$1.a) \int\limits_{\pi/3}^{\pi/2} tg(x)dx = \ln|\sec(x)| = \ln\left[\ |\sec 90°| - \ln|\sec 60°| \ \right]$

$b) \int\limits_{0}^{\pi/2} -sen(x)dx = \cos(x) = \cos 90° - \cos° = 0 - 1 = -1$

$c) \int\limits_{0}^{2} 3x^3 + 3x^2 dx = \dfrac{3x^4}{4} + x^3$

$F(2) = 20$

$F(0) = 0$

$F(2) - F(0) = 20$

2.

$y = -x^2 + 6x - 5$

$-x^2 + 6x - 5 = 0$

$x' = 1, x'' = 5$

$\int\limits_{1}^{5} -x^2 + 6x - 5dx = -\dfrac{x^3}{3} + 3x^2 - 5x$

$F(5) = \dfrac{25}{3}$

$F(1) = -\dfrac{7}{3}$

$F(5) - F(1) = \dfrac{25}{3} - \left(-\dfrac{7}{3}\right) = \dfrac{25}{3} + \dfrac{7}{3} = \dfrac{32}{3} u.a.$

Como a<0, logo, a função terá ponto de máximo.

3.

$$\left[f(x)^2\right]= y^4 +8y^3 +6y^2 -40y+25$$

$$\int_{-2}^{4} y^4 +8y^3 +6y^2 -40y+25\,dy = \frac{y^5}{5}+2y^4 +2y^3 -20y^2 +25y$$

$$F(4)=\frac{3308}{3}$$

$$F(-2)=-\frac{598}{3}$$

$$F(4)-F(-2)=1302\pi$$

4.

$$-x^2 +4x = 2x$$
$$-x^2 +2x = 0$$
$$x'=0,\, x''=2$$

$$\left[f(x)^2\right]=(2x)^2 = 4x^2$$
$$\left[g(x)^2\right]=\left(-x^2 +4x\right)^2 = x^4 -8x^3 +16x^2$$

$$V = \pi.\int_{0}^{2}\left[f(x)^2 - g(x)^2\right]=(4x^2 - x^4 +8x^3 -16x^2)dx = -\frac{12x^3}{3}-\frac{x^5}{5}+2x^4$$

$$F(2)=\frac{96}{15}\pi = \frac{32}{5}\pi$$

$$V = \frac{32}{5}\pi$$