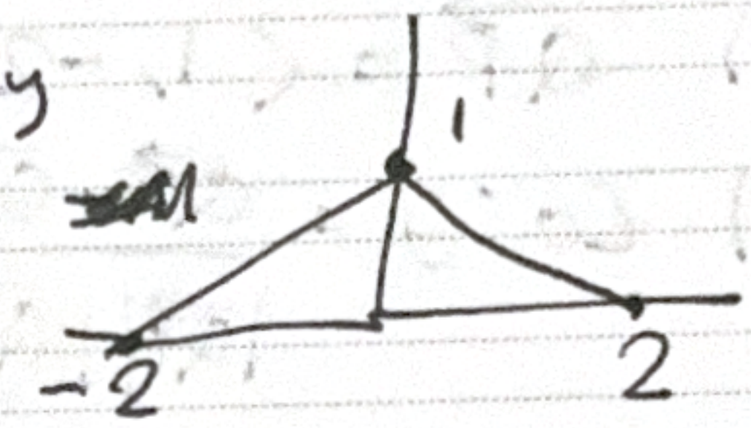
Subject: Practice Exam 3

Year. Month. Date. ( )

Practice Exam 3

1. a) $\int_0^{2y-2} \int_1^{2-2y} dx\,dy$



2. b) $\int_0^{2\pi} \int_1^{2\cos\theta} r^2 |r \sin\theta| r\,dr\,d\theta$

$= \int_0^{\frac{\pi}{2}} \frac{4}{5} |\cos\theta| = \frac{4}{5}$

3 a) $6x^2 + 2bxy^2 - a^2x^2 - 3y^2 = 0$

$a = 6$

$b = 3$

b) $f_x = 6x^2y + y^3 + 1$

$\Rightarrow f = 2x^3y + xy^3 + x + g(y)$

$\Rightarrow f_y = 2x^3 + 3xy^2 + 2 = 2x^3 + 3xy^2 + 0 + g'(y)$

$\Rightarrow g'(y) = 2 \Rightarrow g(y) = 2y$

$\Rightarrow f = 2x^3y + xy^3 + x + 2y$

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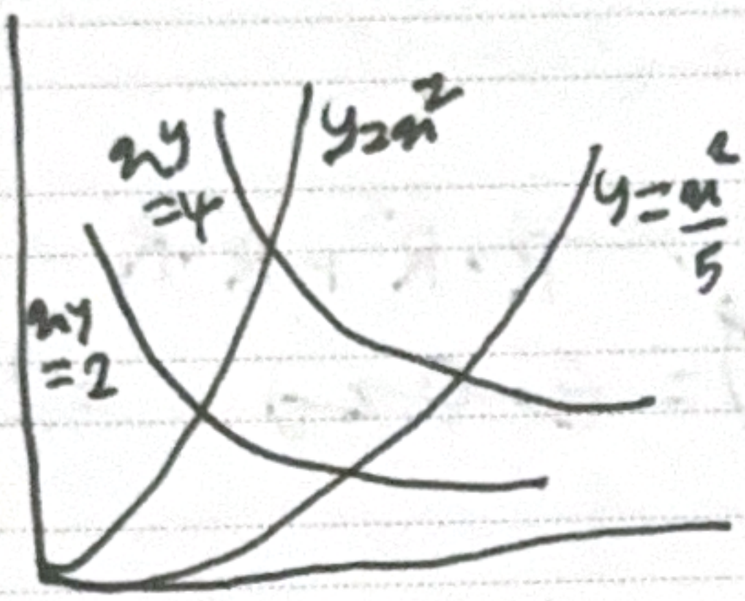
c) [illegible] $= f(\pi) - f(0) = e^{-\pi} - 1$

4. $\int_0^1 t^5 + 2t^{4.5}\,dt = \frac{t^6}{2}\Big|_0^1 = \frac{1}{2}$

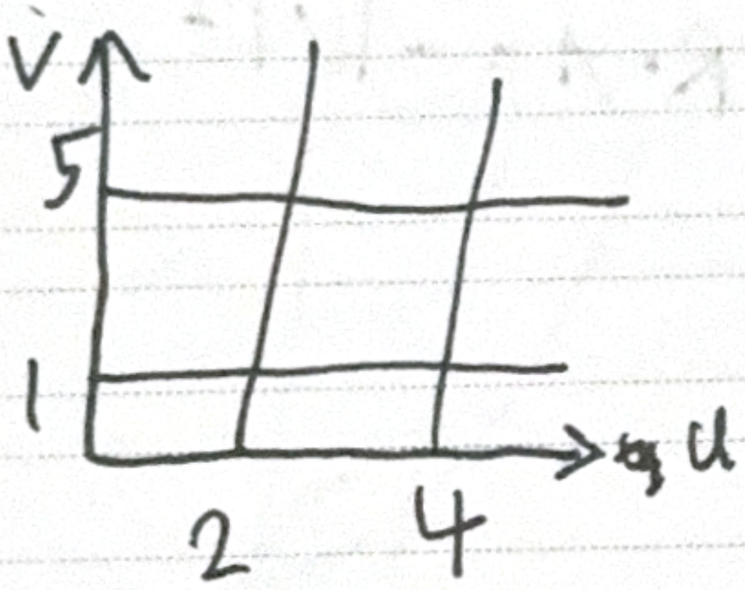
5.



$u = xy$

$v = \frac{x^2}{y}$

a)



$$= \int_1^5 \int_{\frac{1}{3}v}^{\frac{4}{3}v} \frac{2}{3}u\,du\,dv$$

$$= \int_1^5 2v\,dv$$

b) $= 24 - \frac{2}{3} \ln 5$

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6. a) $\iint_R -M_y \, dA$

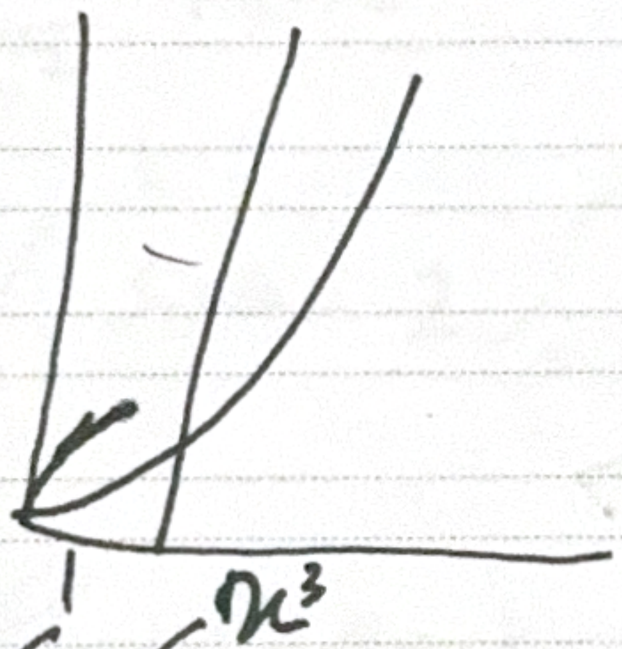
b) $\iint_R -My \, (x^2+y^2) \, dA$

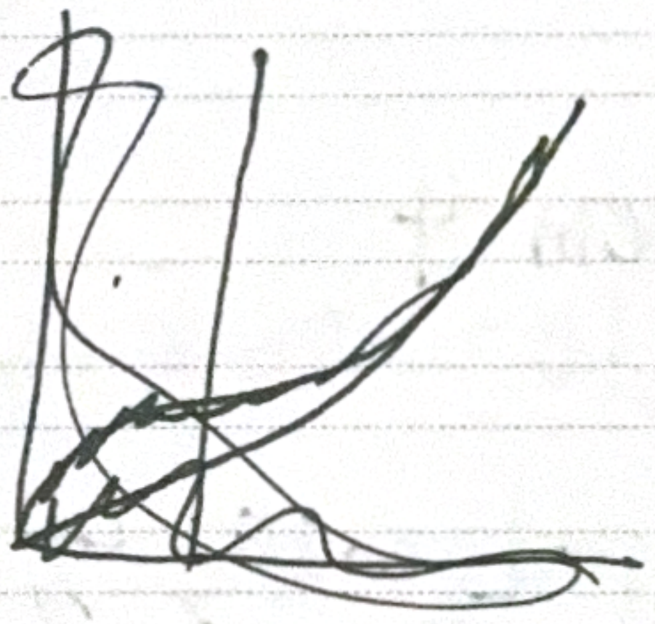
$= \iint_R (x^2+y^2+2yx) \, dA$

$\Rightarrow 4M_y = -x^2-y^2+2xy$

$\Rightarrow M = -\frac{1}{4}x^2 - \frac{1}{4}y^2 + \frac{1}{2}xy = -\frac{1}{3}(x+y)^3$

7.





a) $\int_0^1 \int_0^{x^3} 2y \, dy \, dx$ c) $\frac{1}{3}+1 = \frac{8}{7}$

$= \int_0^1 x^6 \, dx = \frac{x^4}{4}\Big|_0^1 = \frac{1}{4}$

7

b) -1, 0