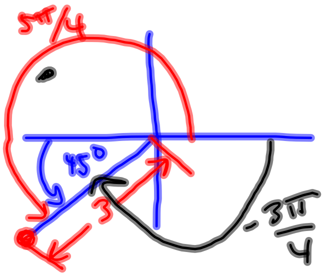
6.7 #s 5, 9, 13, 17, 21, 25, 29, 33, 43, 47, 51, 55,
59, 71, 75, 79, 83, 87, 91, 95, 99, 103, 107, 111,
117, 119, 121, 123

6.8 #s 7-12 ALL, 23-45

6.7 #s 5-18 Plot. Find 2 additional polar representations.

6 $\left(3, \frac{5\pi}{4}\right)$

$= (r, \theta)$

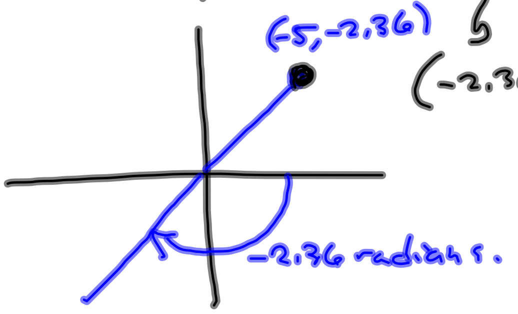


$\left(-3, \frac{\pi}{4}\right)$

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

18 $(-5, -2.36) \approx (-5, -135^\circ)$

$(-2.36)\left(\frac{180}{\pi}\right)^\circ$

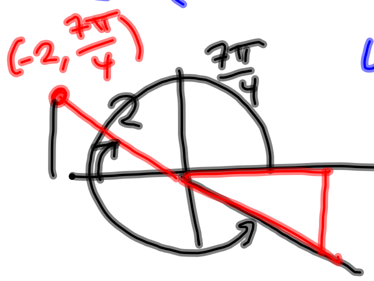


$(-5, -2.36 + 2\pi)$

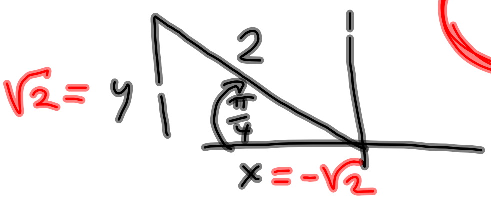
$(5, -2.36 + \pi$

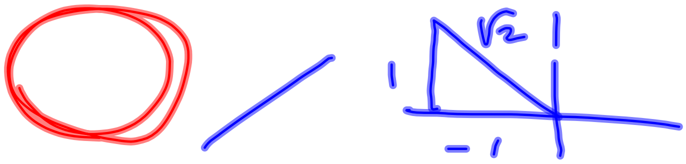
#s 19-34 convert to rectangular

26 $\left(-2, \frac{7\pi}{4}\right)$



Length is $r=-2$, so $\frac{7\pi}{4}$ in QIV becomes a point in QII.





$\sin\frac{\pi}{4} = \frac{y}{2} = \frac{1}{\sqrt{2}} \longrightarrow y = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

$\sin\left(\frac{7\pi}{4}\right) = -\frac{y}{2}$

~~Try again. Get picture right, this time.~~

$\cos\left(\frac{7\pi}{4}\right) = \frac{x}{2}$

$-\cos\left(\frac{\pi}{4}\right) = \frac{x}{2}$

$x = r\cos\theta$

$x = -2\cos\left(\frac{7\pi}{4}\right)$

$-\frac{x}{2} = \cos\left(\frac{7\pi}{4}\right)$

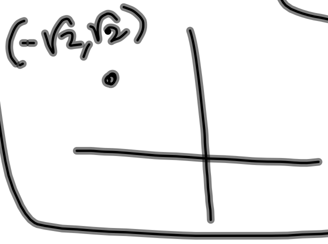
$-x = 2\left(\frac{1}{\sqrt{2}}\right)$

$\boxed{x = -\sqrt{2}}$

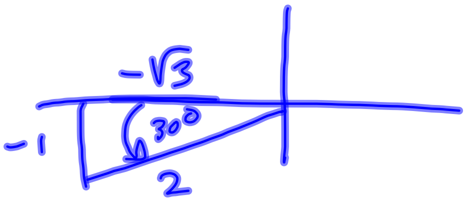
$y = r\sin\theta$

$= -2\sin\left(\frac{7\pi}{4}\right)$

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



32 $(1.5, 3.67)$ $(1.5, 210^\circ)$



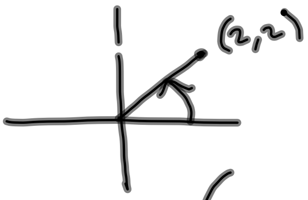
$x = r\cos\theta = 1.5\left(-\frac{\sqrt{3}}{2}\right) = -\frac{3}{2}\cdot\frac{\sqrt{3}}{2} = -\frac{3\sqrt{3}}{4} = x$

$y = r\sin\theta = 1.5\left(\frac{1}{2}\right) = \frac{3}{4} = y$

#s 43–60 Convert to polar coords

44 $(2,2)$

54 $(-\sqrt{3}, \sqrt{3})$



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

$\theta = \arctan\left(\frac{y}{x}\right)$

is true, this time, but not always.

$2 \lfloor 8$
$2 \lfloor 4$
2

$\sqrt{2^2 \cdot 2} =$
$2\sqrt{2}$

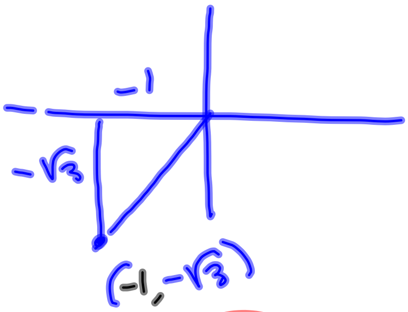
$r = \sqrt{x^2+y^2}$

$= \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

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

$\tan^{-1}\left(\frac{2}{2}\right) = \tan^{-1}(1) = 45^\circ$

$= \frac{\pi}{4}$



$r = \sqrt{(-1)^2 + (-\sqrt{3})^2} =$

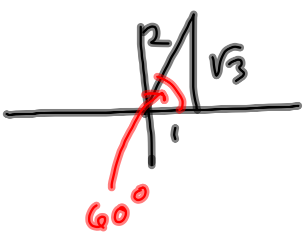
$\sqrt{1+3} = \sqrt{4} = 2$

$\tan\theta = \sqrt{3}$

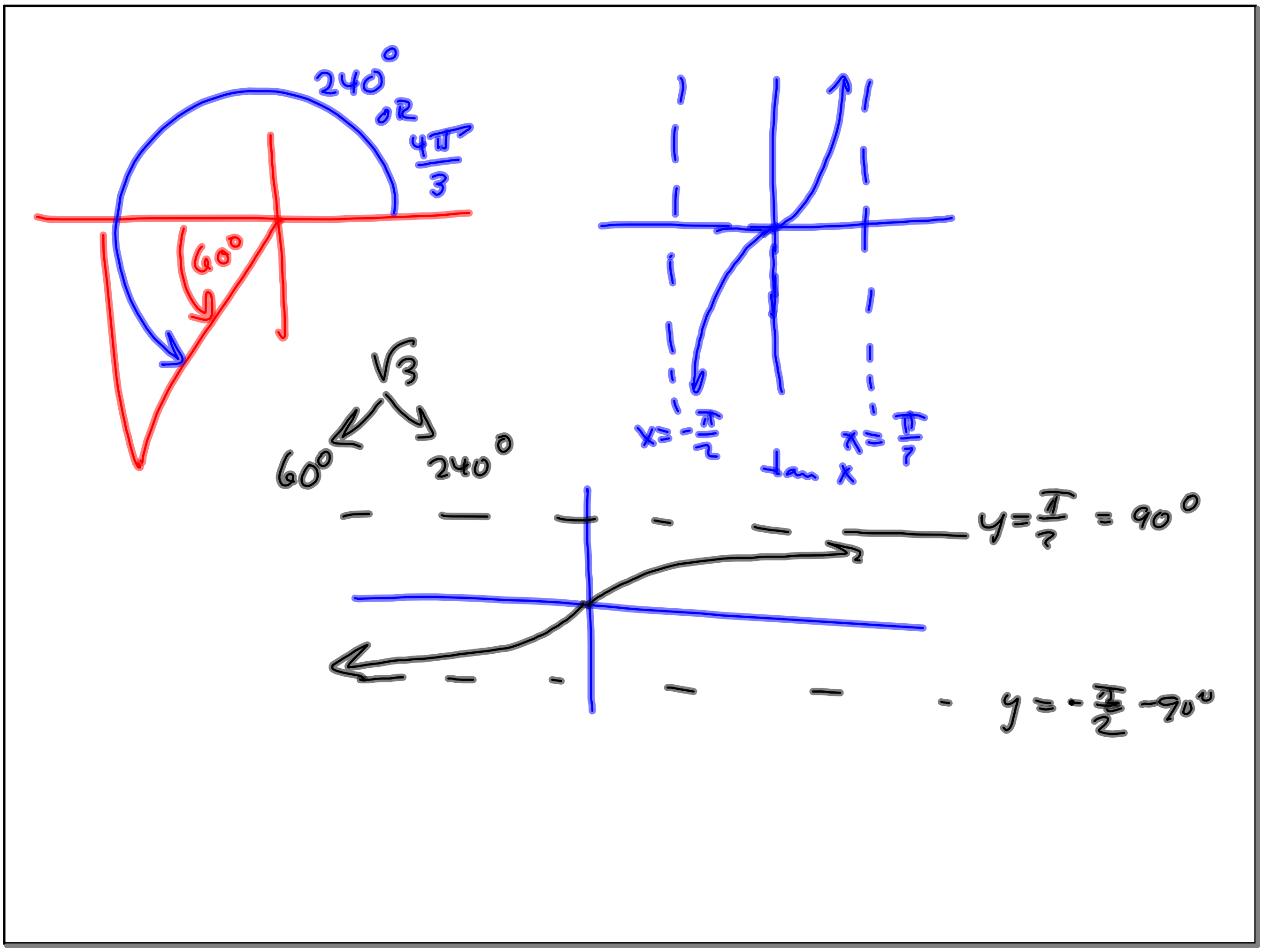
$\tan^{-1}(\sqrt{3}) = 60^\circ$

$(2, -60^\circ)$ → Calculator answer needs interpreting

Interpret:
60° ref. angle.
QIII:



is what the calculator sees.



240° or 4π/3
60°
√3
60°
240°
x = -π/2
x = π/2
tan x
y = π/2 = 90°
y = -π/2 -90°

$r = 2\sin\theta$

$r = 2 \cdot \frac{y}{r}$

$r^2 = 2y$

$2y = r^2$

$y = \frac{1}{2}r^2 = \frac{1}{2}(x^2+y^2)$

$\boxed{2y = x^2+y^2}$

$y^2 - 2y = -x^2$

$y^2 - 2y + 1 = 1 - x^2$

$(y-1)^2 = 1-x^2$

$y - 1 = \pm\sqrt{1-x^2}$

$y = 1 \pm \sqrt{1-x^2}$

$y^2 - 2y$

$= y^2 - 2y + 1^2 - 1^2$

$= (y-1)^2 - 1$

Solved for y,
Got 2 funcs.

$x^2 + y^2 = 2y$

$x^2 + y^2 - 2y = 0$

$x^2 + y^2 - 2y + 1^2 = 0 + 1^2$

$x^2 + (y-1)^2 = 1$

(.

$(x-h)^2 + (y-k)^2 = r^2$

$(h,k) = (0,1) =$ center