INTRODUCTION
TO
POLYNOMIALS

SIMPLIFYING EXPRESSIONS

Question 8

Simplify fully the following expressions.

a) $4\left(x^2-3x\right)-(x+1)(x+4)=$

b) $2\left(3x^2-5\right)-(x+2)(x-3)=$

c) $4\left(2x^2-3\right)-(x-4)(x+5)=$

d) $2x(4-3x)-(2x-1)(1-3x)=$

e) $6x-x(2-x)-2(x-1)(x+2)=$

Question 9

Expand the brackets and simplify fully the following expressions.

a) $(x+3)(x+1)(x+1)$

b) $(x-2)(x-5)(x+1)$

c) $(x-2)(x-3)(x+4)$

d) $(x-3)(x+2)(x+4)$

e) $(x+1)(x+2)(x-1)(x-3)$

Question 10

Expand the brackets and simplify fully the following expressions.

a) $(2x-1)(x-1)(x-2)$

b) $(x-1)(2x-3)(x+2)$

c) $(3x-1)(x+2)(3x+2)$

d) $(1+2x)(3-x)(1-x)$

e) $(x-3)(x-1)(x-2)(x+1)$

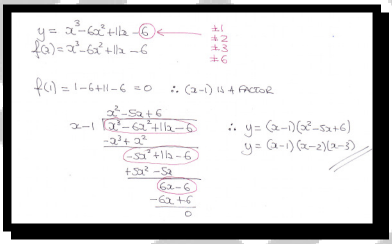
FACTORIZING POLYNOMIALS

Question 1

$$y = x^3 - 6x^2 + 11x - 6 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-1)(x-2)(x-3)}$$



$y = x^3 - 6x^2 + 11x - \textcircled{6} \leftarrow \pm 1, \pm 2, \pm 3, \pm 6$

$f(x) = x^3 - 6x^2 + 11x - 6$

$f(1) = 1 - 6 + 11 - 6 = 0 \quad \therefore (x-1)$ IS A FACTOR

$$\begin{array}{r|l} & x^2 - 5x + 6 \\ \hline x - 1 & x^3 - 6x^2 + 11x - 6 \\ & -x^3 + x^2 \\ \hline & -5x^2 + 11x - 6 \\ & +5x^2 - 5x \\ \hline & 6x - 6 \\ & -6x + 6 \\ \hline & 0 \end{array}$$

$\therefore y = (x-1)(x^2 - 5x + 6)$

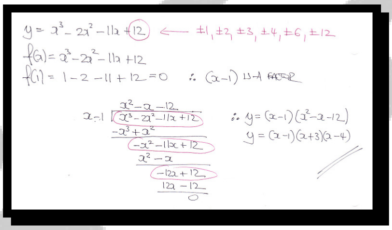
$y = (x-1)(x-2)(x-3)$

Question 2

$$y = x^3 - 2x^2 - 11x + 12 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-1)(x+3)(x-4)}$$



$y = x^3 - 2x^2 - 11x + \textcircled{12} \leftarrow \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

$f(x) = x^3 - 2x^2 - 11x + 12$

$f(1) = 1 - 2 - 11 + 12 = 0 \quad \therefore (x-1)$ IS A FACTOR

$$\begin{array}{r|l} & x^2 - x - 12 \\ \hline x - 1 & x^3 - 2x^2 - 11x + 12 \\ & -x^3 + x^2 \\ \hline & -x^2 - 11x + 12 \\ & x^2 - x \\ \hline & -12x + 12 \\ & 12x - 12 \\ \hline & 0 \end{array}$$

$\therefore y = (x-1)(x^2 - x - 12)$

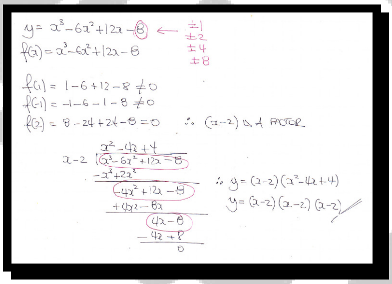
$y = (x-1)(x+3)(x-4)$

Question 3

$$y = x^3 - 6x^2 + 12x - 8 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-2)(x-2)(x-2)}$$



$y = x^3 - 6x^2 + 12x - \boxed{8} \leftarrow \pm 1, \pm 2, \pm 4, \pm 8$

$f(x) = x^3 - 6x^2 + 12x - 8$

$f(1) = 1 - 6 + 12 - 8 \neq 0$

$f(-1) = -1 - 6 - 1 - 8 \neq 0$

$f(2) = 8 - 24 + 24 - 8 = 0$ $\therefore$ $(x-2)$ IS A FACTOR

$$\begin{array}{r|l} & x^2 - 4x + 4 \\ x - 2 & x^3 - 6x^2 + 12x - 8 \\ & -x^3 + 2x^2 \\ & \quad -4x^2 + 12x - 8 \\ & \quad +4x^2 - 8x \\ & \qquad 4x - 8 \\ & \qquad -4x + 8 \\ & \qquad\quad 0 \end{array}$$

$\therefore y = (x-2)(x^2 - 4x + 4)$

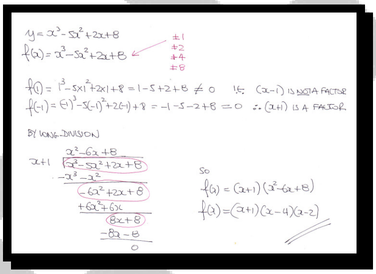
$y = (x-2)(x-2)(x-2)$

Question 4

$$y = x^3 - 5x^2 + 2x + 8 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x+1)(x-4)(x-2)}$$



$y = x^3 - 5x^2 + 2x + 8$

$f(x) = x^3 - 5x^2 + 2x + 8 \leftarrow \pm 1, \pm 2, \pm 4, \pm 8$

$f(1) = 1^3 - 5 \times 1^2 + 2 \times 1 + 8 = 1 - 5 + 2 + 8 \neq 0$ $\therefore$ $(x-1)$ IS NOT A FACTOR

$f(-1) = (-1)^3 - 5(-1)^2 + 2(-1) + 8 = -1 - 5 - 2 + 8 = 0$ $\therefore$ $(x+1)$ IS A FACTOR

BY LONG-DIVISION

$$\begin{array}{r|l} & x^2 - 6x + 8 \\ x + 1 & x^3 - 5x^2 + 2x + 8 \\ & -x^3 - x^2 \\ & \quad -6x^2 + 2x + 8 \\ & \quad +6x^2 + 6x \\ & \qquad 8x + 8 \\ & \qquad -8x - 8 \\ & \qquad\quad 0 \end{array}$$

SO

$f(x) = (x+1)(x^2 - 6x + 8)$

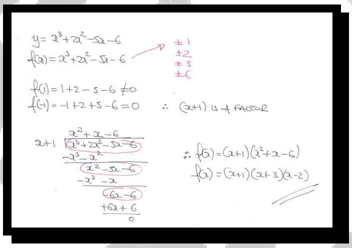
$f(x) = (x+1)(x-4)(x-2)$

Question 5

$$y = x^3 + 2x^2 - 5x - 6 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x+1)(x+3)(x-2)}$$



$y = x^3+2x^2-5x-6$

$f(x) = x^3+2x^2-5x-6 \rightarrow \pm1, \pm2, \pm3, \pm6$

$f(1) = 1+2-5-6 \neq 0$

$f(-1) = -1+2+5-6 = 0$ $\therefore$ $(x+1)$ IS A FACTOR

$x+1$) x^3+2x^2-5x-6 gives x^2+x-6

$-x^3-x^2$

x^2-5x-6

$-x^2-x$

$-6x-6$

$+6x+6$

0

$\therefore f(x) = (x+1)(x^2+x-6)$

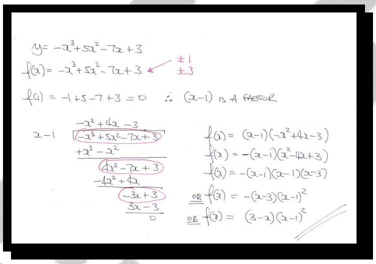
$f(x) = (x+1)(x+3)(x-2)$

Question 6

$$y = -x^3 + 5x^2 - 7x + 3 .$$

Express y as a product of three linear factors.

$$\boxed{y = (3-x)(x-1)^2}$$



$y = -x^3+5x^2-7x+3$

$f(x) = -x^3+5x^2-7x+3 \leftarrow \pm1, \pm3$

$f(1) = -1+5-7+3 = 0$ $\therefore$ $(x-1)$ IS A FACTOR

$x-1$) $-x^3+5x^2-7x+3$ gives $-x^2+4x-3$

$+x^3-x^2$

$4x^2-7x+3$

$-4x^2+4x$

$-3x+3$

$3x-3$

0

$f(x) = (x-1)(-x^2+4x-3)$

$f(x) = -(x-1)(x^2-4x+3)$

$f(x) = -(x-1)(x-1)(x-3)$

OR $f(x) = -(x-3)(x-1)^2$

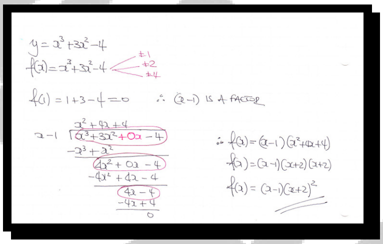
OR $f(x) = (3-x)(x-1)^2$

Question 7

$$y = x^3 + 3x^2 - 4 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-1)(x+2)^2}$$



$y = x^3 + 3x^2 - 4$

$f(x) = x^3 + 3x^2 - 4$ ±1 ±2 ±4

$f(1) = 1 + 3 - 4 = 0$ ∴ $(x-1)$ IS A FACTOR

$$\begin{array}{r l} & x^2 + 4x + 4 \\ x-1 & \overline{)\, x^3 + 3x^2 + 0x - 4} \\ & -x^3 + x^2 \\ & \quad 4x^2 + 0x - 4 \\ & \quad -4x^2 + 4x - 4 \\ & \qquad 4x - 4 \\ & \qquad -4x + 4 \\ & \qquad\quad 0 \end{array}$$

∴ $f(x) = (x-1)(x^2+4x+4)$

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

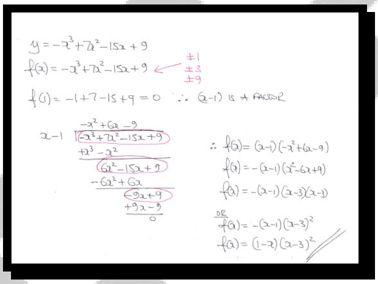
$f(x) = (x-1)(x+2)^2$

Question 8

$$y = -x^3 + 7x^2 - 15x + 9 .$$

Express y as a product of three linear factors.

$$\boxed{y = (1-x)(x-3)^2}$$



$y = -x^3 + 7x^2 - 15x + 9$

$f(x) = -x^3 + 7x^2 - 15x + 9$ ±1 ±3 ±9

$f(1) = -1 + 7 - 15 + 9 = 0$ ∴ $(x-1)$ IS A FACTOR

$$\begin{array}{r l} & -x^2 + 6x - 9 \\ x-1 & \overline{)\, -x^3 + 7x^2 - 15x + 9} \\ & +x^3 - x^2 \\ & \quad 6x^2 - 15x + 9 \\ & \quad -6x^2 + 6x \\ & \qquad -9x + 9 \\ & \qquad +9x - 9 \\ & \qquad\quad 0 \end{array}$$

∴ $f(x) = (x-1)(-x^2+6x-9)$

$f(x) = -(x-1)(x^2-6x+9)$

$f(x) = -(x-1)(x-3)(x-3)$

OR

$f(x) = -(x-1)(x-3)^2$

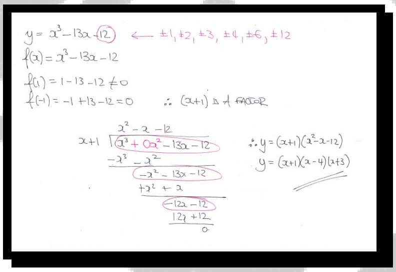
$f(x) = (1-x)(x-3)^2$

Question 9

$$y = x^3 - 13x - 12 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x+1)(x+3)(x-4)}$$



$y = x^3 - 13x - \textcircled{12} \leftarrow \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

$f(x) = x^3 - 13x - 12$

$f(1) = 1 - 13 - 12 \neq 0$

$f(-1) = -1 + 13 - 12 = 0 \quad \therefore (x+1)$ IS A FACTOR

$$\begin{array}{r|l} & x^2 - x - 12 \\ \hline x+1 & x^3 + 0x^2 - 13x - 12 \\ & -x^3 - x^2 \\ \hline & \quad -x^2 - 13x - 12 \\ & \quad +x^2 + x \\ \hline & \qquad -12x - 12 \\ & \qquad 12x + 12 \\ \hline & \qquad\qquad 0 \end{array}$$

$\therefore y = (x+1)(x^2 - x - 12)$

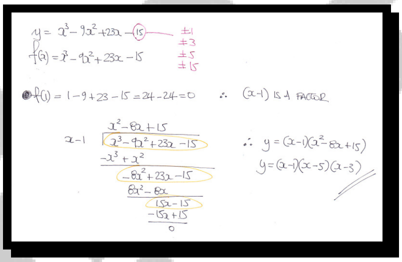
$y = (x+1)(x-4)(x+3)$

Question 10

$$y = x^3 - 9x^2 + 23x - 15 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-1)(x-3)(x-5)}$$



$y = x^3 - 9x^2 + 23x - \textcircled{15}$ — ± 1, ± 3, ± 5, ± 15

$f(x) = x^3 - 9x^2 + 23x - 15$

$f(1) = 1 - 9 + 23 - 15 = 24 - 24 = 0 \quad \therefore (x-1)$ IS A FACTOR

$$\begin{array}{r|l} & x^2 - 8x + 15 \\ \hline x-1 & x^3 - 9x^2 + 23x - 15 \\ & -x^3 + x^2 \\ \hline & \quad -8x^2 + 23x - 15 \\ & \quad 8x^2 - 8x \\ \hline & \qquad 15x - 15 \\ & \qquad -15x + 15 \\ \hline & \qquad\qquad 0 \end{array}$$

$\therefore y = (x-1)(x^2 - 8x + 15)$

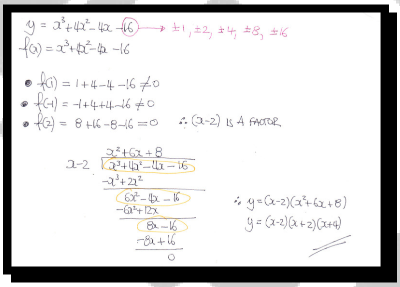
$y = (x-1)(x-5)(x-3)$

Question 11

$$y = x^3 + 4x^2 - 4x - 16\,.$$

Express y as a product of three linear factors.

$$\boxed{y = (x-2)(x+2)(x+4)}$$



$y = x^3 + 4x^2 - 4x - \circled{16} \xrightarrow{} \pm 1, \pm 2, \pm 4, \pm 8, \pm 16$

$f(x) = x^3 + 4x^2 - 4x - 16$

- $f(1) = 1 + 4 - 4 - 16 \neq 0$
- $f(-1) = -1 + 4 + 4 - 16 \neq 0$
- $f(2) = 8 + 16 - 8 - 16 = 0 \quad \therefore (x-2)$ IS A FACTOR

$x-2 \;\overline{\big)\, x^3 + 4x^2 - 4x - 16}$ quotient $x^2 + 6x + 8$

$-x^3 + 2x^2$

$6x^2 - 4x - 16$

$-6x^2 + 12x$

$8x - 16$

$-8x + 16$

0

$\therefore y = (x-2)(x^2 + 6x + 8)$

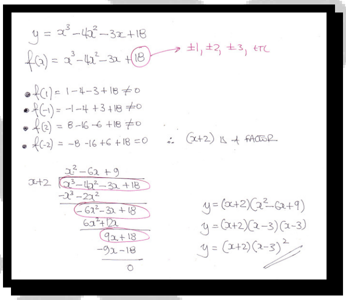
$y = (x-2)(x+2)(x+4)$

Question 12

$$y = x^3 - 4x^2 - 3x + 18\,.$$

Express y as a product of three linear factors.

$$\boxed{y = (x+2)(x-3)^2}$$



$y = x^3 - 4x^2 - 3x + 18$

$f(x) = x^3 - 4x^2 - 3x + \circled{18} \xrightarrow{} \pm 1, \pm 2, \pm 3,$ ETC

- $f(1) = 1 - 4 - 3 + 18 \neq 0$
- $f(-1) = -1 - 4 + 3 + 18 \neq 0$
- $f(2) = 8 - 16 - 6 + 18 \neq 0$
- $f(-2) = -8 - 16 + 6 + 18 = 0 \quad \therefore (x+2)$ IS A FACTOR

$x+2 \;\overline{\big)\, x^3 - 4x^2 - 3x + 18}$ quotient $x^2 - 6x + 9$

$-x^3 - 2x^2$

$-6x^2 - 3x + 18$

$6x^2 + 12x$

$9x + 18$

$-9x - 18$

0

$y = (x+2)(x^2 - 6x + 9)$

$y = (x+2)(x-3)(x-3)$

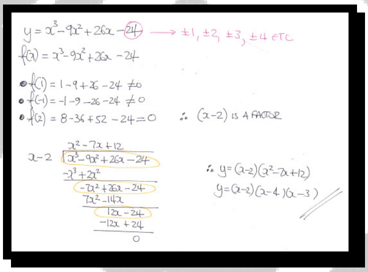
$y = (x+2)(x-3)^2$

Question 13

$$y = x^3 - 9x^2 + 26x - 24 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x-2)(x-3)(x-4)}$$



$y = x^3 - 9x^2 + 26x - \textcircled{24} \longrightarrow \pm1, \pm2, \pm3, \pm4$ ETC

$f(x) = x^3 - 9x^2 + 26x - 24$

- $f(1) = 1 - 9 + 26 - 24 \neq 0$
- $f(-1) = -1 - 9 - 26 - 24 \neq 0$
- $f(2) = 8 - 36 + 52 - 24 = 0$ $\quad \therefore$ $(x-2)$ IS A FACTOR

$x-2 \,\overline{)\, x^3 - 9x^2 + 26x - 24}$, quotient $x^2 - 7x + 12$

$-x^3 + 2x^2$

$-7x^2 + 26x - 24$

$7x^2 - 14x$

$12x - 24$

$-12x + 24$

0

$\therefore y = (x-2)(x^2 - 7x + 12)$

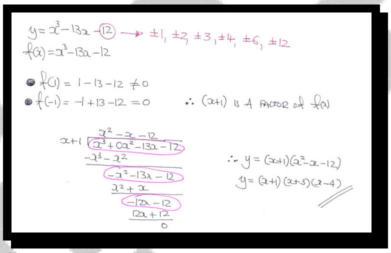
$y = (x-2)(x-4)(x-3)$

Question 14

$$y = x^3 - 13x - 12 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x+1)(x+3)(x-4)}$$



$y = x^3 - 13x - \textcircled{12} \longrightarrow \pm1, \pm2, \pm3, \pm4, \pm6, \pm12$

$f(x) = x^3 - 13x - 12$

- $f(1) = 1 - 13 - 12 \neq 0$
- $f(-1) = -1 + 13 - 12 = 0$ $\quad \therefore$ $(x+1)$ IS A FACTOR of $f(x)$

$x+1 \,\overline{)\, x^3 + 0x^2 - 13x - 12}$, quotient $x^2 - x - 12$

$-x^3 - x^2$

$-x^2 - 13x - 12$

$x^2 + x$

$-12x - 12$

$12x + 12$

0

$\therefore y = (x+1)(x^2 - x - 12)$

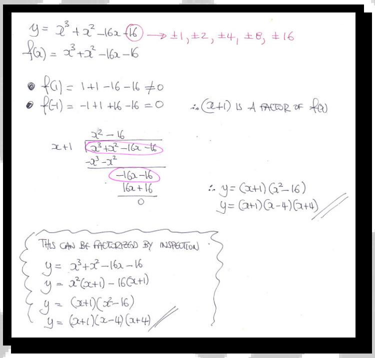
$y = (x+1)(x+3)(x-4)$

Question 15

$$y = x^3 + x^2 - 16x - 16 .$$

Express y as a product of three linear factors.

$$\boxed{y = (x+1)(x+4)(x-4)}$$



$y = x^3 + x^2 - 16x \textcircled{-16} \longrightarrow \pm 1, \pm 2, \pm 4, \pm 8, \pm 16$

$f(x) = x^3 + x^2 - 16x - 16$

- $f(1) = 1 + 1 - 16 - 16 \neq 0$
- $f(-1) = -1 + 1 + 16 - 16 = 0$ $\therefore (x+1)$ IS A FACTOR OF $f(x)$

$$\begin{array}{r l} & x^2 - 16 \\ x+1 & \overline{\big) x^3 + x^2 - 16x - 16} \\ & -x^3 - x^2 \\ \hline & \quad -16x - 16 \\ & \quad 16x + 16 \\ \hline & \qquad 0 \end{array}$$

$\therefore y = (x+1)(x^2 - 16)$

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

THIS CAN BE FACTORIZED BY INSPECTION

$y = x^3 + x^2 - 16x - 16$

$y = x^2(x+1) - 16(x+1)$

$y = (x+1)(x^2 - 16)$

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

SOLVING POLYNOMIAL EQUATIONS

Question 1

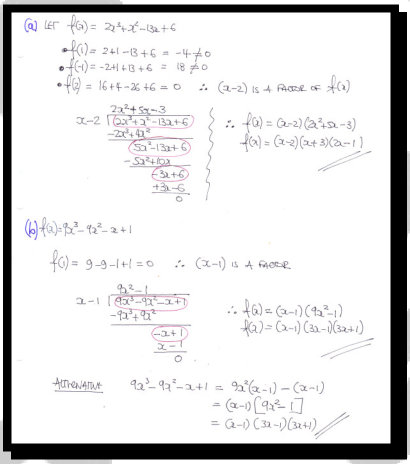
Factorize each of the following cubics into three linear factors.

a) $2x^3 + x^2 - 13x + 6$

b) $9x^3 - 9x^2 - x + 1$

c) $25x^3 - 50x^2 - 4x + 8$

$\boxed{(x-2)(x+3)(2x-1)}$, $\boxed{(x-1)(3x+1)(3x-1)}$, $\boxed{(x-2)(5x+2)(5x-2)}$



(a) LET $f(x) = 2x^3 + x^2 - 13x + 6$

- $f(1) = 2+1-13+6 = -4 \neq 0$
- $f(-1) = -2+1+13+6 = 18 \neq 0$
- $f(2) = 16+4-26+6 = 0$ $\therefore$ $(x-2)$ IS A FACTOR OF $f(x)$

$$\begin{array}{r|l} & 2x^2+5x-3 \\ x-2 & 2x^3+x^2-13x+6 \\ & -2x^3+4x^2 \\ & \quad 5x^2-13x+6 \\ & \quad -5x^2+10x \\ & \qquad -3x+6 \\ & \qquad +3x-6 \\ & \qquad\quad 0 \end{array}$$

$\therefore f(x) = (x-2)(2x^2+5x-3)$

$f(x) = (x-2)(x+3)(2x-1)$

(b) $f(x) = 9x^3 - 9x^2 - x + 1$

$f(1) = 9-9-1+1 = 0$ $\therefore$ $(x-1)$ IS A FACTOR

$$\begin{array}{r|l} & 9x^2-1 \\ x-1 & 9x^3-9x^2-x+1 \\ & -9x^3+9x^2 \\ & \qquad -x+1 \\ & \qquad x-1 \\ & \qquad\quad 0 \end{array}$$

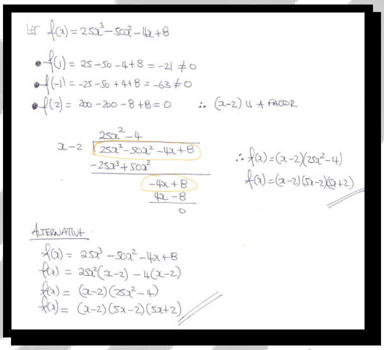
$\therefore f(x) = (x-1)(9x^2-1)$

$f(x) = (x-1)(3x-1)(3x+1)$

ALTERNATIVE $9x^3 - 9x^2 - x + 1 = 9x^2(x-1) - (x-1)$

$= (x-1)[9x^2 - 1]$

$= (x-1)(3x-1)(3x+1)$



LET $f(x) = 25x^3 - 50x^2 - 4x + 8$

- $f(1) = 25-50-4+8 = -21 \neq 0$
- $f(-1) = -25-50+4+8 = -63 \neq 0$
- $f(2) = 200-200-8+8 = 0$ $\therefore$ $(x-2)$ IS A FACTOR

$$\begin{array}{r|l} & 25x^2-4 \\ x-2 & 25x^3-50x^2-4x+8 \\ & -25x^3+50x^2 \\ & \qquad -4x+8 \\ & \qquad 4x-8 \\ & \qquad\quad 0 \end{array}$$

$\therefore f(x) = (x-2)(25x^2-4)$

$f(x) = (x-2)(5x-2)(5x+2)$

ALTERNATIVE

$f(x) = 25x^3 - 50x^2 - 4x + 8$

$f(x) = 25x^2(x-2) - 4(x-2)$

$f(x) = (x-2)(25x^2-4)$

$f(x) = (x-2)(5x-2)(5x+2)$

Question 2

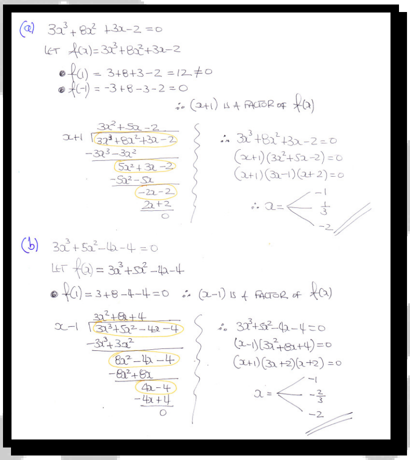
Solve the following cubic equations

a) $3x^3 + 8x^2 + 3x - 2 = 0$

b) $3x^3 + 5x^2 - 4x - 4 = 0$

c) $3x^3 + 2x^2 - 19x + 6 = 0$

$\boxed{x = -1, -2, \frac{1}{3}}$, $\boxed{x = 1, -2, -\frac{2}{3}}$, $\boxed{x = -3, 2, \frac{1}{3}}$



(a) $3x^3 + 8x^2 + 3x - 2 = 0$

LET $f(x) = 3x^3 + 8x^2 + 3x - 2$

- $f(1) = 3 + 8 + 3 - 2 = 12 \neq 0$
- $f(-1) = -3 + 8 - 3 - 2 = 0$

$\therefore (x+1)$ IS A FACTOR OF $f(x)$

$x+1 \,\big)\, 3x^3 + 8x^2 + 3x - 2$ quotient $3x^2 + 5x - 2$

$-3x^3 - 3x^2$

$5x^2 + 3x - 2$

$-5x^2 - 5x$

$-2x - 2$

$2x + 2$

0

$\therefore 3x^3 + 8x^2 + 3x - 2 = 0$

$(x+1)(3x^2 + 5x - 2) = 0$

$(x+1)(3x-1)(x+2) = 0$

$\therefore x = -1, \frac{1}{3}, -2$

(b) $3x^3 + 5x^2 - 4x - 4 = 0$

LET $f(x) = 3x^3 + 5x^2 - 4x - 4$

- $f(1) = 3 + 8 - 4 - 4 = 0$ $\therefore (x-1)$ IS A FACTOR OF $f(x)$

$x-1 \,\big)\, 3x^3 + 5x^2 - 4x - 4$ quotient $3x^2 + 8x + 4$

$-3x^3 + 3x^2$

$8x^2 - 4x - 4$

$-8x^2 + 8x$

$4x - 4$

$-4x + 4$

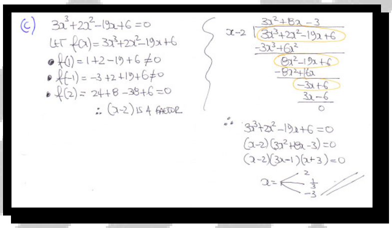
0

$\therefore 3x^3 + 5x^2 - 4x - 4 = 0$

$(x-1)(3x^2 + 8x + 4) = 0$

$(x+1)(3x+2)(x+2) = 0$

$x = -1, -\frac{2}{3}, -2$



(c) $3x^3 + 2x^2 - 19x + 6 = 0$

LET $f(x) = 3x^3 + 2x^2 - 19x + 6$

- $f(1) = 1 + 2 - 19 + 6 \neq 0$
- $f(-1) = -3 + 2 + 19 + 6 \neq 0$
- $f(2) = 24 + 8 - 38 + 6 = 0$

$\therefore (x-2)$ IS A FACTOR

$x-2 \,\big)\, 3x^3 + 2x^2 - 19x + 6$ quotient $3x^2 + 8x - 3$

$-3x^3 + 6x^2$

$8x^2 - 19x + 6$

$-8x^2 + 16x$

$-3x + 6$

$3x - 6$

0

$\therefore 3x^3 + 2x^2 - 19x + 6 = 0$

$(x-2)(3x^2 + 8x - 3) = 0$

$(x-2)(3x-1)(x+3) = 0$

$x = 2, \frac{1}{3}, -3$

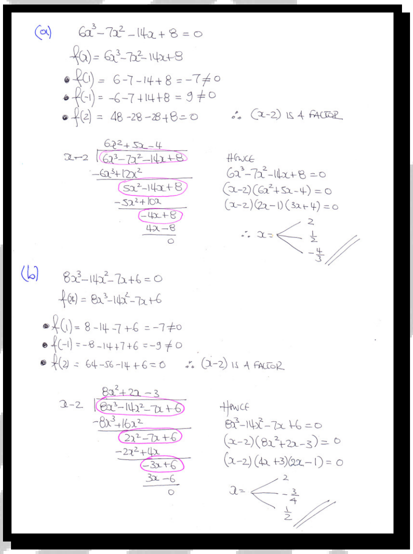
Question 3

Solve the following cubic equations

a) $6x^3 - 7x^2 - 14x + 8 = 0$

b) $8x^3 - 14x^2 - 7x + 6 = 0$

$\boxed{x = \frac{1}{2}, 2, -\frac{4}{3}}$, $\boxed{x = -\frac{3}{4}, \frac{1}{2}, 2}$



(a) $6x^3 - 7x^2 - 14x + 8 = 0$

$f(x) = 6x^3 - 7x^2 - 14x + 8$

- $f(1) = 6 - 7 - 14 + 8 = -7 \neq 0$
- $f(-1) = -6 - 7 + 14 + 8 = 9 \neq 0$
- $f(2) = 48 - 28 - 28 + 8 = 0$ $\therefore$ $(x-2)$ IS A FACTOR

$$\begin{array}{r|l} & 6x^2+5x-4 \\ \hline x-2 & 6x^3-7x^2-14x+8 \\ & -6x^3+12x^2 \\ \hline & 5x^2-14x+8 \\ & -5x^2+10x \\ \hline & -4x+8 \\ & 4x-8 \\ \hline & 0 \end{array}$$

HENCE

$6x^3 - 7x^2 - 14x + 8 = 0$

$(x-2)(6x^2+5x-4) = 0$

$(x-2)(2x-1)(3x+4) = 0$

$\therefore x = 2, \frac{1}{2}, -\frac{4}{3}$ //

(b) $8x^3 - 14x^2 - 7x + 6 = 0$

$f(x) = 8x^3 - 14x^2 - 7x + 6$

- $f(1) = 8 - 14 - 7 + 6 = -7 \neq 0$
- $f(-1) = -8 - 14 + 7 + 6 = -9 \neq 0$
- $f(2) = 64 - 56 - 14 + 6 = 0$ $\therefore$ $(x-2)$ IS A FACTOR

$$\begin{array}{r|l} & 8x^2+2x-3 \\ \hline x-2 & 8x^3-14x^2-7x+6 \\ & -8x^3+16x^2 \\ \hline & 2x^2-7x+6 \\ & -2x^2+4x \\ \hline & -3x+6 \\ & 3x-6 \\ \hline & 0 \end{array}$$

HENCE

$8x^3 - 14x^2 - 7x + 6 = 0$

$(x-2)(8x^2+2x-3) = 0$

$(x-2)(4x+3)(2x-1) = 0$

$x = 2, -\frac{3}{4}, \frac{1}{2}$ //