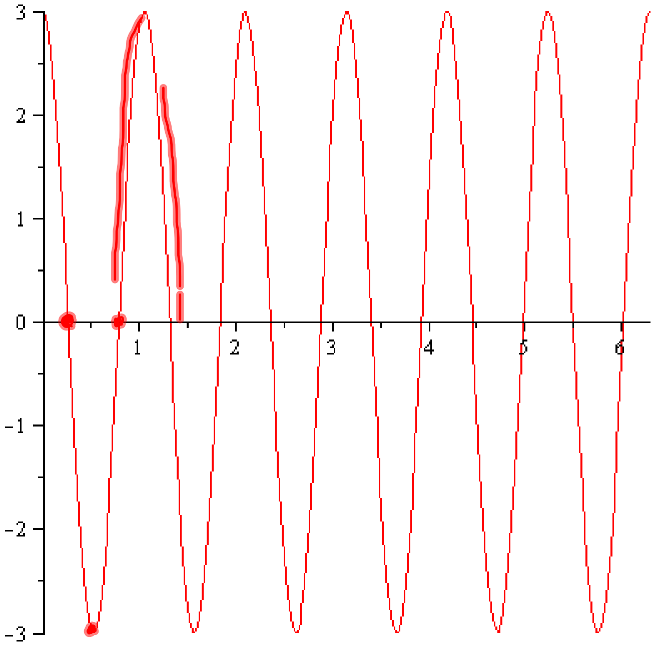
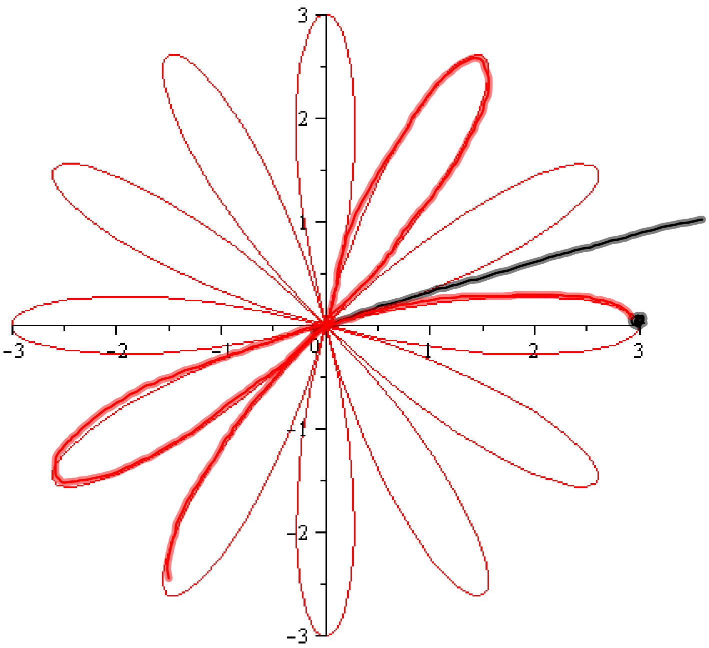


$r = 3\cos(6\theta)$

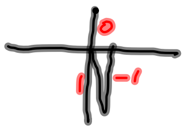


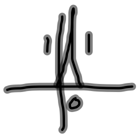
$r = 3\cos(6\theta)$

$\theta = \frac{\pi}{12}$

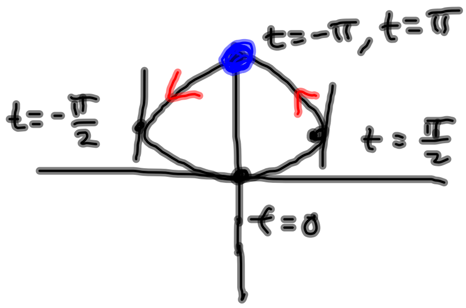
11.1 #3

$x = 5\sin t, \quad y = t^2 \quad -\pi \le t \le \pi$





t	$-\pi$	$-\frac{\pi}{2}$	0	$\frac{\pi}{2}$	π
x	0	-5	0	5	0
y	π^2	$\frac{\pi^2}{4}$	0	$\frac{\pi^2}{4}$	π^2



Not asked-for, but will be on the test.

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{2t}{5\cos t}$$

$$\frac{d^2y}{dx^2} = \frac{\frac{d}{dt}\left(\frac{dy}{dx}\right)}{\frac{dx}{dt}} = \frac{\frac{2(5\cos t) - 2t(-5\sin t)}{(5\cos t)^2}}{5\cos t}$$

$$= \frac{10\cos t + 10t\sin t}{5^3\cos^3 t}$$

Tough to find any inflections.

One that's nicer to solve on test.

where is the curve horizontal?

$t = 0 \quad x = 0 \quad y = 0 \qquad -\pi \le t \le \pi$

$\frac{2t}{5\cos t} \overset{\text{SET}}{=} 0 \Rightarrow t = 0 \qquad t=0:\ (0,0)$ on graph.

where is the curve vertical?

Solve denominator $= 0$:

$5\cos t = 0$

$t = \pm\frac{\pi}{2} \ : \ \left(\pm 5, \frac{\pi^2}{4}\right)$

Find an equation of tangent to the curve at $t = \frac{\pi}{4}$

$$\left.\frac{dy}{dx}\right|_{t=\frac{\pi}{4}} = \left.\frac{2t}{5\cos t}\right|_{t=\frac{\pi}{4}} = \frac{2\left(\frac{\pi}{4}\right)}{5\cos\left(\frac{\pi}{4}\right)} = \frac{\frac{\pi}{2}}{5\cdot\frac{1}{\sqrt{2}}} =$$

$$= \frac{\pi}{2}\cdot\frac{\sqrt{2}}{5} = \frac{\sqrt{2}\pi}{10} = m$$

$$x\left(\frac{\pi}{4}\right) = 5\sin\left(\frac{\pi}{4}\right) = 5\cdot\frac{\sqrt{2}}{2} = \frac{5\sqrt{2}}{2} = x_1$$

$$y\left(\frac{\pi}{4}\right) = \left(\frac{\pi}{4}\right)^2 = \frac{\pi^2}{16} = y_1$$

$$y = m(x - x_1) + y_1$$

$$y = \frac{\sqrt{2}\pi}{10}\left(x - \frac{5\sqrt{2}}{2}\right) + \frac{\pi^2}{16}$$

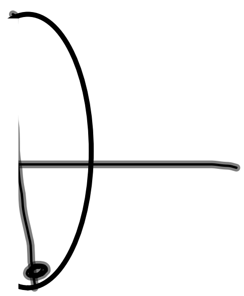
$x = 1 + 2\cos t$, $y = 7 + 2\sin t$

circle, radius 2, center @ (1,7)

$x = 1 + 5\cos t$, $y = 7 + \sin t$

Ellipse.

$x = 4\cos\theta$, $y = 5\sin\theta$, $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$



t	$-\frac{\pi}{2}$	0
x	0	4
y	-5	0

$$\int_{n+1}^{\infty} f(n)\,dn \le R_n \le \int_{n}^{\infty} f(n)\,dn$$

undershot overshot

$$\boxed{S_n + \int_{n+1}^{\infty} f(n)\,dn} \le S \le \boxed{\int_{n}^{\infty} f(n)\,dn + S_n}$$

Use this to get an estimate for S, based on S_n & two integrals.