Sketch the curve represented by the parametric equations $\begin{array}{l} x = 2t^2 - t \\ y = \cos \pi t \end{array}$ for $-1 \le t \le 2$

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

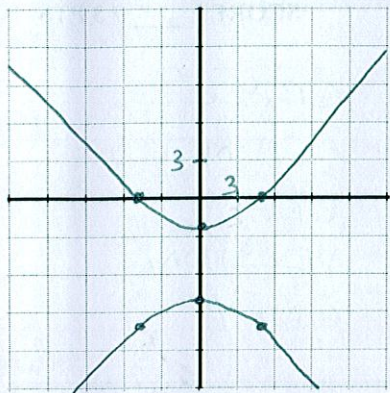| t	x	y	
-1	3	-1 ($\frac{1}{2}$)	(3, -1)
0	0	1 ($\frac{1}{2}$)	(0, 1)
1	1	-1 ($\frac{1}{2}$)	(1, -1)
2	6	1 ($\frac{1}{2}$)	(6, 1)
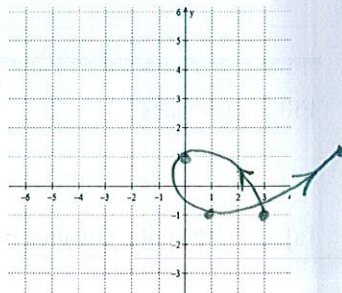
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Consider the graph of the polar equation $r = \dfrac{16}{3-5\sin\theta}$. $= \dfrac{\frac{16}{3}}{1-\frac{5}{3}\sin\theta}$ $\quad e = \frac{5}{3}$ $\quad ep = \frac{16}{3} = \frac{5}{3}p$ $\quad p = \frac{16}{5}$

SCORE: _____ / 9 PTS

[a] Fill in the blanks.

[i] The eccentricity is $\underline{\frac{5}{3}}$ $\left(\frac{1}{2}\right)$.

[ii] The shape of the graph is a/an $\underline{\text{HYPERBOLA}}$ $\left(\frac{1}{2}\right)$.

[iii] The equation of the directrix is $\underline{y = -\frac{16}{5}}$ $\left(1\right)$ $\left(\frac{1}{2}\right)$

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

x – intercept(s) $\quad$ ① $\left(\frac{16}{3}, 0\right) \left(-\frac{16}{3}, 0\right)$

y – intercept(s) $\quad$ ① $(0, -8) \ (0, -2)$

focus/foci $\quad$ ① $(0, -10) \ (0, 0)$

endpoints of the latus rectum/latera recta $\quad$ ① $\left(\frac{16}{3}, -10\right) \left(-\frac{16}{3}, -10\right)$ $\left(\frac{16}{3}, 0\right) \left(-\frac{16}{3}, 0\right)$

θ	r
0	$\frac{16}{3}$
$\frac{\pi}{2}$	-8
π	$\frac{16}{3}$
$\frac{3\pi}{2}$	2

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[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.**
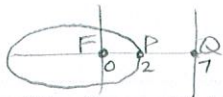
Fill in the blanks.

MUST HAVE "r=" IN ALL ANSWERS → $\boxed{8}\,\textcircled{\tfrac{1}{2}}$

$e=1$

[a] The polar equation of the parabola with focus at the pole and directrix $x = -8$ is $r = \dfrac{8}{1-\cos\theta}$ ①

[b]
$$r = \frac{\frac{4}{3} \cdot 5}{1 + \frac{4}{3}\sin\theta} \cdot \frac{3}{3}$$

The polar equation of the hyperbola with focus at the pole, eccentricity $\frac{4}{3}$ and directrix $y = 5$ is $r = \dfrac{20}{3+4\sin\theta}$ $\textcircled{\tfrac{1}{2}}$ $(1\tfrac{1}{2})$

[c] $\dfrac{PF}{PQ} = \dfrac{2}{5} = e$ $\qquad r = \dfrac{\frac{2}{5} \cdot 7}{1 + \frac{2}{5}\cos\theta} \cdot \dfrac{5}{5}$ $\qquad \boxed{14}\,①$

The polar equation of the ellipse with focus at the pole, one vertex at $(x, y) = (2, 0)$ and directrix $x = 7$ is $r = \dfrac{14}{5+2\cos\theta}$ $(1\tfrac{1}{2})$

Eliminate the parameter and write the rectangular equation for the curve represented by the parametric

equations $x = \dfrac{3}{2-t}$, $y = \dfrac{t}{t+1}$. **Write your final answer in the form y as a simplified function of x.**

$$2 - t = \frac{3}{x}$$

$$t = 2 - \frac{3}{x}$$

②

$$y = \frac{2 - \frac{3}{x}}{3 - \frac{3}{x}} \cdot \frac{x}{x}$$

①

$$y = \frac{2x - 3}{3x - 3}$$

②

Find parametric equations for the line through the points $(5, -7)$ and $(-3, -2)$.

NOTE: Do NOT use either $x = t$ nor $y = t$.

SCORE: _____ / 3 PTS

$$x = 5 + (-3-5)t \; \left(\tfrac{1}{2}\right)$$
$$y = -7 + (-2-7)t \; \left(\tfrac{1}{2}\right)$$

OR

$$x = -3 + (5--3)t \; \left(\tfrac{1}{2}\right)$$
$$y = -2 + (-7-2)t \; \left(\tfrac{1}{2}\right)$$

$$x = 5 - 8t \quad \textcircled{1}$$
$$y = -7 + 5t \quad \textcircled{1}$$

← MUST HAVE "x=" AND "y=" →

$$x = -3 + 8t \quad \textcircled{1}$$
$$y = -2 - 5t \quad \textcircled{1}$$

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AGAINST
ONE
VERSION
ONLY

Find parametric equations for the circle that has a diameter with endpoints $(4, -8)$ and $(4, 6)$.   **SCORE:** _____ / 3 PTS

$$\text{CENTER} = \left(4, \frac{-8+6}{2}\right) = (4, -1) \, \text{(½)}$$

$$\text{RADIUS} = \frac{6 - -8}{2} = 7 \, \text{(½)}$$

$$x = 4 + 7\cos t \quad \text{①}$$
$$y = -1 + 7\sin t \quad \text{①}$$

MUST HAVE
"$x =$" AND "$y =$"

OTHER ANSWERS POSSIBLE —
TALK TO ME