

Quiz Review 4.1 (Class Problems)

$$1) \int \frac{x^3 - 3\sqrt{x} + \sqrt[5]{x^3} + 4}{\sqrt[3]{x^2}} dx$$

a) general equation

2) Find b) specific equation for $f(x)$ if

$$f''(x) = 12x^2 - 12x \quad \text{given that } f(-1) = -6, f'(2) = 10$$

3) Find antiderivative for

$$h(x) = -3\cos x - \frac{2\csc^2 x}{3} - \sec x \tan x$$

Answer:

$$H(x) = -3\sin x + \frac{2}{3}\cot x - \sec x + C$$

Solutions - (Quiz Review 4.1 Class Problems)

$$1) \int \frac{x^3 - 3\sqrt{x} + \sqrt[5]{x^3} + 4}{\sqrt[3]{x^2}} dx \quad \int (x^3 - 3x^{1/2} + x^{3/5} + 4) x^{-2/3} dx$$

$$\int \frac{x^3}{x^{2/3}} - \frac{3x^{1/2}}{x^{2/3}} + \frac{x^{3/5}}{x^{2/3}} + \frac{4}{\sqrt[3]{x^2}} dx$$

$$\int x^{7/3} - 3x^{-1/6} + x^{-1/15} + 4x^{-2/3} dx$$

$$\frac{x^{10/3}}{10/3} - \frac{3x^{5/6}}{5/6} + \frac{x^{14/15}}{14/15} + \frac{4x^{1/3}}{1/3} + C$$

$$\frac{3}{10} x^{10/3} - 3 \left(\frac{6}{15} \right) x^{5/6} + \frac{15}{14} x^{14/15} + 4(3) x^{1/3} + C$$

$$\frac{3}{10} x^{10/3} - \frac{18}{5} x^{5/6} + \frac{15}{14} x^{14/15} + 12 x^{1/3} + C$$

$$2) f''(x) = 12x^2 - 12x \quad f(-1) = -6 \quad f'(2) = 10$$

$$f'(x) = \int 12x^2 - 12x \, dx$$

$$f'(x) = \frac{12x^3}{3} - \frac{12x^2}{2} + C$$

$$f'(x) = 4x^3 - 6x^2 + C$$

$$10 = 4(2)^3 - 6(2)^2 + C$$

$$10 = 32 - 24 + C \quad \underline{\underline{2 = C}}$$

$$f'(x) = 4x^3 - 6x^2 + 2$$

$$f(x) = \int 4x^3 - 6x^2 + 2 \, dx = \frac{4x^4}{4} - \frac{6x^3}{3} + 2x + K$$

$$f(x) = x^4 - 2x^3 + 2x + K$$

$$-6 = (-1)^4 - 2(-1)^3 + 2(-1) + K$$

$$-6 = 1 + 2 - 2 + K$$

$$-6 = 1 + K$$

$$-7 = K$$

Specific

$$f(x) = x^4 - 2x^3 + 2x - 7$$

a) $f(x)$: general

$$f(x) = x^4 - 2x^3 + C_1x + C_2$$