MATH 102.5 (Term 122)

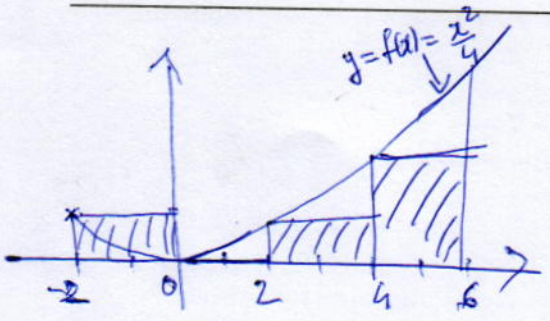
Quiz 1 (Sects. 5.3-5.5) Duration: 20mn

Name: ID number:

1.)(4pts)Find an approximation to the integral $A = \int_{-2}^{6} \frac{x^2}{4} dx$ using Riemann sum with left endpoints and $n = 4$.

2.)(6pts)Evaluate $B = \int \frac{e^{\sqrt{\sin x}} \cos x}{\sqrt{\sin x}} dx$, $C = \int_{\frac{\pi^2}{4}}^{\frac{\pi^2}{9}} \frac{2}{\sqrt{x}\sec(2\sqrt{x}+\pi)} dx$, $D = \int_0^{\frac{\pi}{12}} (\cos x + \sin x)^2 \cos 2x dx$

1.)



$A \approx 2f(-2) + 2f(0) + 2f(2) + 2f(4)$

$= 2\left[\frac{(-2)^2}{4} + 0 + \frac{2^2}{4} + \frac{4^2}{4}\right]$

$= 2[1 + 1 + 4] = 12$

2) a) $u = \sqrt{\sin x} \Rightarrow du = \frac{\cos x}{2\sqrt{\sin x}} dx$

$B = \int e^u (2\,du) = 2e^u + C$

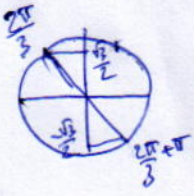
$\boxed{B = 2e^{\sqrt{\sin x}} + C}$

b) $u = 2\sqrt{x} + \pi$ | $x =$

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

$C = \int \frac{2}{\sec u} du = \int 2\cos u \, du$

$= 2\sin u + C$



$C = 2\left[\sin(2\sqrt{x} + \pi)\right]_{\pi^2/4}^{\pi^2/9}$

$= 2\left[\sin\left(\frac{2\pi}{3} + \pi\right) - \sin\left(\frac{2\pi}{2} + \pi\right)\right]$

$= 2\left(\frac{-\sqrt{3}}{2}\right) = -\sqrt{3}$

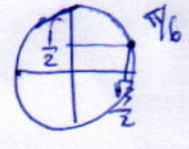
c) $D = \int_0^{\pi/12} (\cos^2 x + \sin^2 x + 2\cos x \sin x)\cos 2x \, dx$

$= \int_0^{\pi/12} (1 + 2\cos x \sin x)\cos 2x \, dx$

$= \int_0^{\pi/12} (\cos 2x + \sin 2x \cos 2x) \, dx$

$= \left[\frac{\sin 2x}{2} + \frac{\sin^2 2x}{4}\right]_0^{\pi/12}$

$= \frac{1}{2}\sin\frac{\pi}{6} + \frac{1}{4}\sin^2\frac{\pi}{6}$



$= \frac{1}{2}\left(\frac{1}{2}\right) + \frac{1}{4}\left(\frac{1}{2}\right)^2 = \frac{1}{4}\left(1 + \frac{1}{4}\right)$

$= \frac{5}{16}$.