5.1 - 5.4 Notes

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1 test

1.

$$\int_0^1 |x-1|dx = \frac{1}{2} \tag{1}$$

2. If F and f are continuous functions such that $F'(x) = f(x)$ for all x, then:

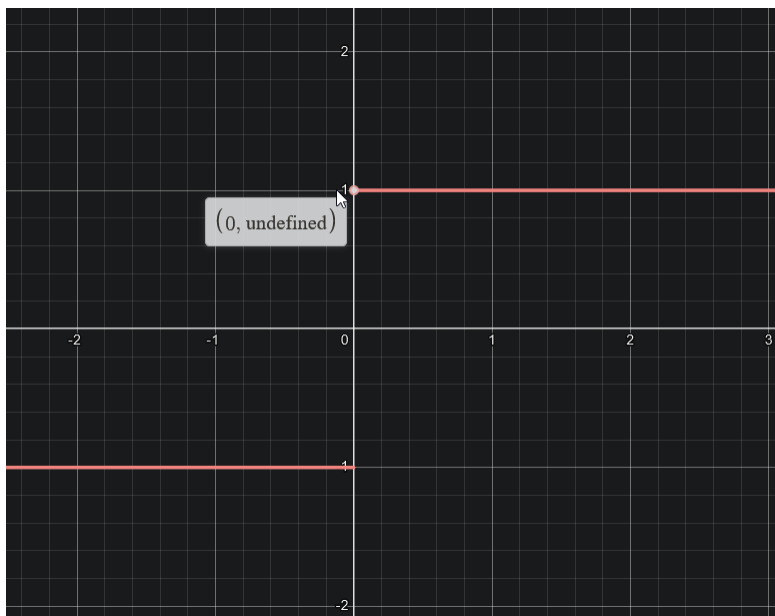$$\int_a^b f(x)dx \tag{1}$$
$$= F(x)|_a^b \tag{2}$$
$$= F(b) - F(a) \tag{3}$$

2 01/08/24 Warm-up

1.

$$\int_{-1}^2 \frac{|x|}{x}dx \tag{1}$$
$$= 1 \tag{2}$$

2. For what non-negative value of b is the line give by $y = -\frac{1}{3}x + b$ normal (perpendicular) to the curve $y = x^3$

$$-\frac{1}{3}x + b \tag{1}$$

$$m_1 \cdot m_2 = -1 \tag{2}$$

$$m = 3 = 3x^2 \tag{3}$$

$$1 = x^2 \tag{4}$$

$$\pm 1 = x \tag{5}$$

$$\therefore 3x^2 \Rightarrow -\frac{1}{3x^2} \tag{6}$$

$$\int -\frac{1}{3x^2}dx \tag{7}$$

$$= -\frac{1}{3}\int \frac{1}{x^2}dx \tag{8}$$

$$= -\frac{1}{3}\int x^{-2}dx \tag{9}$$

$$= -\frac{1}{3} \cdot \frac{x^{-1}}{-1} + C \tag{10}$$

$$\therefore y = \frac{1}{3x} + C \tag{11}$$