Write each of the following in Cartesian (x, y) coordinates. Then describe the curve.

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(b) $r = 9\tan\theta\sec\theta$

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$x^2+y^2 = 4r\cos\theta$

$= 4x$

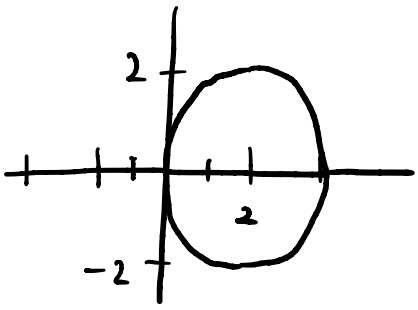
$y^2 = -x^2+4x$

$= -(x^2-4x)$

$= -(x^2-4x+2^2-2^2)$

$y^2 = -(x-2)^2+4$

$\Rightarrow (x-2)^2+y^2 = 2^2$



∴ A circle centered at $(2, 0)$ with radius 2.

(b) $r = 9\tan\theta\sec\theta$

$r = 9\dfrac{\sin\theta}{\cos\theta}\cdot\dfrac{1}{\cos\theta}$

$x^2+y^2 = 9\dfrac{y/r}{x/r}\cdot\dfrac{1}{x/r}$

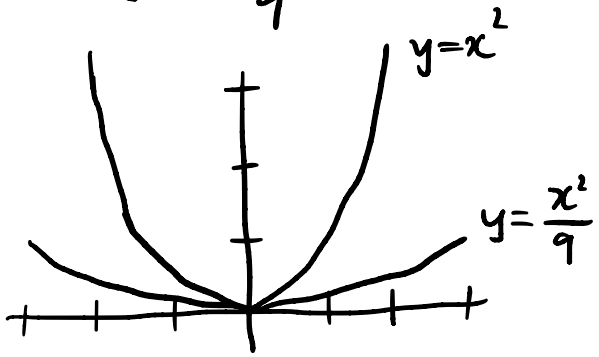
$= 9\dfrac{y}{x}\cdot\dfrac{r}{x}$

$x^4+x^2y^2 = 9yr$

$x^2(x^2+y^2) = 9y(x^2+y^2)$

$x^2 = 9y$

$y = \dfrac{x^2}{9}$



∴ A parabola stretched in the x-axis.

$y = \dfrac{r^2}{9}\cos^2\theta$

$x = 3\sqrt{r\sin\theta}$

$\sec\theta$ and $\tan\theta$ are not defined for all θ which are ignored in this problem.