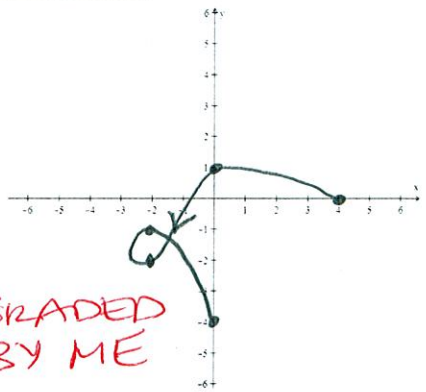
Sketch the curve represented by the parametric equations $\begin{aligned} x &= t^2 - 3t \\ y &= -t + \cos \pi t \end{aligned}$ for $-1 \le t \le 3$. **SCORE: ____ / 5 PTS**

Include the rectangular co-ordinates of 5 points on the curve. Indicate the orientation (direction) of the curve.

t	(x, y)
-1	$(4, 0)$
0	$(0, 1)$
1	$(-2, -2)$
2	$(-2, -1)$
3	$(0, -4)$

$\left(\frac{1}{2}\right)$ POINT EACH = $\left(2\frac{1}{2}\right)$ TOTAL



GRADED BY ME

Eliminate the parameter and write the rectangular equation for the curve represented by the parametric equations $\begin{aligned} x &= \ln 3t \\ y &= 6t^2 \end{aligned}$. **Write your final answer in the form y as a simplified function of x.** **SCORE: ____ / 3 PTS**

GRADE USING 1 VERSION ONLY

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

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

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

OR

$\left(\frac{1}{2}\right)$ $t = \sqrt{\frac{y}{6}}$

$\left(\frac{1}{2}\right)$ $x = \ln 3\sqrt{\frac{y}{6}}$

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

Simplify the expression $\frac{(6n-1)!}{(6n+2)!}$. **SCORE: ____ / 3 PTS**

$$\frac{(6n-1)!}{(6n+2)(6n+1)(6n)(6n-1)!} = \frac{1}{6n(6n+2)(6n+1)}$$

$\left(1\frac{1}{2}\right)$ $\left(\frac{1}{2}\right)$

Find the value of $\sum_{p=2}^{5}\left(\frac{1}{2}(p!) + 2\right)$. **SCORE: ____ / 3 PTS**

$3 + 5 + 14 + 62 = 84$

$\left(\frac{1}{2}\right)$ POINT EACH = (2) TOTAL (1)

GRADED BY ME

The parametric equations ① $x = t^2$, $y = t^2 + 2$ and ② $x = e^{-t}$, $y = e^{-t} + 2$ both correspond to the rectangular equation $y = x + 2$. **SCORE: ____ / 2 PTS**

Explain how the parametric curves differ from each other.

AS t GOES FROM $-\infty$ TO ∞

① x ∞ TO 0 TO ∞

② ∞ TO 0

A cat jumps off a 4 foot shelf at an angle of 60° with the horizontal, at a speed of 6 feet per second. **SCORE: ____ / 3 PTS**

Find parametric equations that model the cat's trajectory (path).

$x = (6\cos 60^\circ)t = 3t$ (1)

$y = 4 + (6\sin 60^\circ)t - 16t^2 = 4 + 3\sqrt{3}t - 16t^2$ (1½)

(½)

Write $\frac{41}{36} - \frac{35}{49} + \frac{29}{64} - \frac{23}{81} + \frac{17}{100} - \frac{11}{121} + \frac{5}{144}$ in sigma notation. ← ARITHMETIC $d = -6$ **SCORE: ____ / 4 PTS**

$\sum_{n=1}^{7} (-1)^{n+1} \frac{41-6(n-1)}{(n+5)^2} = \sum_{n=1}^{7} (-1)^{n+1} \frac{47-6n}{(n+5)^2}$ (1) (1) (1) (1)

OR $\sum_{n=0}^{6} (-1)^n \frac{41-6n}{(n+6)^2}$

OR $\sum_{n=6}^{12} (-1)^n \frac{77-6n}{n^2}$

* SUBTRACT (1) IF YOU USED DIFFERENT (MISMATCHED) LETTER/INDEX INSIDE Σ

Find parametric equations for the hyperbola with vertices $(\pm 7, 0)$ and foci $(\pm 9, 0)$. **SCORE: ____ / 3 PTS**

$9^2 = 7^2 + b^2 \rightarrow b = \sqrt{32} = 4\sqrt{2}$ (½)

$x = 7\sec t$ (½)

$y = 4\sqrt{2}\tan t$ (½)

(1½) IF YOU HAVE BOTH

Write the first five terms of the sequence defined recursively by $a_{n+1} = n^2 - 2a_n$, $a_1 = 2$. **SCORE: ____ / 4 PTS**

Write your final answer as a sequence.

$a_2 = 1^2 - 2a_1 = 1 - 2(2) = -3$

$a_3 = 2^2 - 2a_2 = 4 - 2(-3) = 10$

$a_4 = 3^2 - 2a_3 = 9 - 2(10) = -11$

$a_5 = 4^2 - 2a_4 = 16 - 2(-11) = 38$

(½) IF WRITTEN IN A LIST

(½) 2, −3, 10, −11, 38

(1) IF YOU GOT 2 CORRECT

(2) 3

(3) ALL 4