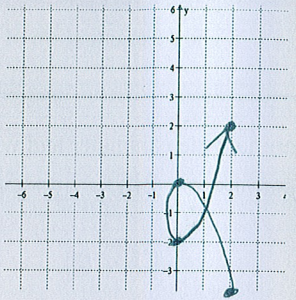
Sketch the curve represented by the parametric equations $x = t^2 - t$, $y = 2t^3 - 3t^2 - t$ for $-1 \le t \le 2$

SCORE: ____ / 4 PTS

by plotting at least *4* points. Indicate the orientation (direction) of the curve.

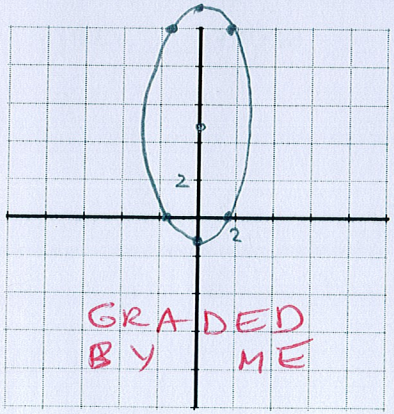
t	x	y	
-1	2	-4	$\frac{1}{2}$
0	0	0	$\frac{1}{2}$
1	0	-2	$\frac{1}{2}$
2	2	2	$\frac{1}{2}$



GRADED BY ME

Consider the graph of the polar equation $r = \dfrac{11}{6-5\sin\theta}$. $\cdot \dfrac{\frac{1}{6}}{\frac{1}{6}} = \dfrac{\frac{11}{6}}{1-\frac{5}{6}\sin\theta}$

SCORE: ____ / 9 PTS



[a] Fill in the blanks.

[i] The eccentricity is $\frac{5}{6}$ (1).

[ii] The shape of the graph is a/an ELLIPSE (1).

[iii] The equation of the directrix is $y = -\frac{11}{5}$. $ep = \frac{11}{6} \rightarrow \frac{5}{6}p = \frac{11}{6}$ ($\frac{1}{2}$) (1)

[iv] Find the **rectangular** coordinates of the ($\frac{1}{2}$)

x – intercept(s) $(\pm\frac{11}{6}, 0)$ ($\frac{1}{2}$)

y – intercept(s) $(0, 11), (0, -1)$ ($\frac{1}{2}$)

focus/foci $(0, 0), (0, 10)$ (1)

endpoints of the latus rectum/latera recta $(\pm\frac{11}{6}, 0), (\pm\frac{11}{6}, 10)$ (1)

θ	r	
0	$\frac{11}{6}$	ENDPOINTS OF L.R.
$\frac{\pi}{2}$	11	VERTICES
π	$\frac{11}{6}$	
$\frac{3\pi}{2}$	1	

CENTER $= \left(0, \frac{11+-1}{2}\right) = (0, 5)$

FOCUS $= (0, 2 \cdot 5) = (0, 10)$

[b] Sketch the graph on the grid provided above. **You must provide a scale for the axes & plot all points from part [a][iv] above.**

Fill in the blanks.

+(1) IF YOU WROTE "r=" ON ALL ANSWERS

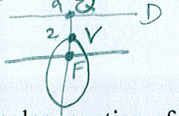
SCORE: ____ / 7 PTS

$r = \dfrac{\frac{7}{2}\cdot 3}{1-\frac{7}{2}\cos\theta}\cdot\dfrac{2}{2}$

[a] The polar equation of the hyperbola with focus at the pole, eccentricity $\frac{7}{2}$ and directrix $x=-3$ is $r = \dfrac{21}{2-7\cos\theta}$. (2)

$r = \dfrac{1\cdot 5}{1-1\cdot\sin\theta}$

[b] The polar equation of the parabola with focus at the pole and directrix $y=-5$ is $r = \dfrac{5}{1-\sin\theta}$. (2)



$e = \dfrac{VF}{VQ} = \dfrac{2}{7}$

$r = \dfrac{\frac{2}{7}\cdot 9}{1+\frac{2}{7}\sin\theta}\cdot\dfrac{7}{7}$

[c] The polar equation of the ellipse with focus at the pole, one vertex at $(x, y) = (0, 2)$ and directrix $y=9$ is $r = \dfrac{18}{7+2\sin\theta}$. (2)

Eliminate the parameter and write the rectangular equation for the curve represented by the parametric equations $x = 2\ln t, \quad y = 5t^6$. **Write your final answer in the form y as a simplified function in terms of x.**

SCORE: _____ / 4 PTS

$\frac{x}{2} = \ln t$

$t = e^{\frac{x}{2}}$

(2)

$y = 5(e^{\frac{x}{2}})^6$

$y = 5e^{3x}$

(2)

Find parametric equations for the circle that has a diameter with endpoints $(-3,-5)$ and $(12,-5)$.

SCORE: _____ / 3 PTS

CENTER $= \left(\frac{-3+12}{2}, -5\right) = \left(\frac{9}{2}, -5\right)$ (1/2)

RADIUS $= \frac{1}{2}(12-(-3)) = \frac{15}{2}$ (1/2)

$x = \frac{15}{2}\cos t + \frac{9}{2}$ (1)

$y = \frac{15}{2}\sin t - 5$ (1)

AJ is standing 24 feet from BJ, who is 5 feet tall. AJ throws a football at 30 feet per second in BJ's direction, **SCORE: _____ / 3 PTS**
at an angle of 60° with the horizontal, from an initial height of 6 feet. Write parametric equations for the position of the football.

$x = (v_0 \cos\theta)t$

$y = h_0 + (v_0 \sin\theta)t - 16t^2$ $\longrightarrow$ $x = (30\cos 60^\circ)t$

$y = 6 + (30 \sin 60^\circ)t - 16t^2$

① $x = 15t$

② $y = 6 + 15\sqrt{3}t - 16t^2$