

Question 26 again

$$\begin{array}{l} (1) \quad x + y - z = 1 \\ (2) \quad 8x + 3y - 6z = 1 \\ \quad \quad \quad \cancel{-4x - 8y + 3z = 1} \end{array}$$

$$(3) \quad -4x - y + 3z = 1$$

$$(2) \times 1 \quad 8x + 3y - 6z = 1$$

$$(3) \times 2 \quad -8x - 2y + 6z = 2$$

$$\cancel{(3) \times 2 \quad -8x - 2y + 6z = 2}$$

$$8x + 3y - 6z + (-8x) - 2y + 6z = 1 + 2$$

$$y = 3$$

$$(1) \times 3 \quad 3x + 3y - 3z = 3$$

$$(3) \times 1 \quad -4x - y + 3z = 1$$

$$3x + 3y - 3z + (-4x) - y + 3z = 3 + 1$$

$$(4) \rightarrow \quad -x + 2y = 4$$

Sub $(4) \quad -x + 2 \times 3 = 4$

$$-x + 6 = 4$$

$$-x = -2$$

$$x = 2$$

$$(3) \quad -4x - y + 3z = 1$$

$$(-8) - 3 + 15 = 1 \quad \times$$

Sub $(1) \quad x + y - z = 1$

$$2 + 3 - z = 1$$

$$z = 5$$

check



Maths Assessment 1

Due: 1.45 pm 04/03/21

Question 1.

a) ^{simplify}
 $2xy - 4xz + yz - 2zx + 3yx$
 $= 5xy - 6xz + yz$
 $= x(5y - 6z) + yz$

b) Solve for x

$$5(x-1) + 3(2x+9) - 2 = 4(3x-1) + 2(4x+3)$$

$$5x - 5 + 6x + 18 - 2 = 12x - 4 + 8x + 6$$

$$10x + 11 = 20x + 2$$

$$11 = 10x + 2$$

$$9 = 10x$$

$$x = 0.9$$

c) Solve for x

$$\frac{x+4}{3} = \frac{14-5x}{2}$$

$$6\left(\frac{x+4}{3}\right) = 6\left(\frac{14-5x}{2}\right)$$

$$2x + 8 = 42 - 15x$$

$$8 = 42 - 17x$$

$$-34 = -17x$$

$$x = 2$$

d) Divide the polynomial $x^2 - 9x - 10$ by $(x+1)$

$$\begin{array}{r}
 x+1 \overline{) x^2 - 9x - 10} \\
 \underline{x^2 + x} \\
 10x - 10 \\
 \underline{10x + 10} \\
 20 \leftarrow \text{Remainder}
 \end{array}$$

$$= x + 10 \text{ rem } 20$$

e) Divide the polynomial $2x^3 + 4x^2 - 5$ by $(x+3)$

$$\begin{array}{r}
 x+3 \overline{) 2x^3 + 4x^2 + 0x - 5} \\
 \underline{2x^3 + 6x^2} \\
 (-2x^2) + 0x \\
 \underline{(-2x^2) - 6x} \\
 6x - 5 \\
 \underline{6x + 18} \\
 -23
 \end{array}$$

$$= 2x^2 - 2x + 6 \text{ rem } -23 \quad -23 \quad \text{Rem}$$

Question 2.

a) Solve by substitution

$$(1) -x + y = 2$$

$$(2) 2x + y = 11$$

$$(1) -x + y = 2$$

$$y = 2 + x$$

$$(2) 2x + 2 + x = 11$$

$$3x + 2 = 11$$

$$3x = 9$$

$$x = 3$$

(2a contd.)

$$(2) \quad 2x + y = 11$$

$$3 \times 2x + y = 11$$

$$6 + y = 11$$

$$y = 5$$

check

$$(1) \quad -x + y = 2 \quad = -3 + 5 = 2 \quad \checkmark$$

2b) Solve by elimination

$$(1) \quad x + y - z = 1$$

$$(2) \quad 8x + 3y - 6z = 1$$

$$(3) \quad -4x - y + 3z = 1$$

$$(2) \times 1 \quad 8x + 3y - 6z = 1$$

$$(3) \times 2 \quad -8x + 2y - 6z = 2$$

ADD $\therefore$

$$-8x + 8x + 2y + 3y - 6z - 6z = 3$$

$$5y - 12z = 3$$

$\leftarrow (4)$

$$(1) \times 4 \quad 4x + 4y - 4z = 4$$

$$(3) \times 1 \quad -4x - y + 3z = 1$$

$$\therefore 4x + 4y - 4z + (-4x) - y + 3z = 5$$

$$3y - z = 5$$

$\leftarrow (5)$

$$(4) \quad 5y - 12z = 3$$

$$(5) \quad 3y - z = 5$$

(2b. contd)

$$(4) \times 3 \quad 15y - 36z = 9$$

$$(5) \times 5 \quad 15y + 5z = 25$$

$$-41z = -16$$

$$z = \frac{16}{41}$$

$$(4) \quad 5y - 12z = 3$$

$$5y - 12\left(\frac{16}{41}\right) = 3$$

$$5y - \frac{192}{41} = 3$$

$$5y = \frac{315}{41}$$

$$y = \frac{63}{41}$$

check (3) $-4x - y + 3z = 1$

$$-\left(\frac{-6}{41}\right) - \frac{63}{41} + 3\left(\frac{16}{41}\right) = 1 \quad \times$$

(1)

$$\therefore x + y - z = 1$$

$$x + \frac{63}{41} - \frac{16}{41} = 1$$

$$x + \frac{47}{41} = 1$$

$$x = \frac{-6}{41}$$

Question 3

a) ~~211.~~ Differentiate

$$a) y = 4x^6$$

$$\frac{dy}{dx} = \cancel{6(4x)} \cdot 6 \times 4x^5$$

$$= \frac{24x^5}{1}$$

$$b) y = 6x^{-6}$$

$$\frac{dy}{dx} = -6 \times 6x^{-7}$$

$$= -36x^{-7}$$

$$c) y = 4x^3 + 3x^2 + 14x - 7$$

$$\frac{dy}{dx} = 12x^2 + 6x + \frac{1}{x}$$

$$d) y = (7x+3)^5 = 7x^5 + 3^5 = 7x^5 + 243$$

$$\frac{dy}{dx} = 35x^4$$

$$e) y = \frac{9+18x^3}{3x^2} = \frac{9}{3x^2} + \frac{18x^3}{3x^2} = \frac{9}{3x^2} + 6x$$

$$\frac{dy}{dx} = \frac{3x^2(0) - 9(2)}{(3x^2)^2}$$

$$\frac{dy}{dx} = \frac{3x^2(0) - 9 \times 6x}{(3x^2)^2}$$

$$= \frac{-54x}{(3x^2)^2}$$

$$= \frac{-54}{3x^2}$$

$$p) \quad y = \sin x \quad \frac{dy}{dx} = \cos x$$

$$g) \quad y = e^x \quad \frac{dy}{dx} = e^x$$

Question 4. Determine Integrals for

$$a) \quad \int 3x^5 dx = \frac{3x^6}{6} + C$$

$$b) \quad \int 5x^{-3} dx = \frac{5x^{-2}}{-2} + C$$

$$c) \quad \int \frac{9}{3x} dx = \cancel{\frac{9}{3x}}$$

$$d) \quad \int \sec^2 x dx = \frac{1}{x} + C$$

$$e) \quad \int 2 \cos x dx = 2 \sin x + C$$

$$f) \quad \int 12 dx = 0 + C$$

$$g) \quad \int x^{\frac{3}{2}} dx = \frac{x^{\frac{3}{2}+1}}{\frac{3}{2}+1} + C = \frac{x^{\frac{5}{2}}}{\frac{5}{2}} + C$$

$$h) \quad \int x^{-\frac{1}{2}} dx = \frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} + C = \frac{x^{\frac{1}{2}}}{\frac{1}{2}} + C = 2x^{\frac{1}{2}} + C$$

$$i) \quad \int 3x^{-3} dx = -\frac{3}{2} x^{-2} + C$$

$$j) \quad \int 7^x dx = \frac{7^x}{\ln 7} + C$$