

Midterm exam Math106

Question 1(2+3+3+3+2)

- a) Use Simpson's rule with  $n=4$  to approximate  $\int_0^4 \frac{dx}{\sqrt{2+x^3}}$
- b) Use Riemann sums to compute the integral  $\int_0^1 (2x + 1)dx$
- c) Evaluate the integral  $\int \frac{\sqrt{x}dx}{\cos^2(x^{3/2})}$
- d) Compute  $\int \frac{2\sqrt{3x+1}}{\sqrt{3x+1}} dx$
- e) If  $y = (x^3 + 1)^3(x^4 + 1)^4(x^5 + 1)^5$ , find  $\frac{dy}{dx}$ .

Question 2(3+3+3+2+3+3)

- a) Compute  $\int \frac{dx}{\sqrt{x}\sqrt{4-x}}$  ( $0 < x < 4$ )
- b) Find the indefinite integral  $\int \frac{dx}{x\sqrt{x^6-16}}$  ( $x > \sqrt[3]{4}$ )
- c) Evaluate the integral  $\int \frac{dx}{x\sqrt{9-x^4}}$  ( $0 < x < \sqrt{3}$ )
- d) Find  $\lim_{x \rightarrow 0^+} x^2 \ln x$
- e) Compute  $\int e^{\sqrt{x}} dx$  ( $x > 0$ )
- f) Evaluate  $\int (\sin x)^5 (\cos x)^8 dx$