Cálculo 1, lista de exercícios 6

3 a) $\int_0^3 \frac{1}{2}x - 1 \, dx = F(3) - F(0)$

$F = \frac{1}{2}\frac{x^2}{2} - 1x + c = \frac{x^2}{4} - x + c$

$F(3) - F(0) = \frac{3^2}{4} - 3 + c - \left(\frac{0^2}{4} - 0 + c\right) = \frac{9}{4} + 3 + \cancel{c} - \cancel{c} = -\frac{3}{4}$

b) $\int_{-1}^3 (3 - 2x) \, dx = \int_{-1}^3 3 \, dx - \int_{-1}^3 2x \, dx = 12 - \int_{-1}^3 2x \, dx$

$= 12 - \left(\cancel{2} \cdot \frac{x^2 + c}{\cancel{2}}\right)\Big|_{-1}^3 = 12 - (3^2 + \cancel{c} - (-1^2 + \cancel{c})) = 12 - (9 - 1) = 4$

c) $\int_{-1}^2 |x| \, dx = \int_{-1}^0 -x \, dx + \int_0^2 x \, dx = \left(-\frac{x^2}{2} + c_1\right)\Big|_{-1}^0 + \left(\frac{x^2}{2} + c_2\right)\Big|_0^2$

$= -\frac{0^2}{2} + \cancel{c_1} - \left(-\frac{(-1)^2}{2} + \cancel{c_1}\right) + \frac{2^2}{2} + \cancel{c_2} - \left(\frac{0^2}{2} + \cancel{c_2}\right) = 0 + \frac{1}{2} + 2 - 0 = \frac{5}{2}$