-\frac{1}{\sqrt{2}}}}$$

$$\cos(225^\circ) = -\cos(45^\circ) = -\left(\frac{1}{\sqrt{2}}\right) = \underline{\underline{-\frac{1}{\sqrt{2}}}}$$

36) 320°

Q IV

$$\theta^r = 360^\circ - 320^\circ = 40^\circ$$



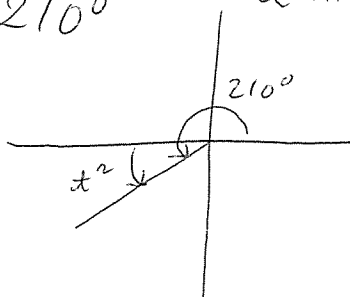
$$\sin(320^\circ) = \underline{\underline{-\sin(40^\circ)}}$$

$$\cos(320^\circ) = \underline{\underline{\cos(40^\circ)}}$$

38) 210°

Q III

$$\theta^r = 210^\circ - 180^\circ = 30^\circ$$



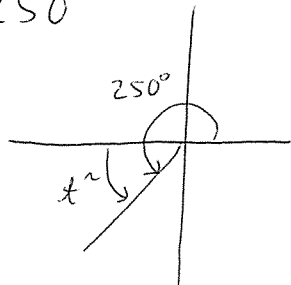
$$\sin(210^\circ) = -\sin(30^\circ) = -\left(\frac{1}{2}\right) = \underline{\underline{-\frac{1}{2}}}$$

$$\cos(210^\circ) = -\cos(30^\circ) = -\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{-\frac{\sqrt{3}}{2}}}$$

40) 250°

Q III

$$\theta^r = 250^\circ - 180^\circ = 70^\circ$$

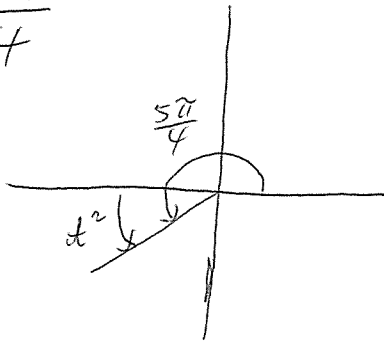


$$\sin(250^\circ) = \underline{\underline{-\sin(70^\circ)}}$$

$$\cos(250^\circ) = \underline{\underline{-\cos(70^\circ)}}$$

42) $\frac{5\pi}{4}$

Q III



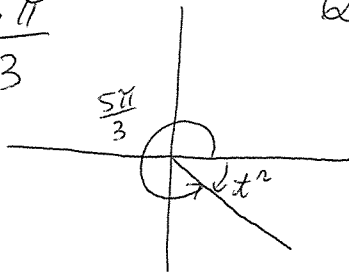
$$x^r = \frac{5\pi}{4} - \pi = \frac{5\pi}{4} - \frac{4\pi}{4} = \frac{\pi}{4}$$

$$\sin\left(\frac{5\pi}{4}\right) = -\sin\left(\frac{\pi}{4}\right) = -\left(\frac{1}{\sqrt{2}}\right) = \underline{\underline{-\frac{1}{\sqrt{2}}}}$$

$$\cos\left(\frac{5\pi}{4}\right) = -\cos\left(\frac{\pi}{4}\right) = -\left(\frac{1}{\sqrt{2}}\right) = \underline{\underline{-\frac{1}{\sqrt{2}}}}$$

44) $\frac{5\pi}{3}$

Q IV



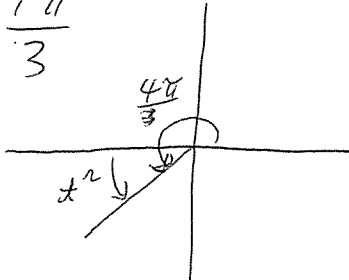
$$x^r = 2\pi - \frac{5\pi}{3} = \frac{6\pi}{3} - \frac{5\pi}{3} = \frac{\pi}{3}$$

$$\sin\left(\frac{5\pi}{3}\right) = -\sin\left(\frac{\pi}{3}\right) = -\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{-\frac{\sqrt{3}}{2}}}$$

$$\cos\left(\frac{5\pi}{3}\right) = \cos\left(\frac{\pi}{3}\right) = \underline{\underline{\frac{1}{2}}}$$

46) $\frac{4\pi}{3}$

Q III



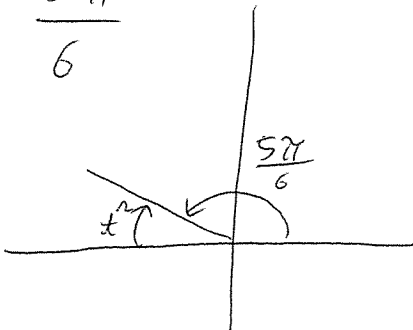
$$x^r = \frac{4\pi}{3} - \pi = \frac{4\pi}{3} - \frac{3\pi}{3} = \frac{\pi}{3}$$

$$\sin\left(\frac{4\pi}{3}\right) = -\sin\left(\frac{\pi}{3}\right) = -\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{-\frac{\sqrt{3}}{2}}}$$

$$\cos\left(\frac{4\pi}{3}\right) = -\cos\left(\frac{\pi}{3}\right) = -\left(\frac{1}{2}\right) = \underline{\underline{-\frac{1}{2}}}$$

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

Q II



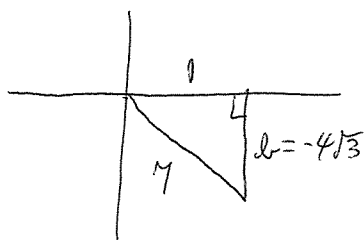
$$x^r = \pi - \frac{5\pi}{6} = \frac{6\pi}{6} - \frac{5\pi}{6} = \frac{\pi}{6}$$

$$\sin\left(\frac{5\pi}{6}\right) = \sin\left(\frac{\pi}{6}\right) = \underline{\underline{\frac{1}{2}}}$$

$$\cos\left(\frac{5\pi}{6}\right) = -\cos\left(\frac{\pi}{6}\right) = -\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{-\frac{\sqrt{3}}{2}}}$$

$$50) \cos(t) = \frac{1}{7} \quad t \text{ in Q IV}$$

7.3 L6



$$b^2 + (1)^2 = (7)^2$$

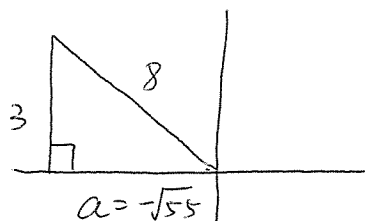
$$b^2 + 1 = 49$$

$$b^2 = 48$$

$$b = \pm \sqrt{48} = \pm \sqrt{(16)(3)} = \pm 4\sqrt{3}$$

$$\sin(t) = \frac{-4\sqrt{3}}{7}$$

$$52) \sin(t) = \frac{3}{8} \quad t \text{ in Q II}$$



$$a^2 + (3)^2 = (8)^2$$

$$a^2 + 9 = 64$$

$$a^2 = 55$$

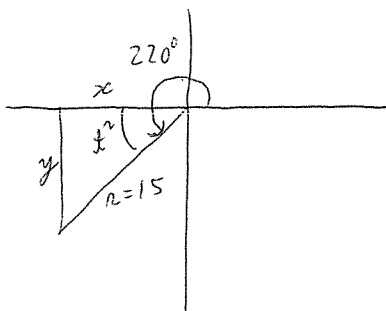
$$a = \pm \sqrt{55}$$

$$\cos(t) = \frac{-\sqrt{55}}{8}$$

$$54) r = 15, t = 220^\circ$$

Q III

$$t' = 220^\circ - 180^\circ = 40^\circ$$



$$\frac{x}{r} = \cos(220^\circ)$$

$$\frac{y}{r} = \sin(220^\circ)$$

$$\frac{x}{15} = -\cos(40^\circ)$$

$$\frac{y}{15} = -\sin(40^\circ)$$

$$x = -15\cos(40^\circ)$$

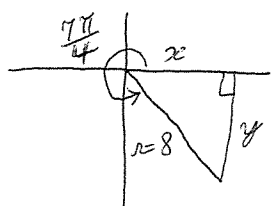
$$y = -15\sin(40^\circ)$$

$$(-15\cos(40^\circ), -15\sin(40^\circ))$$

$$56) r = 8, t = \frac{7\pi}{4}$$

Q IV

$$t' = 2\pi - \frac{7\pi}{4} = \frac{8\pi}{4} - \frac{7\pi}{4} = \frac{\pi}{4}$$



$$\frac{x}{r} = \cos\left(\frac{7\pi}{4}\right)$$

$$\frac{y}{r} = \sin\left(\frac{7\pi}{4}\right)$$

$$\frac{x}{8} = +\cos\left(\frac{\pi}{4}\right)$$

$$\frac{y}{8} = -\sin\left(\frac{\pi}{4}\right)$$

$$\frac{x}{8} = \left(\frac{1}{\sqrt{2}}\right)$$

$$\frac{y}{8} = -\left(\frac{1}{\sqrt{2}}\right)$$

$$x = \frac{8}{\sqrt{2}} = \frac{4(2)}{\sqrt{2}} = \frac{4(\sqrt{2})(\sqrt{2})}{\sqrt{2}} = 4\sqrt{2}$$

$$y = \frac{-8}{\sqrt{2}} = \frac{-4(2)}{\sqrt{2}} = \frac{-4(\sqrt{2})(\sqrt{2})}{\sqrt{2}} = -4\sqrt{2}$$

$$(4\sqrt{2}, -4\sqrt{2})$$

$$58) \sin(t), \cos(t) \quad \text{Domain: } (-\infty, \infty)$$