

## AP Calculus Review I

1. Determine:  $\int \sin(5t-7) dt$

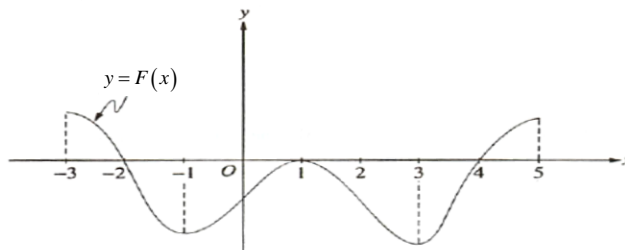
2. Solve:  $\frac{dy}{dx} = 4x^2 - 3x$ , given  $y(0) = -2$ .

3. The graph of  $y = F(x)$  is given on the right, over  $x \in (-3, 5)$ .

a. At what value(s) of  $x$ , will  $y = f(x)$  have a zero?

Justify your answer.

b. At what values(s) of  $x$  will  $y = f(x)$  change from increasing to decreasing? Justify your answer.



c. Determine the interval(s) over which  $y = f(x)$  is negative. Justify your answer.

4. Given  $f(x) = 3\ln(x^2)$ , determine the slope of  $y = F(x)$  at  $x = e$ .

5. Approximate the area between the  $x$ -axis and the graph of  $y = \sqrt[3]{x}$  to three decimal places over the interval  $[0, 3]$  using six sub-intervals and given RAM:

- a. LRAM      b. RRAM      c. MRAM      d. Trapezoids

6. The table on the right shows  $R(t)$ , the rate of flow of people per hour through the entrance of Playland,  $t$  hours after it opens. Use the Trapezoidal method to approximate the total number of people that entered Playland during the first ten hours of the day.

$t$	0	5	7	10
$R(t)$	223	305	107	150

7. Explain clearly and completely when each of the RAMs and Trapezoids method over- and under-estimate the total area under a function,  $f(x)$ .

### Solutions

1.  $-\frac{1}{5}\cos(5t-7) + C$

2.  $y = \frac{4}{3}x^3 - \frac{3}{2}x^2 - 2$

3. a) -1, 1, 3      b) 0, 3.5      c)  $(-3, -1), (1, 3)$

4. 6

5. a) 2.778      b) 3.499      c) 3.266      d) 3.138

6. 2118 people

7. Consider incr+CU, incr+CD, decr+CU, decr+CD