MATH102.5 (Term 151)

Quiz 2 (Sects. 5.6 & 6.1) Duration: 20 min

Name: ID:

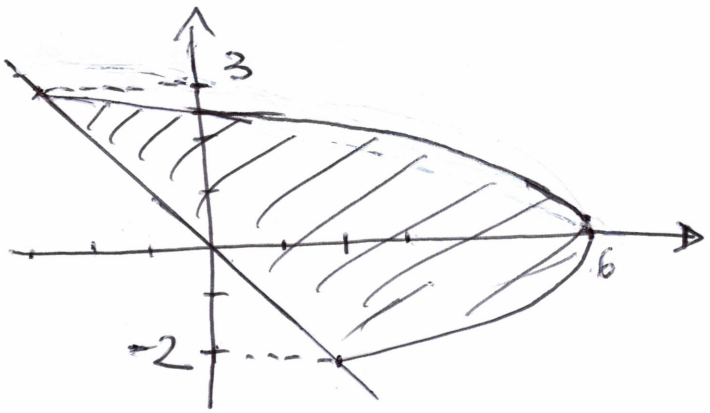
1.) Find the area of the region enclosed by the line $y=-x$ and the parabola $y^2=-x+6$. (5pts)

2.) The base of a solid is bounded by the curves $y=x^2$, $y=0$ and $x=1$. If the cross-section perpendiculaire to the x-axis are circles, then find the volume of the solid. (5pts)

1.) $x^2=-x+6$, $x^2+x-6=0$

$x_1=\frac{-1-\sqrt{25}}{2}=-3 \Rightarrow y_1=3$

$x_2=\frac{-1+5}{2}=2 \Rightarrow y_2=-2$



$$A=\int_{-2}^{3}\left[-y^2+6-(-y)\right]dy$$

$$=\int_{-2}^{3}(-y^2+y+6)\,dy$$

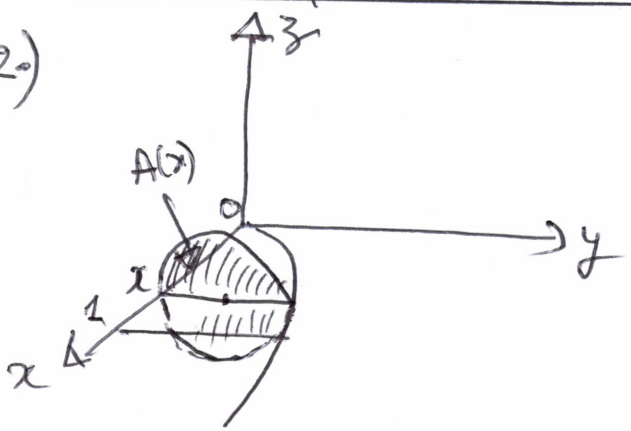
$$=\left[\frac{-y^3}{3}+\frac{y^2}{2}+6y\right]_{-2}^{3}$$

$$=\left(-9+\frac{9}{2}+18\right)-\left(\frac{8}{3}+2-12\right)$$

$$=\frac{27}{2}+\frac{22}{3}$$

$$=\frac{125}{6}$$

2.)



$$V=\int_0^1 A(x)\,dx$$, where $A(x)$ is the area of the disk of radius $\frac{x^2}{2}$.

Thus, $A(x)=\pi\left(\frac{x^2}{2}\right)^2=\pi\frac{x^4}{4}$

$$V=\pi\int_0^1\frac{x^4}{4}\,dx=\frac{\pi}{4}\left[\frac{x^5}{5}\right]_0^1$$

$$=\frac{\pi}{20}$$