

# MAC 2311: Test 4 Review

1. a.  $f(x) = x^5$

$$\int x^5 dx = \frac{x^6}{6} + C$$

1. b.  $f(x) = 3x^2 - \frac{2}{x^2} = 3x^2 - 2x^{-2}$

$$\begin{aligned} \int (3x^2 - 2x^{-2}) dx &= \frac{3x^3}{3} - \frac{2x^{-1}}{-1} + C \\ &= x^3 + \frac{2}{x} + C \end{aligned}$$

1. c.  $f(x) = \cos(4x)$

$$\begin{aligned} \int \cos(4x) dx &= \frac{4}{4} \int \cos(4x) dx \\ &= \frac{1}{4} \int \cos(4x) 4 dx \\ &= \frac{1}{4} \sin(4x) + C \end{aligned}$$

1. d.  $f(x) = \sqrt[3]{x} + \sec^2(x) + \sec(x)\tan(x)$

$$\begin{aligned} f(x) &= x^{1/3} + \sec^2(x) + \sec(x)\tan(x) \\ \int (x^{1/3} + \sec^2(x) + \sec(x)\tan(x)) dx &= x^{4/3} + \tan x + \sec x + C \\ &= \frac{x^{4/3}}{4/3} + \tan x + \sec x + C \\ &= \frac{3}{4} x^{4/3} + \tan x + \sec x + C \end{aligned}$$

2. a.  $\int (4x^5 - 3x^3 + \frac{1}{2}x - 1) dx$

$$\begin{aligned} &= \frac{4x^6}{6} - \frac{3x^4}{4} + \frac{1}{2} \frac{x^2}{2} - x + C \\ &= \frac{2}{3} x^6 - \frac{3}{4} x^4 + \frac{1}{4} x^2 - x + C \end{aligned}$$

2. b.  $\int (x^3 \sqrt[3]{x}) dx$

$$\begin{aligned} &= \int (x^3 \cdot x^{1/3}) dx \\ &= \int x^{10/3} dx \\ &= \frac{x^{13/3}}{13/3} + C \\ &= \frac{3}{13} x^{13/3} + C \end{aligned}$$