

Math 150 Practice Test 5

1. Make a schematic picture of the motion of a particle with position function

$$s = t + \frac{9}{t+1}, t \geq 0.$$

2. Verify that the hypotheses of Rolle's Theorem are satisfied by $f(x) = \frac{x^2 - 1}{x - 2}$ on $[-1, 1]$ and find all values of c that satisfy the conclusion of the theorem.

3. Evaluate:

a. $\int \left(\frac{4}{x^3} - 2 \sec^2 x + \pi \right) dx$

b. $\int \left(\sqrt[4]{x^5} - 3 \sin x \right) dx$

c. $\int \left(\frac{4\sqrt{t} - t\sqrt{t}}{t^2} \right) dt$

d. $\int \sqrt[3]{t} \left(4t^2 - 3t + \frac{5}{t} \right) dt$

- 4.. Find y if $\frac{dy}{dx} = \frac{1}{2\sqrt{x}}$ and $y(4) = 3$.

5. Evaluate:

a. $\int \left(\frac{\sin x}{\sqrt{\cos x - 3}} \right) dx$

b. $\int 5x(x^2 - 2)^1 dx$

c. $\int \frac{r^2 dr}{\sqrt{3 + r^3}}$

d. $\int \sin(\cos r) \sin r dr$

e. $\int \cos^3 2x \sin 2x dx$

f. $\int \tan^3 x \sec^2 x dx$

6. a. Evaluate: $\sum_{k=1}^6 \sin\left(\frac{k\pi}{2}\right)$

b. Evaluate: $\sum_{k=0}^5 (-1)^k 2^k$

7. Find y if $\frac{dy}{dx} = \sqrt[3]{x} \sin\left(x^{\frac{4}{3}} - 2\right)$ and $y(1) = 0$.