MATH 102.6 (Term 132)

Quiz 2 (Sects. 5.6-6.1) Duration: 20mn

Name: ID number:

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

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

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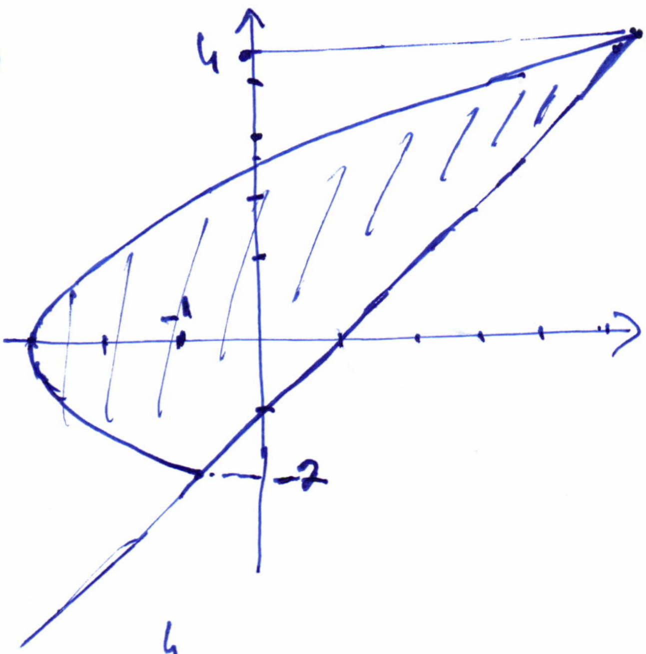
1)



$$A = \int_{-2}^{4}\left[(y+1) - \left(\frac{y^2-6}{2}\right)\right] dy$$

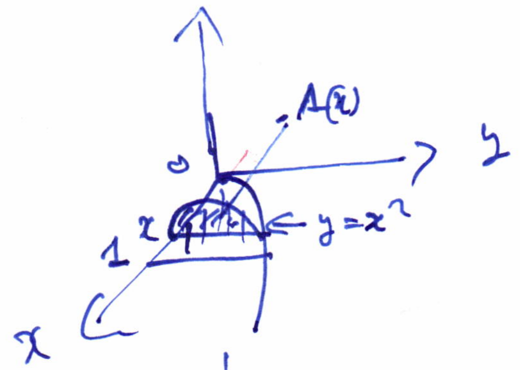
$$= \int_{-2}^{4}\left(y - \frac{y^2}{2} + 4\right) dy$$

$$= \left[\frac{y^2}{2} - \frac{y^3}{6} + 4y\right]_{-2}^{4}$$

$$= \left(8 - \frac{32}{3} + 16\right) - \left(2 + \frac{4}{3} - 8\right)$$

$$= 30 - \frac{36}{3} = 30 - 12 = \underline{\underline{18}}$$

2.)



$$V = \int_0^1 A(x)\,dx$$

$A(x)$ is the area of the half-disk of radius $\frac{x^2}{2}$

Thus, $A(x) = \frac{1}{2}\left(\frac{x^2}{2}\right)^2 \pi = \frac{x^4}{8}\pi$

$$V = \frac{\pi}{8}\int_0^1 x^4\,dx$$

$$= \frac{\pi}{8}\left[\frac{x^5}{5}\right]_0^1 = \frac{\pi}{40}$$