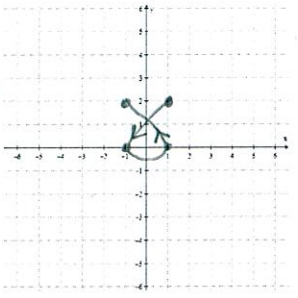
Sketch the curve represented by the parametric equations $x = \cos \pi t$, $y = t^2 + t$ for $-2 \le t \le 1$ **SCORE: ____ / 4 PTS**

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

t	x	y	
-2	1	2	½
-1	-1	0	½
0	1	0	½
1	-1	2	½

GRADED BY ME



Find the value of $\sum_{n=2}^{5}[n! - 2n^2]$. **SCORE: ____ / 3 PTS**

$[2! - 2(2)^2] + [3! - 2(3)^2] + [4! - 2(4)^2] + [5! - 2(5)^2]$

$= (2 - 8) + (6 - 18) + (24 - 32) + (120 - 50)$

$= \underbrace{-6}_{\frac{1}{2}} + \underbrace{-12}_{\frac{1}{2}} + \underbrace{-8}_{\frac{1}{2}} + \underbrace{70}_{\frac{1}{2}} = \underbrace{44}_{1}$

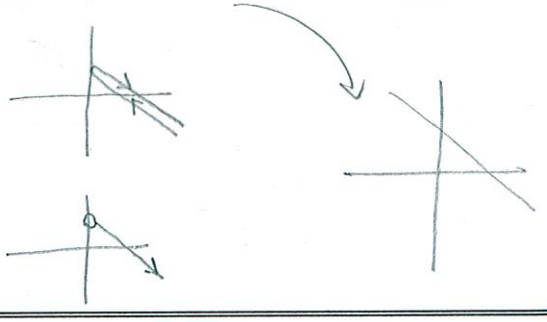
The parametric equations $x = t^2$, $y = 2 - t^2$ and $x = e^t$, $y = 2 - e^t$ both correspond to the rectangular equation $y = 2 - x$. **SCORE: ____ / 3 PTS**

Explain how the parametric curves differ from each other. **Be as specific as possible.**

① $x = t^2$ GOES FROM ∞ TO 0 TO ∞

② $x = e^t$ GOES FROM ≈ 0 TO ∞

GRADED BY ME



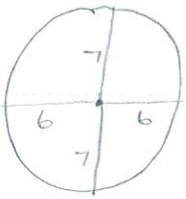
Simplify $\dfrac{(n-3)!}{(n-1)!}$. **SCORE: ____ / 3 PTS**

$\dfrac{(n-3)!}{(n-1)(n-2)(n-3)!}$ (1½) $=$ EITHER ONE IS OK $\dfrac{1}{(n-1)(n-2)}$ OR $\dfrac{1}{n^2-3n+2}$ (1½)

OR $\dfrac{(n-3)(n-4)(n-5)\cdots(1)}{(n-1)(n-2)(n-3)(n-4)(n-5)\cdots(1)}$

EITHER ONE IS OK

Find parametric equations for the ellipse that has center $(4,-8)$, and is 12 units wide (side-to-side) and 14 units tall (top-to-bottom).



SCORE: ____ / 2 PTS

$x = 4 + 6\cos t$ (1)

$y = -8 + 7\sin t$ (1)

Eliminate the parameter and write the rectangular equation for the curve represented by the parametric equations $x = \dfrac{t}{1-t}$, $y = \dfrac{t}{2t-1}$. **Write your final answer in the form y as a simplified function of x.**

SCORE: ____ / 5 PTS

$x(1-t) = t$

$x - xt = t$ (1)

$x = t + xt$

$x = t(1+x)$ (1)

$t = \dfrac{x}{1+x}$ (1)

$y = \left|\dfrac{\frac{x}{1+x}}{2\left(\frac{x}{1+x}\right)-1}\right| \cdot \dfrac{1+x}{1+x}$ (1)

$= \dfrac{x}{2x-(1+x)}$

$= \boxed{\dfrac{x}{x-1}}$ (1)

Write $\dfrac{8}{16} - \dfrac{27}{32} + \dfrac{64}{64} - \dfrac{125}{128} + \dfrac{216}{256} - \dfrac{343}{512}$ using sigma notation.

$2^3 \quad 3^3 \quad 4^3 \quad 5^3 \quad 6^3 \quad 7^3$

$2^4 \quad 2^5 \quad 2^6 \quad 2^7 \quad 2^8 \quad 2^9$

SCORE: ____ / 5 PTS

$\sum_{n=2}^{7} (-1)^n \dfrac{n^3}{2^{n+2}}$ (1) (1) (1)

OR $\sum_{n=4}^{9} (-1)^n \dfrac{(n-2)^3}{2^n}$

IE. LETTER

(1) POINT FOR USING SAME INDEX UNDER $\sum$ AS IN FORMULA

Find parametric equations for the line through the points $(4,-8)$ and $(-1,-2)$.

SCORE: ____ / 2 PTS

$x = 4 + (-1-4)t = 4 - 5t$ (1)

$y = -8 + (-2-8)t = -8 + 6t$ (1)

OR

$x = -1 + (4-(-1))t = -1 + 5t$

$y = -2 + (-8-(-2))t = -2 - 6t$

Find the 4^{th} term of the sequence defined recursively by $a_1 = -1$, $a_n = n^2 - 2a_{n-1}$ for $n \geq 2$.

SCORE: ____ / 3 PTS

$a_2 = 2^2 - 2a_1 = 4 - 2(-1) = 6$ (1)

$a_3 = 3^2 - 2a_2 = 9 - 2(6) = -3$ (1)

$a_4 = 4^2 - 2a_3 = 16 - 2(-3) = 22$ (1)