

## Homework 22

$$3) f(x) = \frac{x^3 - x^2 + 2x - 6}{x} = x^2 - x + 2 - \frac{6}{x}$$

$$F(x) = \frac{1}{3}x^3 - \frac{1}{2}x^2 + 2x - 6 \ln|x| + C$$

$$4) f(\theta) = e + \sec^2 \theta - e^\theta$$

$$F(\theta) = e\theta + \tan \theta - e^\theta + C$$

$$6) f(t) = \frac{t^2 - 1}{\sqrt{t}} = \frac{t^2}{t^{\frac{1}{2}}} - \frac{1}{t^{\frac{1}{2}}} = t^{\frac{3}{2}} - t^{-\frac{1}{2}}$$

$$F(t) = \frac{2}{5}t^{\frac{5}{2}} - 2t^{\frac{1}{2}} + C$$

$$10) f''(x) = -\cos(x) + \sin(x) \quad f(0) = 1 \quad f(\pi) = 0$$

$$f'(x) = -\sin(x) - \cos(x) + C_1$$

$$f(x) = \cos(x) - \sin(x) + C_1 x + C_2$$

$$f(0) = \cos(0) - \sin(0) + C_1 \cdot 0 + C_2$$

$$1 = 1 - 0 + 0 + C_2$$

$$1 = 1 + C_2$$

$$C_2 = 0$$

$$f(x) = \cos(x) - \sin(x) + C_1 x$$

$$f(\pi) = \cos(\pi) - \sin(\pi) + C_1 \cdot \pi$$

$$0 = -1 - 0 + C_1 \pi$$

$$C_1 \pi = 1$$

$$C_1 = \frac{1}{\pi}$$

$$f(x) = \cos(x) - \sin(x) + \frac{1}{\pi} x$$

$$11) \quad a(t) = 2t + 1 \quad s(0) = 3 \quad v(0) = -2$$

$$v(t) = t^2 + t + C$$

$$-2 = 0 + 0 + C$$

$$C = -2$$

$$v(t) = t^2 + t - 2$$

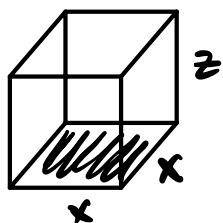
$$s(t) = \frac{1}{3}t^3 + \frac{1}{2}t^2 - 2t + C$$

$$3 = 0 + 0 + 0 + C$$

$$C = 3$$

$$s(t) = \frac{1}{3}t^3 + \frac{1}{2}t^2 - 2t + 3$$

## Homework 21



$$SA = 1200 \text{ cm}^2$$

$$SA = x^2 + 4xz$$

$$1200 = x^2 + 4xz$$

$$z = \frac{1200 - x^2}{4x}$$

$$V = x^2 z$$

$$V = x^2 \cdot \frac{(1200 - x^2)}{4x}$$

$$V = \frac{1}{4} x (1200 - x^2)$$

$$V = 300x - \frac{1}{4} x^3$$

$$V' = 300 - \frac{3}{4} x^2$$

$$0 = 300 - \frac{3}{4} x^2$$

$$\frac{3}{4} x^2 = 300$$

$$x^2 = 400$$

$$x = 20$$

$$\begin{array}{c} + \quad \wedge \quad - \\ \hline \quad \quad | \quad \quad \\ \quad \quad 20 \leftarrow \text{max} \end{array}$$

## Homework 22

$$5) f(x) = x^2 \cdot \sqrt[3]{x} - 4 \cot(x) \csc(x)$$

$$= x^2 \cdot x^{\frac{1}{3}} - 4 \cot(x) \csc(x)$$

$$= x^{\frac{7}{3}} - 4 \cot(x) \csc(x)$$

$$F(x) = \frac{3}{10} x^{\frac{10}{3}} + 4 \csc(x) + C$$

# Exam B

$[0, 2]$

$$f(x) = \frac{1}{x-1} \quad x$$

$$g(x) = \ln(x) \quad x$$

$$h(x) = \cos(\pi x)$$

$$x^2 - 2x$$

$$h(0) = 1$$

$$h(2) = 1$$

0

$$4 - 4 = 0$$