

NAME: BRADLEY BURTON

STUDENT ID: 1803066

DATE/TIME: 28TH APRIL 2020 11:00 HRS

M CODE: M4X02193

MODULE DES: ANALYTICAL METHODS WITH STUDY SKILLS

1

A) $Y = 9x^4 - 2x^3 + 2x + 5$ $\frac{DY}{DX} = 36x^3 - 6x^2 + 2$
 $9(4)x^{4-1} - 2(3)x^{3-1} + 2(1)x^{1-1} + 5(0)$

B) $Y = (x+2)(x+5)$ $\frac{DY}{DX} = 2x + 7$
 $Y = x^2 + 2x + 5x + 10$
 $Y = x^2 + 7x + 10$
 $2x^{2-1} + 7x^{1-1} + 10(0)$

C) $Y = 2e^{2x} + 2 \ln x$ $\frac{DY}{DX} = 4e^{2x} + \frac{2}{x}$
 $2(2)e^{2x} + 2\frac{1}{x}$

D) $Y = 2 \sin 5x$ $\frac{DY}{DX} = 10 \cos 5x$
 $2(5) \cos 5x$

E) $Y = \frac{1}{x^3}$ $\frac{DY}{DX} = -3x^{-4}$
 $Y = x^{-3}$

F) $Y = x^3 \sin x$ $\frac{DY}{DX} = (x^3)(\cos x) + (\sin x)(3x^2)$
 $\frac{DU}{DX} = 3x^2$
 $\frac{DV}{DX} = \cos x$

G) $Y = \frac{x^5 + 2x + 1}{\sin x}$ $\leftarrow U$
 $\leftarrow V$

$\frac{DU}{DX} = 5x^4 + 2$

$\frac{DV}{DX} = \cos x$

$\frac{DY}{DX} = \frac{(\sin x)(5x^4 + 2) - (x^5 + 2x + 1)(\cos x)}{(\sin x)^2}$

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$$H) \quad Y = (6x^3 + 2x^2 - 1)^5 \quad 18x^2 + 4x$$

$$\frac{dY}{dx} = 5(6x^3 + 2x^2 - 1)^4 (18x^2 + 4x)$$

2.

$$A) \quad Z_1 = 6 + 2j \quad Z_2 = 2 - 5j$$

$$I) \quad Z_1 + Z_2$$

$$(6 + 2j) + (2 - 5j) = 8 - 3j$$

$$II) \quad Z_1 - \overline{Z_2}$$

$$(6 + 2j) - (2 + 5j) = 4 - 3j$$

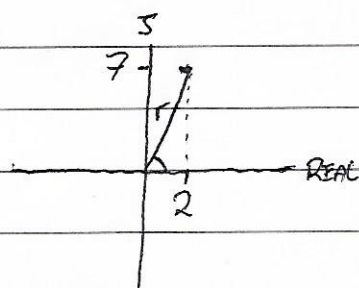
$$III) \quad \overline{Z_1} Z_2$$

$$(6 - 2j)(2 + 5j)$$

$$12 - 4j + 30j - 10j^2 = 12 + 26j - 10j^2$$

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B) DE MOIVRES $(2 + 7j)^5$



$$r = \sqrt{2^2 + 7^2} = \sqrt{53} = 7.28$$

$$\theta = \tan^{-1}\left(\frac{7}{2}\right) = 74.0546^\circ$$

74.06°

$$r^n (\cos n\theta + j \sin n\theta)$$

$$(7.28)^5 (\cos(5)(74.06) + j \sin(5)(74.06))$$

$$20448.29 (\cos(370.3) + j \sin(370.3))$$

$$20118.77 + 3656.2 j$$

C) RECTANGULAR FORM AKA. CARTESIAN FORM

3.

A) $\int 8x^3 + 5x + 7 dx$ $\frac{8x^4}{4} + \frac{5x^2}{2} + 7x + C$

B) $\int \frac{1}{x^2} \int x^{-2}$ $\frac{x^{-1}}{-1} + C$

C) $\int -\sin x$ $\cos x + C$

D) $\int (x+3)^2$ $\int (x+3)(x+3)$ ~~$\int x^3 + 6x^2 + 9x$~~

$$x^2 + 6x + 9$$

$$\frac{x^3}{3} + \frac{6x^2}{2} + 9x + C$$

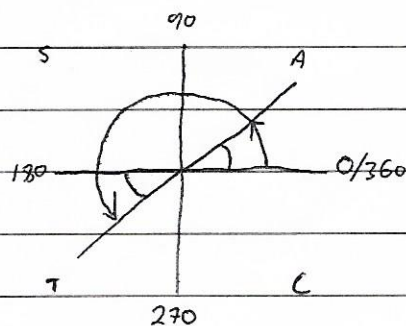
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E) $\int_0^3 x^2 + 3x + 2 \, dx$ $\frac{x^3}{3} + \frac{3x^2}{2} + 2x$
 $\frac{3^3}{3} + \frac{3(3)^2}{2} + 2(3) = 28.5 - 0 = 28.5$
 $9 + 40.5 + 6 = 13.5$

F) $\int_2^3 \frac{(x+4)(x+1)}{x^2 + 5x + 4} \, dx$ $\frac{x^3}{3} + \frac{5x^2}{2} + 4x$
 $\frac{3^3}{3} + \frac{5(3)^2}{2} + 4(3) = 43.5$
 $\frac{2^3}{3} + \frac{5(2)^2}{2} + 4(2) = 20.67 = 22.83$

4.

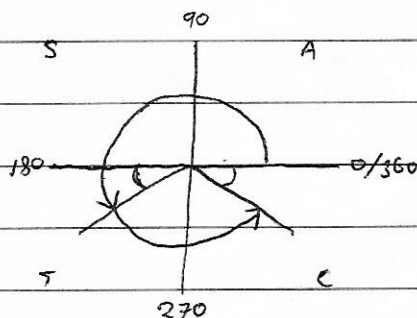
A) $\tan x = 0.35$
 $x = \tan^{-1}(0.35)$
 $x = 19.29$



$x = 19.29$

$x = 180 + 19.29 = 199.29$

B) $\sin x = -0.68$
 $x = \sin^{-1}(0.68)$
 $x = 42.84$



$x = 180 + 42.84 = 222.84$

$x = 360 - 42.84 = 317.16$