

Maths Assessment 1 - Peter Down

$$\textcircled{1} \text{ a) } 2xy - 4xz + yz - 2xz + 3xy = 5xy - 6xz + yz \\ = \underline{x(5y - 6z) + yz}$$

$$\text{b) } 5(x-1) + 3(2x+9) - 2 = 4(3x-1) + 2(4x+3)$$

$$5x - 5 + 6x + 27 - 2 = 12x - 4 + 8x + 6$$

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

$$9x = 18$$

$$\underline{x = 2}$$

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

$$2(x+4) = 3(14-5x)$$

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

$$17x = 34$$

$$\underline{x = 2}$$

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$$\underline{x = 2}$$

$$\text{d) } \begin{array}{r} x-10 \\ x+1 \overline{) x^2-9x-10} \\ \underline{x^2+x} \\ -10x-10 \\ \underline{-10x-10} \\ 0 \end{array} \quad \therefore \frac{x^2-9x-10}{x+1} = \underline{x-10}, r=0$$

$$\text{e) } \begin{array}{r} 2x^2-2x+6 \\ x+3 \overline{) 2x^3+4x^2+0x-5} \\ \underline{2x^3+6x^2} \\ -2x^2+0x-5 \\ \underline{-2x^2-6x} \\ 6x-5 \\ \underline{6x+18} \\ -23 \end{array} \quad \therefore \frac{2x^3+4x^2-5}{x+3} = \underline{2x^2-2x+6}, r=-23$$

$$\textcircled{2} \text{ a) } -x + y = 2 \longrightarrow y = x + 2 \textcircled{1}$$

$$2x + y = 11 \textcircled{2}$$

sub $\textcircled{1}$ in $\textcircled{2}$

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

$$3x = 9$$

$$\underline{\underline{x = 3}}$$

sub $x = 3$ in $\textcircled{1}$

$$y = 3 + 2$$

$$\underline{\underline{y = 5}}$$

$$\text{b) } x + y - z = 1 \textcircled{1}$$

$$8x + 3y - 6z = 1 \textcircled{2}$$

$$-4x - y + 3z = 1 \textcircled{3}$$

$$\underline{\underline{x = 3}}$$

$$\text{b) } x + y - z = 1 \textcircled{1}$$

$$8x + 3y - 6z = 1 \textcircled{2}$$

$$-4x - y + 3z = 1 \textcircled{3}$$

$\textcircled{1} + \textcircled{3}$

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

$$-3x + 2z = 2 \textcircled{4}$$

$\textcircled{2} + 3\textcircled{3}$

$$8x + 3(-4x) + 3y + 3(-y) - 6z + 3(3z) = 1 + 3$$

$$-4x + 3z = 4 \textcircled{5}$$

~~3~~ $3\textcircled{4} - 2\textcircled{5}$:

$$3(-3x) - 2(-4x) + 3(2z) - 2(3z) = 3(2) - 2(4)$$

$$-9x + 8x = -2$$

$$-x = -2$$

$$\underline{\underline{x = 2}}$$

sub $x = 2$ in $\textcircled{4}$

$$-3(2) + 2z = 2$$

$$-6 + 2z = 2$$

$$2z = 8$$

$$\underline{\underline{z = 4}}$$

sub $x = 2, z = 4$ in $\textcircled{1}$

$$2 + y - 4 = 1$$

$$\underline{\underline{y = 3}}$$

$$\textcircled{3} \text{ a) } y = 4x^6$$

$$\frac{dy}{dx} = \underline{\underline{24x^5}}$$

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

$$\frac{dy}{dx} = \underline{\underline{-36x^{-7}}}$$

$$\text{c) } y = 4x^3 + 3x^2 + 14x - 7$$

$$\frac{dy}{dx} = \underline{\underline{12x^2 + 6x + 14}}$$

$$\text{d) } y = (7x+3)^5$$

$$\frac{dy}{dx} = (7)(5)(7x+3)^4$$

$$\frac{dy}{dx} = \underline{\underline{35(7x+3)^4}}$$

$$\text{e) } y = \frac{4 + 18x^3}{3x^2}$$

$$= 3x^{-2} + 6x$$

$$\frac{dy}{dx} = -6x^{-3} + 6$$

$$\frac{dy}{dx} = \underline{\underline{6 - \frac{6}{x^3}}}$$

$$\text{f) } y = \sin x$$

$$\frac{dy}{dx} = \underline{\underline{\cos x}}$$

$$\text{g) } y = e^x$$

$$\frac{dy}{dx} = \underline{\underline{e^x}}$$

$$\textcircled{4} \text{ a) } \int 3x^5 dx = \frac{3}{6} x^6 + C$$

$$= \underline{\underline{\frac{x^6}{2} + C}}$$

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

$$\text{c) } \int \frac{9}{3x} dx = \int 3 \left(\frac{1}{x} \right) dx$$

$$= \underline{\underline{3 \ln x + C}}$$

$$\text{d) } \int \sec^2 x dx = \underline{\underline{\tan x + C}}$$

$$\text{e) } \int 2 \cos x dx = \underline{\underline{2 \sin x + C}}$$

$$\text{f) } \int 12 dx = \underline{\underline{12x + C}}$$

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

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

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

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