Math 1B **Review for Chapter 10 Test**

Name _____

Section 10.1

Eliminate the parameter to find a Cartesian equation of the curve. Do not sketch the curve.

1. $x = \frac{1}{2}\cos(t),\ y = 2\sin(t)$

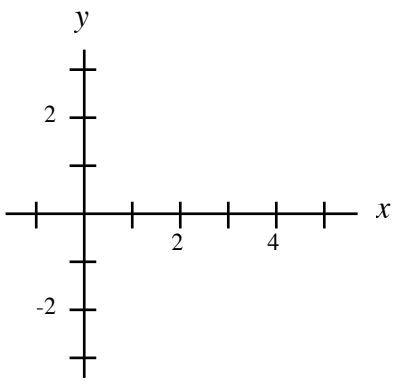
2. $x = \tan^2(t),\ y = \sec(t)$

3. $x = e^t - 1,\ y = e^{2t}$

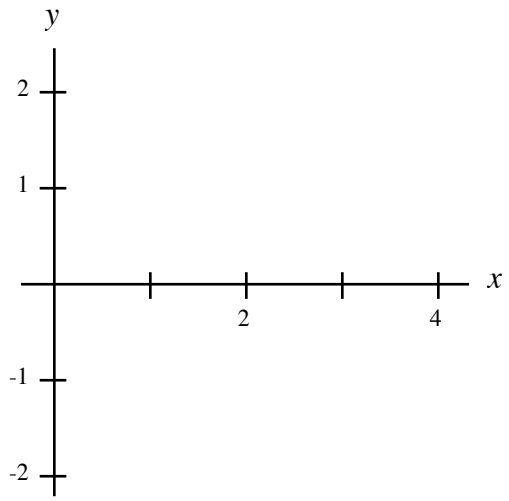
4. $x = \sqrt{t+1},\ y = \sqrt{t-1}$

Set up a table of values for *t*, *x*, and *y*, and sketch the curve in the *x*-*y*-plane. Use arrows to show the direction in which the curve is traced.

5. $x = t^2 + 1,\ y = t - 1,\quad -2 \le t \le 2$



6. $x = 2t,\ \ y = \cos(\pi t),\ \ \ 0 \le t \le 2$



Section 10.2

7. Consider the parametric equations $x = \frac{3}{t}$ and $y = t^2 - 6t$, for $t \ge 1$.

a) Find the first derivative, $\frac{dy}{dx}$. and simplify

b) Write the equation of the tangent line for $t = 2$.

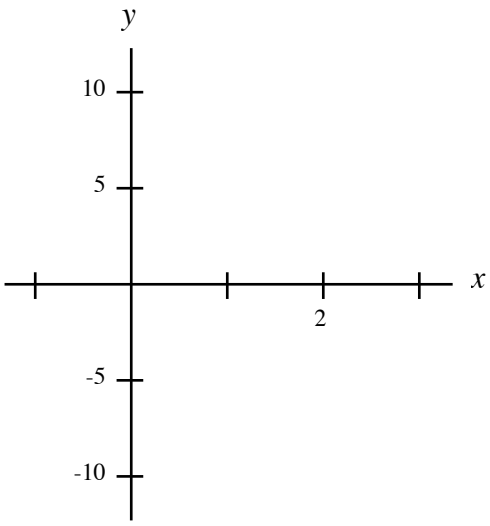
c) Determine where the tangent line is horizontal and where it is vertical.

#7 Continued: $x = \frac{3}{t}$ and $y = t^2 - 6t$, for $t \geq 1$.

d) Find the second derivative, $\frac{d^2y}{dx^2}$.

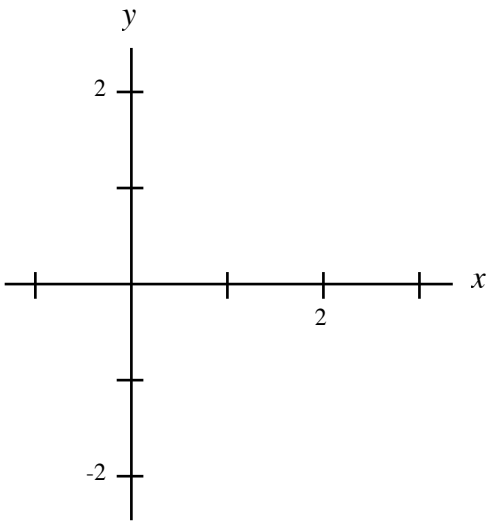
e) Determine the intervals of concavity for the curve.

f) Use the information above and a table of values for *t*, *x*, and *y*, and sketch the curve in the *x*-*y*-plane.
(Hint: for *t* use integers)



8. Consider the curve given by $x = t^2$ and $y = t^2 - 2t$, $t \geq 0$.

a) Set up a table of values for t, x, and y, and sketch the curve in the x-y-plane, especially where it creates a pocket with the x-axis.



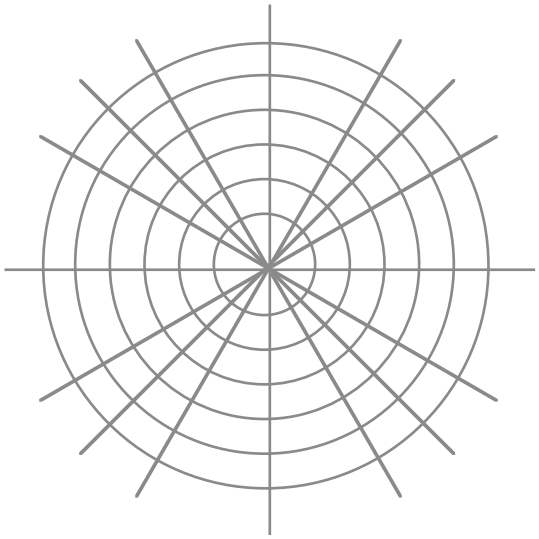
b) Find the area of the region enclosed between the x-axis and the curve.

c) Set up the integral, and simplify the integrand (but do not solve) for the arc length of the curve from $0 \leq t \leq 2$.

Section 10.3

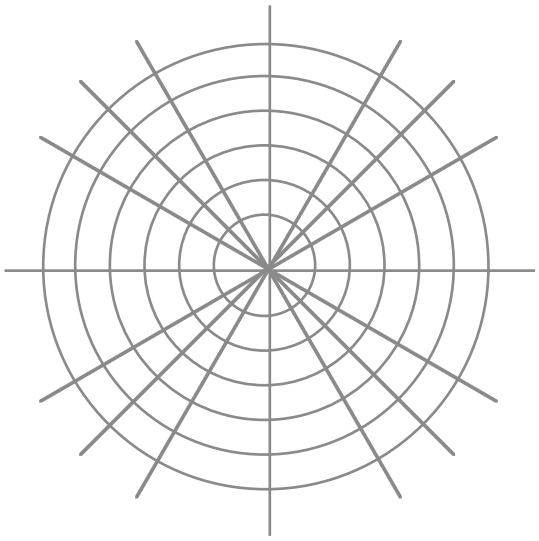
Sketch the curve with the given polar equation by first sketching the graph of r as a function of θ in the Cartesian coordinate system.

9. $r = 1 + 2\cos\theta$



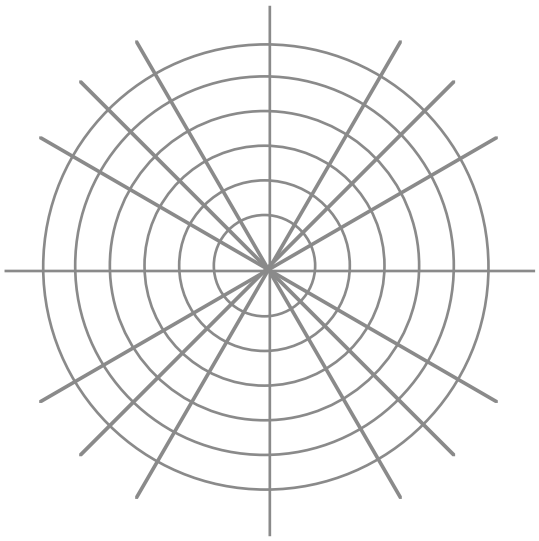
10. For the polar equation in #9, find $\frac{dy}{dx}$. and identify the slope of the tangent lines at the origin.

11. $r = 3\sin(2\theta)$

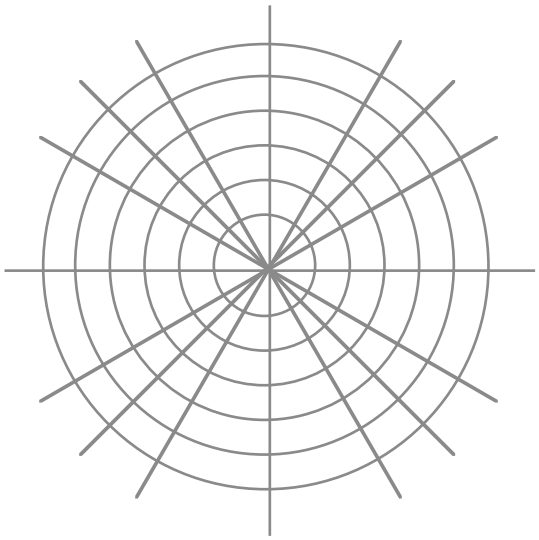


Section 10.4, Area

12. Sketch the curve and find the area that it encloses: $r = 1 - \cos\theta$



13. Find the area of the region enclosed by one loop of the curve: $r = 4\sin(4\theta)$
(Hint: Sketch enough to create one loop.)



Section 10.3

14. Find the Cartesian equation for the curve defined by $r = \tan\theta\sec\theta$