UNISUL

UNIVERSIDADE DO SUL DE SANTA CATARINA
Campus Tubarão
Unidade Acadêmica Tecnológica
Curso: Ciência da Computação

Disciplina: **Integrais de funções de uma ou mais variáveis**
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Alunos(as): Pâmela Domingos Data: 05/outubro/2017

2ª Avaliação – peso 6

1. Calcule as integrais definidas abaixo (1,0 cada)

1,0 a) $\int_0^2 (2x+5)dx$

4,7/6

0,7 b) $\int_1^3 \left(\frac{x^2}{2} - \frac{1}{x^5}\right)dx$

1,0 c) $\int_0^1 (x^3 - x^2 - 2x)dx$

0,8 d) $\int_{-1}^{1} \sqrt{3+x}\,dx$

2. Calcule as áreas das regiões delimitadas pelas funções abaixo (1,0 cada)

0,4 a) $f(x) = -x^2 + 5x - 4,\ 2 \leq x \leq 5$

0,8 b) $f(x) = \frac{3}{(x+2)^2},\ -1 \leq x \leq 3$

☺ Boa Prova !!!

Pâmela Domingos

a) $\int_0^2 (2x+5)\,dx$

$\frac{\cancel{2}x^2}{\cancel{2}} + 5x \Rightarrow \left[x^2 + 5x\right]_0^2 \Rightarrow 2^2 + 5.2 - (0^2 + 5.0)$

$4 + 10$

$\boxed{= 14}$

b) $\int_1^3 \left(\frac{x^2}{2} - \frac{1}{x^5}\right) dx$

$\frac{1}{2}\int_1^3 x^2\,dx - \int_1^3 x^{-5}\,dx$

$\frac{1}{2}\cdot\frac{x^3}{3} - \frac{x^{-4}}{-4} \Rightarrow \frac{x^3}{6} - \frac{x^{-4}}{-4} \Rightarrow \frac{x^3}{6} + \frac{x^{-4}}{4} \Rightarrow \left[\frac{x^3}{6} + \frac{1}{4x^4}\right]_1^3$

$\frac{3^3}{6} + \frac{1}{4.3^4} - \left(\frac{1^3}{6} + \frac{1}{4.1^4}\right) \Rightarrow \frac{27}{6} + \frac{1}{324} - \left(\frac{1}{6} + \frac{1}{4}\right)$

$\frac{1458 + 1}{324} - \left(\cancel{\frac{11}{6}}\right)$

$\boxed{4.5 - \left(\cancel{\frac{7}{6}}\right)}$

c) $\int_0^1 (x^3 - x^2 - 2x)\,dx$

$\frac{x^4}{4} - \frac{x^3}{3} - \frac{\cancel{2}x^2}{\cancel{2}} \Rightarrow \left[\frac{x^4}{4} - \frac{x^3}{3} - x^2\right]_0^1$

$\frac{1^4}{4} - \frac{1^3}{3} - 1^2 - (0) \Rightarrow \frac{1}{4} - \frac{1}{3} - 1 \Rightarrow \frac{1 - \frac{4}{3} - 4}{4}$

$\boxed{\Rightarrow \frac{-\frac{13}{3}}{4}} = -\frac{13}{12}$

d) $\int_{-1}^{1} \sqrt{3+x}\, dx$

$\int_{-1}^{1} (3+x)^{1/2}\, dx$

$u = 3 + x$

$\frac{du}{dx} = 1$

$du = dx$

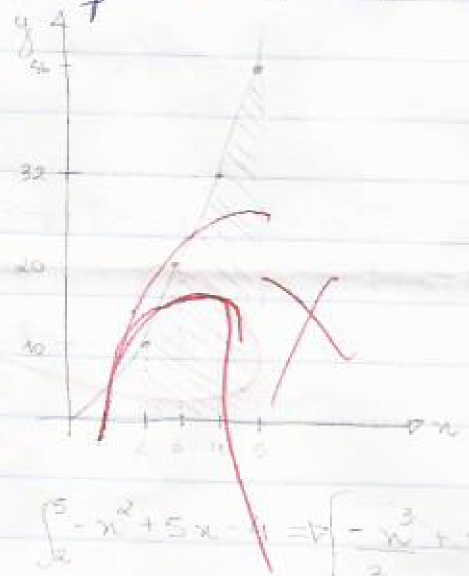
$\int u^{1/2} \cdot du$

$\frac{u^{3/2}}{3/2} \Rightarrow \frac{2u^{3/2}}{3} \Rightarrow \left[\frac{2(3+x)^{3/2}}{3}\right]_{-1}^{1}$

? ?

$\frac{2(3+1)^{3/2}}{3} - \left(\frac{2(3-1)^{3/2}}{3}\right) \Rightarrow \boxed{\frac{2 \cdot 4^{3/2}}{3} - \left(\frac{2 \cdot 2^{3/2}}{3}\right)}$ 4

(2) a) $f(x) = -x^2 + 5x - 4, \quad x \geq 2 \text{ e } x \leq 5$



x	$y = -x^2 + 5x - 4$
2	$-2^2 + 5 \cdot 2 - 4 = 4 + 10 - 4 = 10$
3	$-3^2 + 5 \cdot 3 - 4 = 9 + 15 - 4 = 20$
4	$-4^2 + 5 \cdot 4 - 4 = 16 + 20 - 4 = 32$
5	$-5^2 + 5 \cdot 5 - 4 = 25 + 25 - 4 = 46$

? 0

??

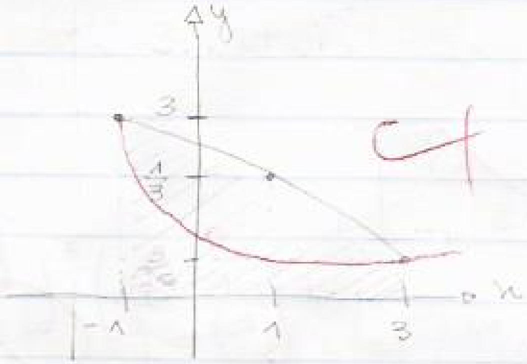
$\int_2^5 -x^2 + 5x - 4 \Rightarrow \left[-\frac{x^3}{3} + \frac{5x^2}{2} - 4x\right]_2^5 \Rightarrow -\frac{5^3}{3} + \frac{5 \cdot 5^2}{2} - 4 \cdot 5 \Rightarrow -\frac{125}{3} + \frac{30}{2} - \frac{20}{1}$

$\frac{-125 + 45 - 60}{3} \Rightarrow \frac{-140}{3} - \left(\frac{-2^3}{3} + \frac{5 \cdot 2^2}{2} - 4 \cdot 2\right)$

$\frac{-140}{3} - \left(\frac{-8}{3} + 10 - 8\right) \Rightarrow \frac{-8 + 30 - 24}{3} = -\frac{2}{3}$

$\frac{-140}{3} + \frac{2}{3} \Rightarrow \frac{-140+2}{3} = \frac{-138}{3} = \cancel{\boxed{-46}}$

② b) $f(x) = \frac{3}{(x+2)^2}$ x entre -1 e 3



x	$y = \frac{3}{(x+2)^2}$
-1	$\frac{3}{(-1+2)^2} = \frac{3}{1} = 3$
1	$\frac{3}{(1+2)^2} = \frac{3}{9} = \frac{1}{3}$
3	$\frac{3}{(3+2)^2} = \frac{3}{25}$

$$\int_{-1}^{3} \frac{3}{(x+2)^2}$$

$u = x+2$

$u = 1$

$du = dx$

$$\int \frac{3}{u^2}\,dx$$

$$3\int u^{-2}\,dx$$

$$3\,\frac{u^{-1}}{-1} \Rightarrow -3.(x+2)^{-1}$$

$$\left[\frac{-3}{(x+2)^1}\right]_{-1}^{3}$$

$$\frac{-3}{(3+2)} - \left(\frac{-3}{(-1+2)}\right) \Rightarrow \frac{-3}{5} - \left(\frac{-3}{1}\right) \Rightarrow \frac{-3}{5} + 3$$

$$\frac{-3+15}{5} = \boxed{\frac{12}{5}}$$