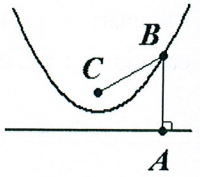
In the diagram on the right, **not drawn to scale**, the curve is a conic, the horizontal line underneath it is its directrix and point C is its focus. Points A and B are 7 units apart, and points B and C are 8 units apart.

SCORE: _____ / 2 PTS



[a] The eccentricity of the conic is $\frac{8}{7}$ (1) $\frac{PF}{PQ} = \frac{BC}{BA}$.

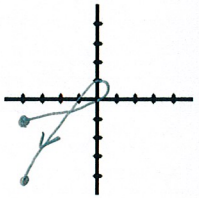
[b] The shape of the conic is a/an HYPERBOLA (1)

Sketch the curve represented by the parametric equations $x = 2t - 2t^2$, $y = 2t - t^3$ 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
(½)	-1	-4	-1
(½)	0	0	0
(½)	1	0	1
(½)	2	-4	-4



GRADED BY ME

Consider the graph of the polar equation $r = \dfrac{24}{7-5\cos\theta} \cdot \dfrac{\frac{1}{7}}{\frac{1}{7}} = \dfrac{\frac{24}{7}}{1-\frac{5}{7}\cos\theta}$

$ep = \frac{24}{7}$

$\frac{5}{7}p = \frac{24}{7}$

$p = \frac{24}{5}$

SCORE: ____ / 9 PTS

[a] Fill in the blanks.

[i] The eccentricity is $\frac{5}{7}$ (1/2).

[ii] The shape of the graph is a/an ELLIPSE (1/2).

[iii] The equation of the directrix is $x = -\frac{24}{5}$ (1/2 + 1/2).

[iv] Find the **rectangular** coordinates of the

x – intercept(s) (1)

$(12, 0)$ $(-2, 0)$

(rectangular coordinates)

y – intercept(s) (1)

$(0, \frac{24}{7})$ $(0, -\frac{24}{7})$

(rectangular coordinates)

focus/foci (1)

$(10, 0)$ $(0, 0)$

(rectangular coordinates)

endpoints of the latus rectum / latera recta

$(0, \pm\frac{24}{7})$ $(10, \pm\frac{24}{7})$ (1)

(rectangular coordinates)

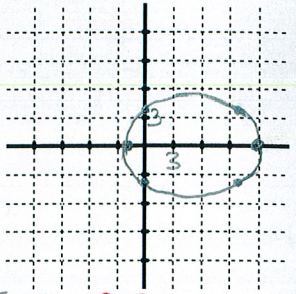
θ	r
0	12
$\frac{\pi}{2}$	$\frac{24}{7}$
π	2
$\frac{3\pi}{2}$	$\frac{24}{7}$

VERTICES GRADED BY ME

CENTER $= \left(\frac{12+-2}{2}, 0\right)$

$= (5, 0)$

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



[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. Find the polar equations of the following conics with their focus at the pole.

SCORE: ____ / 4 PTS

[a] parabola with vertex $(x, y) = (0, -11)$

(+½) IF YOU HAVE "r=" IN BOTH ANSWERS

$r = \dfrac{1 \cdot 22}{1 - 1\sin\theta} = \dfrac{22}{1 - \sin\theta}$ (½) (1)

[b] conic with eccentricity $\frac{5}{2}$ and directrix $x = 3$

$r = \dfrac{\frac{5}{2} \cdot 3}{1 + \frac{5}{2}\cos\theta} \cdot \dfrac{2}{2} = \dfrac{15}{2 + 5\cos\theta}$ (½) (1½)

Eliminate the parameter and write the rectangular equation for the curve represented by the parametric equations $x = 3\ln 2t, \quad y = 4t^6$. **Write your final answer in the form $y = f(x)$ completely simplified.**

SCORE: _____ / 4 PTS

$\frac{1}{3}x = \ln 2t$

$e^{\frac{1}{3}x} = 2t$

$\frac{1}{2}e^{\frac{1}{3}x} = t$ (1½)

$y = 4\left(\frac{1}{2}e^{\frac{1}{3}x}\right)^6$ (1)

$y = 4\left(\frac{1}{64}e^{2x}\right)$

$y = \frac{1}{16}e^{2x}$ (1½)

Find parametric equations for the hyperbola with vertices $(\pm 4, 0)$ and foci $(\pm 5, 0)$.

SCORE: _____ / 4 PTS

$5^2 = 4^2 + b^2$ (½)

$25 = 16 + b^2$

$9 = b^2$

$3 = b$ (½)

$x = 4\sec t$ (1½)

$y = 3\tan t$ (1½)

The parametric equations $\begin{aligned} x &= -t^2 + 2 \\ y &= t^2 \end{aligned}$ and $\begin{aligned} x &= -\ln t \\ y &= \ln t + 2 \end{aligned}$ both correspond to the rectangular equation $y = -x + 2$. **SCORE: ____ / 3 PTS**

Show how the parametric curves differ from each other by sketching them on the dotted copies of the graph of $y = -x + 2$ shown below.

You must show the orientation of the curves clearly.

AS t GOES FROM $-\infty$ TO ∞

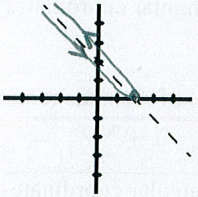
① $y = t^2$ $\quad \infty$ TO 0 TO ∞

Ψ

② $x = -\ln t$ $\quad \infty$ TO $-\infty$

ψ

① $x = -t^2 + 2$, $y = t^2$



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② $x = -\ln t$, $y = \ln t + 2$