

D. $y = e^{\sqrt{x} - \ln x}$ (4 Marks)

{Ans: $4(x^3 - 3x^2 - x + 8)$, $18x(3x^2 + 5)^2$, $\frac{1}{x-5} - \frac{3x}{3x^2+6}$ and $e^{\sqrt{x} - \ln x} \cdot \frac{1}{2\sqrt{x}} - \frac{1}{x}$ }

Total 18 Marks

3. Find and classify the Stationary points for the following curves:

$y = x^2 - 6x - 3$ (4 Marks)

A. $y = x^2 + 12x - 20$ (4 Marks)

B. $y = 40 + 3x - 2x^2 + \frac{x^3}{3}$ (6 Marks)

C. $y = x^3 - 3x^2 + 3x + 2$ (6 Marks)

{Ans: (3, -12), (-6, -48), [(3, 40) & (1, 41 $\frac{1}{3}$)] and (1, 3)}

Total 20 Marks

4. A. The Fresh Brew Coffee Company has found that it's cost of producing x grams of coffee is given by: $c(x) = 100x^2 + x + 1600$

(i) Determine the average change in cost from $x = 23$ to $x = 25$; (5 Marks)

(ii) At what level of output will average cost per unit be a minimum? What is this minimum? (8 Marks)

B. The demand equation for a monopolist's product is $p = 400 - 2x$ and the average-cost function is:

$$\bar{c} = 0.2x + 4 + \frac{400}{x},$$

where x is number of units, and both p and \bar{c} are expressed in dollars per unit.

(i) Determine the level of output at which profit is maximized; (6 Marks)

(ii) Determine the price at which maximum profit occurs; (3 Marks)

(ii) Determine the maximum profit; (3 Marks)

{Ans: \$ 4801, 4 & \$ 801, 90, \$220, \$17,420}

Total 25 Marks

Business Calculus – Assignment # 1

Due Feb 28, 2019

Presentation of Assignment:

- Assignments are to be submitted on the stated date unless otherwise communicated.
- Late assignments will be accepted three (3) days after the due BUT the candidate cannot get more than 40%
- Assignments that are more than Three (3) days late **WILL NOT BE ACCEPTED**
- Assignments should be typed or neatly written.
- Assignments **MUST** have a **TYPED** cover page with the following.
 - Name of Institution and campus
 - Candidate's name
 - Candidate's identification number
 - Date of submission.

1. Find the Limits of the following. Show all working

A. $\lim_{x \rightarrow 2} \frac{2x^2 + x - 10}{x - 2}$ (3 Marks)

B. $\lim_{x \rightarrow 2} \frac{x^2 + 5x - 14}{x^2 - 5x + 6}$ (5 Marks)

C. $\lim_{b \rightarrow 0} \frac{(9 + b)^2 - 81}{b}$ (5 Marks)

D. $\lim_{x \rightarrow 0} \frac{\frac{1}{x+1} - \frac{1}{x}}{x}$ (5 Marks)
{Ans: 9, -9, 18, -1}

Total 18 Marks

2. Differentiate the following wrt x:

A. $y = (x - 2)^2(x^2 - 2)$ (5 Marks)

B. $y = (3x^2 + 5)^3$ (4 Marks)

C. $y = \ln \left[\sqrt{\frac{2x - 5}{(3x^2 + 6)}} \right]$ (5 Marks)