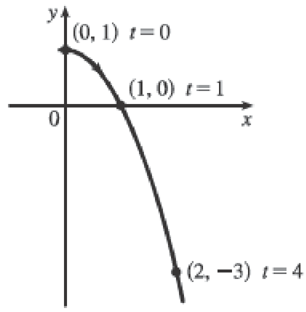
9. $x = \sqrt{t},\ y = 1 - t$

(a)

t	0	1	2	3	4
x	0	1	1.414	1.732	2
y	1	0	-1	-2	-3



(b) $x = \sqrt{t} \ \Rightarrow\ t = x^2 \ \Rightarrow\ y = 1 - t = 1 - x^2$. Since $t \geq 0$, $x \geq 0$.

So the curve is the right half of the parabola $y = 1 - x^2$.

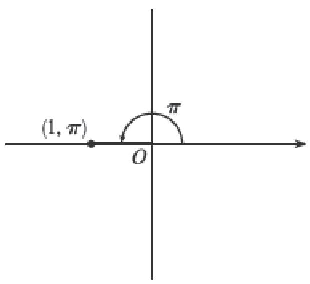
7. (a) $x = 1 + \ln t,\ y = t^2 + 2;\ (1, 3)$. $\dfrac{dy}{dt} = 2t$, $\dfrac{dx}{dt} = \dfrac{1}{t}$, and $\dfrac{dy}{dx} = \dfrac{dy/dt}{dx/dt} = \dfrac{2t}{1/t} = 2t^2$. At $(1, 3)$,

$x = 1 + \ln t = 1 \ \Rightarrow\ \ln t = 0 \ \Rightarrow\ t = 1$ and $\dfrac{dy}{dx} = 2$, so an equation of the tangent is $y - 3 = 2(x - 1)$, or $y = 2x + 1$.

(b) $x = 1 + \ln t \ \Rightarrow\ \ln t = x - 1 \ \Rightarrow\ t = e^{x-1}$, so $y = t^2 + 2 = (e^{x-1})^2 + 2 = e^{2x-2} + 2$, and $y' = e^{2x-2} \cdot 2$.

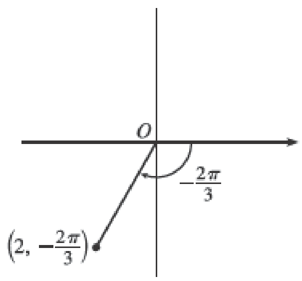
At $(1, 3)$, $y' = e^{2(1)-2} \cdot 2 = 2$, so an equation of the tangent is $y - 3 = 2(x - 1)$, or $y = 2x + 1$.

3. (a)



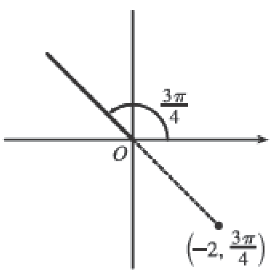
$x = 1\cos\pi = 1(-1) = -1$ and $y = 1\sin\pi = 1(0) = 0$ give us the Cartesian coordinates $(-1, 0)$.

(b)



$x = 2\cos\left(-\frac{2\pi}{3}\right) = 2\left(-\frac{1}{2}\right) = -1$ and $y = 2\sin\left(-\frac{2\pi}{3}\right) = 2\left(-\frac{\sqrt{3}}{2}\right) = -\sqrt{3}$ give us $\left(-1, -\sqrt{3}\right)$.

(c)



$x = -2\cos\frac{3\pi}{4} = -2\left(-\frac{\sqrt{2}}{2}\right) = \sqrt{2}$ and $y = -2\sin\frac{3\pi}{4} = -2\left(\frac{\sqrt{2}}{2}\right) = -\sqrt{2}$ gives us $\left(\sqrt{2}, -\sqrt{2}\right)$.

4. $a_n = \dfrac{3^n}{1+2^n}$, so the sequence is $\left\{\dfrac{3}{1+2}, \dfrac{9}{1+4}, \dfrac{27}{1+8}, \dfrac{81}{1+16}, \dfrac{243}{1+32}, \ldots\right\} = \left\{1, \dfrac{9}{5}, 3, \dfrac{81}{17}, \dfrac{81}{11}, \ldots\right\}$.