



**COLLEGE OF BUSINESS PEACE LEADERSHIP AND
GOVERNANCE**

CSC 103: CALCULUS

END OF SECOND SEMESTER EXAMINATIONS

NOVEMBER/DECEMBER 2018

LECTURER: P TARAMBAWAMWE

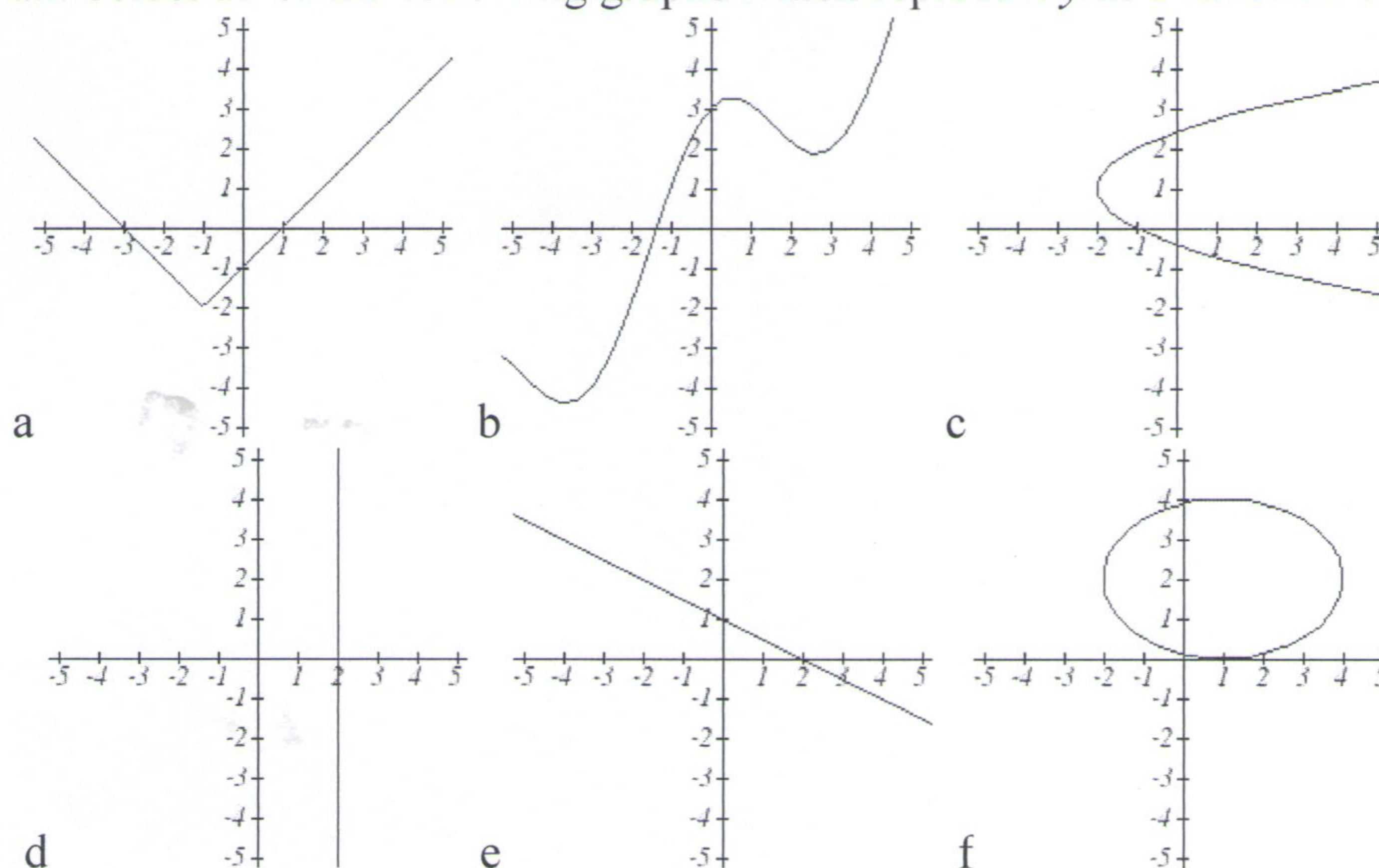
DURATION: (3 HRS)

INSTRUCTIONS

ANSWER ALL QUESTIONS

M

Q1 a.i. Select all of the following graphs which represent y as a function of x . (3 marks)



Select all of the following tables which represent y as a function of x . (3 marks)

ii.

a.

x	2	6	13
y	3	10	10

b.

x	2	6	6
y	3	10	14

c.

x	2	6	13
y	3	10	14

Select all of the following tables which represent y as a function of x . (3 marks)

iii.

a.

x	y
0	-2
3	1
4	6
8	9
3	1

b.

x	y
-1	-4
2	3
5	4
8	7
12	11

c.

x	y
0	-5
3	1
3	4
9	8
16	13

d.

x	y
-1	-4
1	2
4	2
9	7
12	13

iv. For each of the following functions, evaluate: $f(-2)$, $f(0)$, $f(1)$,

a. $f(x) = 3 + \sqrt{x+3}$

b. $f(x) = 4 - \sqrt[3]{x-2}$ (6 marks)

a.

v. If $f(x) = x^3 - 5$ and $g(x) = \sqrt[3]{x+5}$, find

a. $f(g(x))$

b. $g(f(x))$

c. What does this tell us about the relationship between $f(x)$ and $g(x)$?

(6 marks)

Q2 a.

Find the exact value of $\lim_{x \rightarrow 0} \frac{\sqrt{3+x} - \sqrt{3}}{x}$.

b.

Evaluate

$$\lim_{x \rightarrow 0} \frac{\ln(1+2x)}{e^{3x} - 1}.$$

c.

Evaluate

$$\lim_{x \rightarrow 0^+} \sqrt{x} \ln x.$$

d.

Evaluate

$$\lim_{x \rightarrow 0} \frac{e^x - 1 - x}{\cos x - 1}.$$

(16 marks)

Q3.i

Differentiate, with respect to x ,

(a) $e^{3x} + \ln 2x$,

(3)

(b) $(5 + x^2)^{\frac{3}{2}}$.

(3)

ii.

What is the equation of the line tangent to the graph of $f(x) = x \ln x$ at the point $(1,0)$?

(4 marks)

iii

A baseball team plays in a 57,000 seat stadium. The team has found that if the cost of a ticket is $\$X$ then they will sell $57,000 - 3,000X$ tickets. What ticket price will maximize the income the team receives from ticket sales?

(3 marks)

iv.

At what point or points does the given parametric curve have a horizontal tangent line?

$$x = te^{-2t}$$

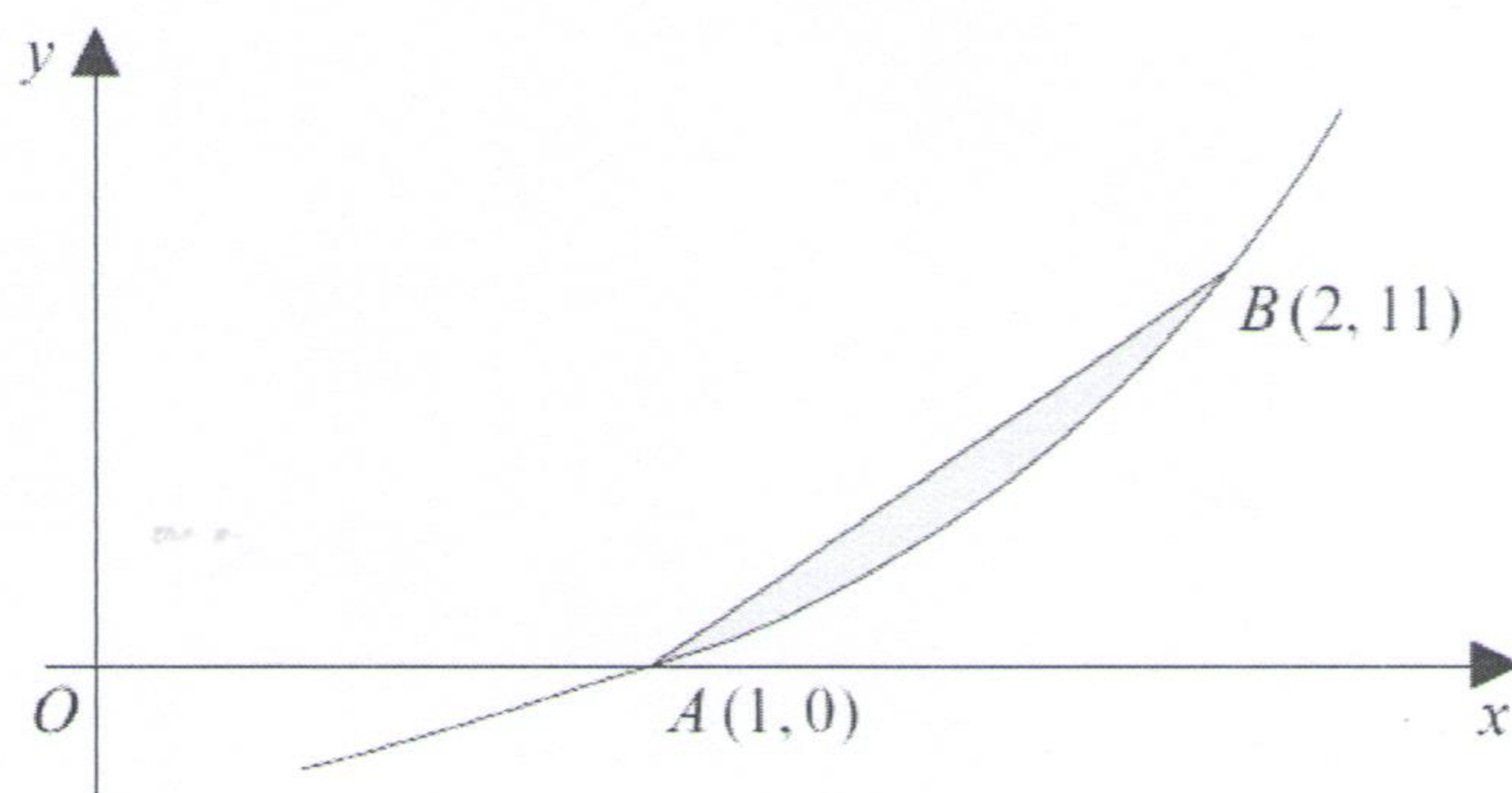
$$y = t + t^3$$

(4 marks)

Q4(a) i. Solve: $x \frac{dy}{dx} - y = 2x^2 y$ (3marks)

ii. Solve: $\frac{dy}{dx} = \frac{x^2 + 1}{x + 1}$. (4 marks)

- (b) The curve with equation $y = x^3 + 4x - 5$ is sketched below.



The curve cuts the x -axis at the point $A(1, 0)$ and the point $B(2, 11)$ lies on the curve.

- (i) Find $\int (x^3 + 4x - 5) dx$. (3 marks)
- (ii) Hence find the area of the shaded region bounded by the curve and the line AB . (4 marks)

(c) Find

$$\int \frac{6x^5 - \sqrt{x} + 5x^2}{x^3} dx$$

(4 marks)

END OF PAPER