EQUATIONS BASIC TECHNIQUES

LINEAR EQUATIONS

Question 1

Solve each of the following equations.

1. $5(4-2x)=30$ $\boxed{x=-1}$

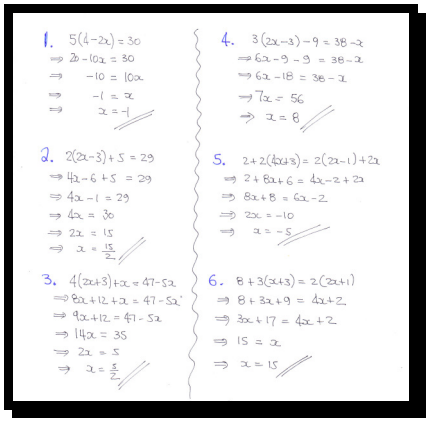
2. $2(2x-3)+5=29$ $\boxed{x=\frac{15}{2}}$

3. $4(2x+3)+x=47-5x$ $\boxed{x=\frac{5}{2}}$

4. $3(2x-3)-9=38-x$ $\boxed{x=8}$

5. $2+2(4x+3)=2(2x-1)+2x$ $\boxed{x=-5}$

6. $8+3(x+3)=2(2x+1)$ $\boxed{x=15}$



Question 2

Solve each of the following equations.

1. $6-4(4-x)=4$ $\boxed{x=\frac{7}{2}}$

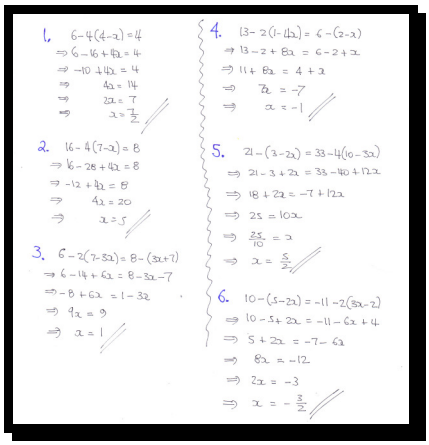
2. $16-4(7-x)=8$ $\boxed{x=5}$

3. $6-2(7-3x)=8-(3x+7)$ $\boxed{x=1}$

4. $13-2(1-4x)=6-(2-x)$ $\boxed{x=-1}$

5. $21-(3-2x)=33-4(10-3x)$ $\boxed{x=\frac{5}{2}}$

6. $10-(5-2x)=-11-2(3x-2)$ $\boxed{x=-\frac{3}{2}}$



Question 3

Solve each of the following equations.

1. $3(7-4x)=15$ $\boxed{x=\frac{1}{2}}$

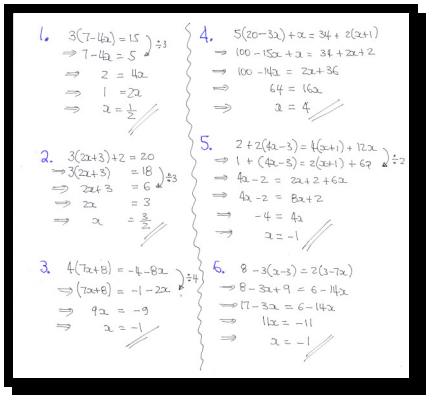
2. $3(2x+3)+2=20$ $\boxed{x=\frac{3}{2}}$

3. $4(7x+8)=-4-8x$ $\boxed{x=-1}$

4. $5(20-3x)+x=34+2(x+1)$ $\boxed{x=4}$

5. $2+2(4x-3)=4(x+1)+12x$ $\boxed{x=-1}$

6. $8-3(x-3)=2(3-7x)$ $\boxed{x=-1}$



Question 4

Solve the following equations

1. $6-4(2-x)=2x-1$ $\boxed{x=\frac{1}{2}}$

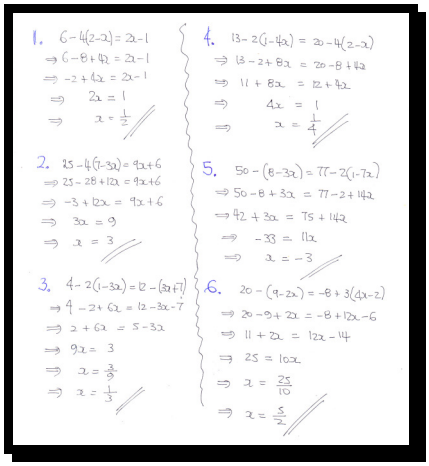
2. $25-4(7-3x)=9x+6$ $\boxed{x=3}$

3. $4-2(1-3x)=12-(3x+7)$ $\boxed{x=\frac{1}{3}}$

4. $13-2(1-4x)=20-4(2-x)$ $\boxed{x=\frac{1}{4}}$

5. $50-(8-3x)=77-2(1-7x)$ $\boxed{x=-3}$

6. $20-(9-2x)=-8+3(4x-2)$ $\boxed{x=\frac{5}{2}}$



FRACTIONAL EQUATIONS

Question 1

Solve each of the following fractional equations.

1. $\frac{x}{2}+\frac{x}{3}=20$ $\boxed{x=24}$

2. $\frac{x}{2}-\frac{x}{3}=2$ $\boxed{x=12}$

3. $\frac{x}{5}+\frac{2x}{3}=26$ $\boxed{x=30}$

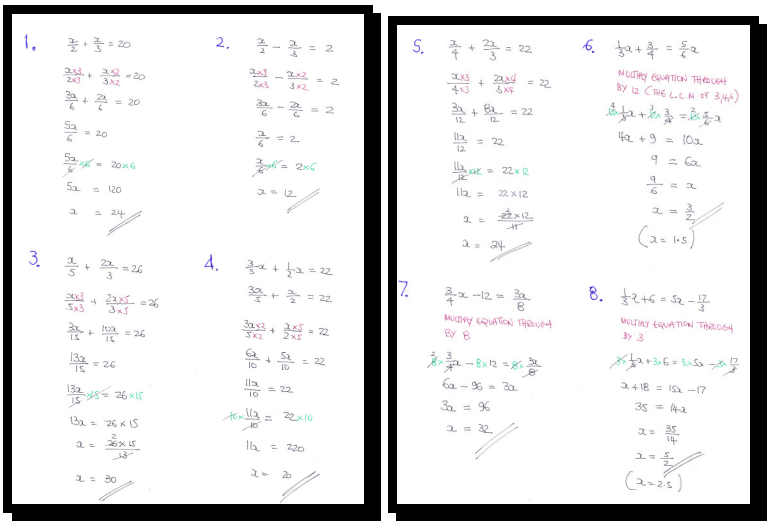
4. $\frac{3}{5}x+\frac{1}{2}x=22$ $\boxed{x=20}$

5. $\frac{x}{4}+\frac{2x}{3}=22$ $\boxed{x=24}$

6. $\frac{1}{3}x+\frac{3}{4}=\frac{5x}{6}$ $\boxed{x=\frac{3}{2}}$

7. $\frac{3}{4}x-12=\frac{3x}{8}$ $\boxed{x=32}$

8. $\frac{1}{3}x+6=5x-\frac{17}{3}$ $\boxed{x=\frac{5}{2}}$



Question 2

Solve each of the following fractional equations.

1. $\dfrac{x+1}{2}+\dfrac{x-3}{4}=2$ $\boxed{x=3}$

2. $\dfrac{5+x}{3}+\dfrac{9-x}{2}=6$ $\boxed{x=1}$

3. $\dfrac{2x+1}{3}+\dfrac{3x-1}{5}=9$ $\boxed{x=7}$

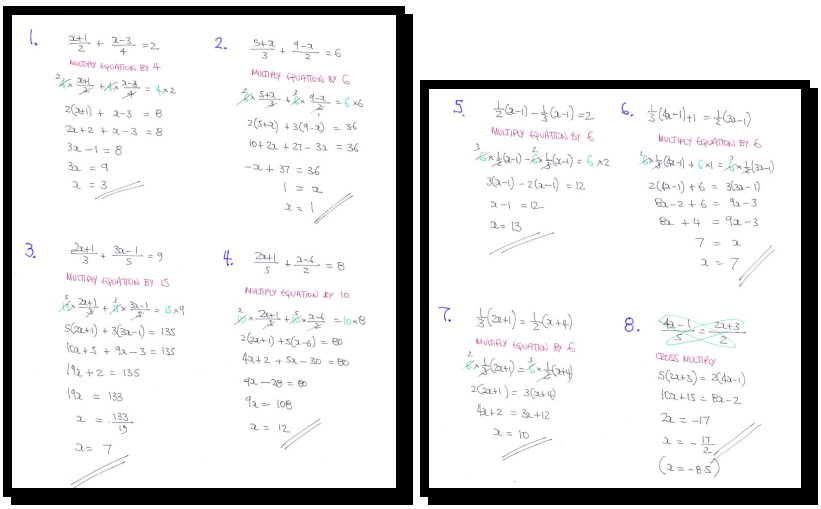
4. $\dfrac{2x+1}{5}+\dfrac{x-6}{2}=8$ $\boxed{x=12}$

5. $\dfrac{1}{2}(x-1)-\dfrac{1}{3}(x-1)=2$ $\boxed{x=13}$

6. $\dfrac{1}{3}(4x-1)+1=\dfrac{1}{2}(3x-1)$ $\boxed{x=7}$

7. $\dfrac{1}{3}(2x+1)=\dfrac{1}{2}(x+4)$ $\boxed{x=10}$

8. $\dfrac{4x-1}{5}=\dfrac{2x+3}{2}$ $\boxed{x=-\dfrac{17}{2}}$



Question 3

Solve each of the following fractional equations.

1. $\dfrac{x-2}{x+2}=\dfrac{2}{3}$ $\boxed{x=10}$

2. $\dfrac{3x-1}{x+1}=\dfrac{5}{2}$ $\boxed{x=7}$

3. $\dfrac{2x-4}{3x-1}=\dfrac{3}{4}$ $\boxed{x=-13}$

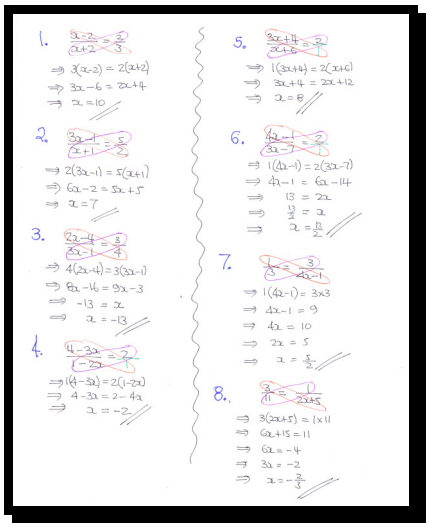
4. $\dfrac{4-3x}{1-2x}=2$ $\boxed{x=-2}$

5. $\dfrac{3x+4}{x+6}=2$ $\boxed{x=8}$

6. $\dfrac{4x-1}{3x-7}=2$ $\boxed{x=\dfrac{13}{2}}$

7. $\dfrac{1}{3}=\dfrac{3}{4x-1}$ $\boxed{x=\dfrac{5}{2}}$

8. $\dfrac{3}{11}=\dfrac{1}{2x+5}$ $\boxed{x=-\dfrac{2}{3}}$



Question 4

Solve each of the following fractional equations.

1. $-\frac{2}{3}=\frac{1-3x}{4x+3}$ $\boxed{x=9}$

2. $\frac{1}{2x+5}+3=0$ $\boxed{x=-\frac{8}{3}}$

3. $\frac{4}{4x+1}-3=0$ $\boxed{x=\frac{1}{12}}$

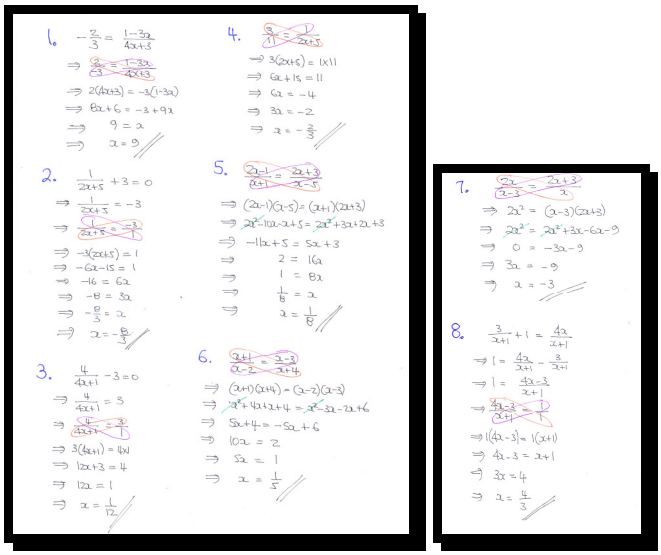
4. $\frac{3}{11}=\frac{1}{2x+5}$ $\boxed{x=-\frac{2}{3}}$

5. $\frac{2x-1}{x+1}=\frac{2x+3}{x-5}$ $\boxed{x=\frac{1}{8}}$

6. $\frac{x+1}{x-2}=\frac{x-3}{x+4}$ $\boxed{x=\frac{1}{5}}$

7. $\frac{2x}{x-3}=\frac{2x+3}{x}$ $\boxed{x=-3}$

8. $\frac{3}{x+1}+1=\frac{4x}{x+1}$ $\boxed{x=\frac{4}{3}}$



Question 5

Solve each of the following fractional equations.

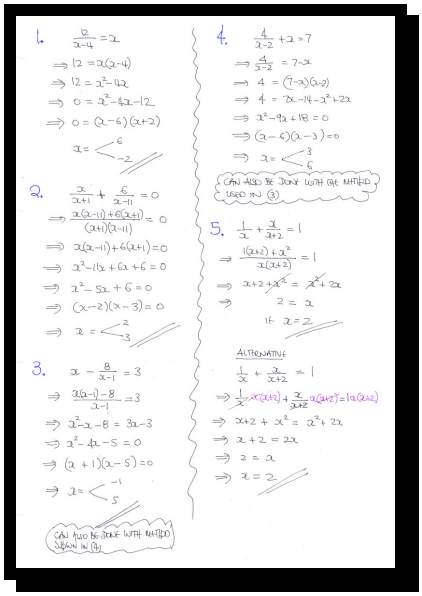
1. $\dfrac{12}{x-4}=x$ $\boxed{x=-2,6}$

2. $\dfrac{x}{x+1}+\dfrac{6}{x-11}=0$ $\boxed{x=2,3}$

3. $x-\dfrac{8}{x-1}=3$ $\boxed{x=-1,5}$

4. $\dfrac{4}{x-2}+x=7$ $\boxed{x=3,6}$

5. $\dfrac{1}{x}+\dfrac{x}{x+2}=1$ $\boxed{x=2}$



Question 6

Solve each of the following fractional equations.

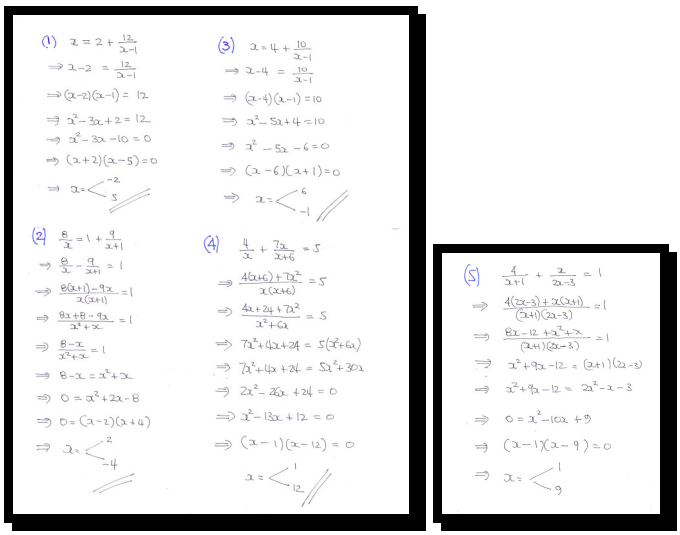
1. $x = 2 + \dfrac{12}{x-1}$ $\boxed{x = -2, 5}$

2. $\dfrac{8}{x} = 1 + \dfrac{9}{x+1}$ $\boxed{x = -4, 2}$

3. $x = 4 + \dfrac{10}{x-1}$ $\boxed{x = -1, 6}$

4. $\dfrac{4}{x} + \dfrac{7x}{x+6} = 5$ $\boxed{x = 1, 12}$

5. $\dfrac{4}{x+1} + \dfrac{x}{2x-3} = 1$ $\boxed{x = 1, 9}$



Question 7

Solve each of the following fractional equations.

1. $\dfrac{4}{x}+\dfrac{3}{x-2}=1$ $\qquad$ $\boxed{x=1,8}$

2. $\dfrac{6}{x}+\dfrac{7}{x-5}=2$ $\qquad$ $\boxed{x=\dfrac{3}{2},10}$

3. $\dfrac{2}{x}-\dfrac{3}{x+1}=2$ $\qquad$ $\boxed{x=-2,\dfrac{1}{2}}$

4. $\dfrac{8}{x+2}-\dfrac{6}{x+4}=1$ $\qquad$ $\boxed{x=2,-6}$

5. $\dfrac{4}{x+3}+\dfrac{3}{2x-1}=1$ $\qquad$ $\boxed{x=-1,4}$



Question 8

Solve each of the following fractional equations.

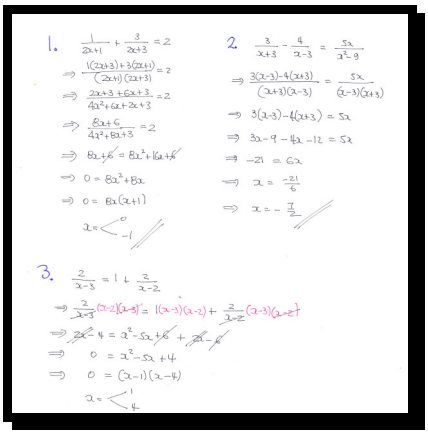
1. $\dfrac{1}{2x+1}+\dfrac{3}{2x+3}=2$ $\qquad$ $\boxed{x=0,-1}$

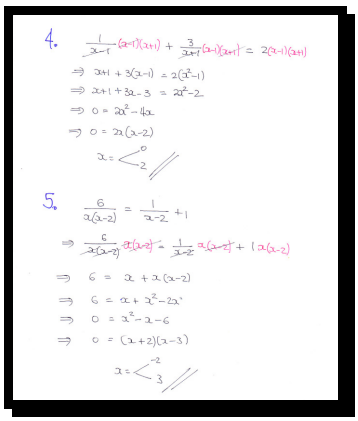
2. $\dfrac{3}{x+3}-\dfrac{4}{x-3}=\dfrac{5x}{x^2-9}$ $\qquad$ $\boxed{x=-\dfrac{7}{2}}$

3. $\dfrac{2}{x-3}=1+\dfrac{2}{x-2}$ $\qquad$ $\boxed{x=1,4}$

4. $\dfrac{1}{x-1}+\dfrac{3}{x+1}=2$ $\qquad$ $\boxed{x=0,2}$

5. $\dfrac{6}{x(x-2)}=\dfrac{1}{x-2}+1$ $\qquad$ $\boxed{x=3,-2}$





Question 9

Solve each of the following fractional equations.

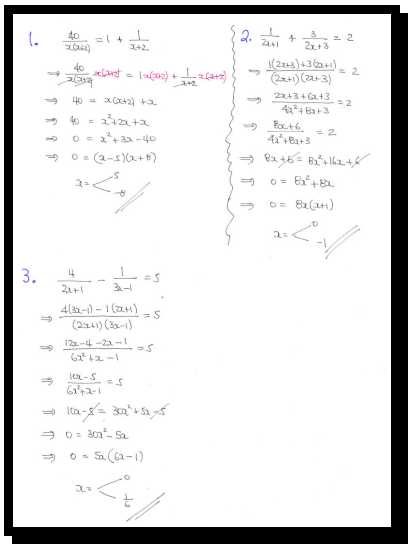
1. $\dfrac{40}{x(x+2)}=1+\dfrac{1}{x+2}$ $\boxed{x=5,-8}$

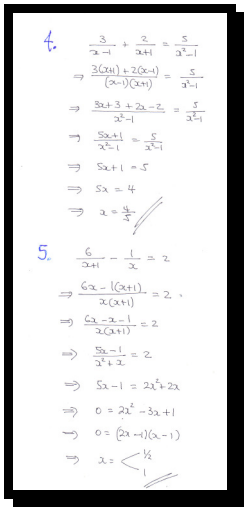
2. $\dfrac{1}{2x+1}+\dfrac{3}{2x+3}=2$ $\boxed{x=0,-1}$

3. $\dfrac{4}{2x+1}-\dfrac{1}{3x-1}=5$ $\boxed{x=0,\dfrac{1}{6}}$

4. $\dfrac{3}{x-1}+\dfrac{2}{x+1}=\dfrac{5}{x^2-1}$ $\boxed{x=\dfrac{4}{5}}$

5. $\dfrac{6}{x+1}-\dfrac{1}{x}=2$ $\boxed{x=\dfrac{1}{2},1}$





Question 10

Solve each of the following fractional equations.

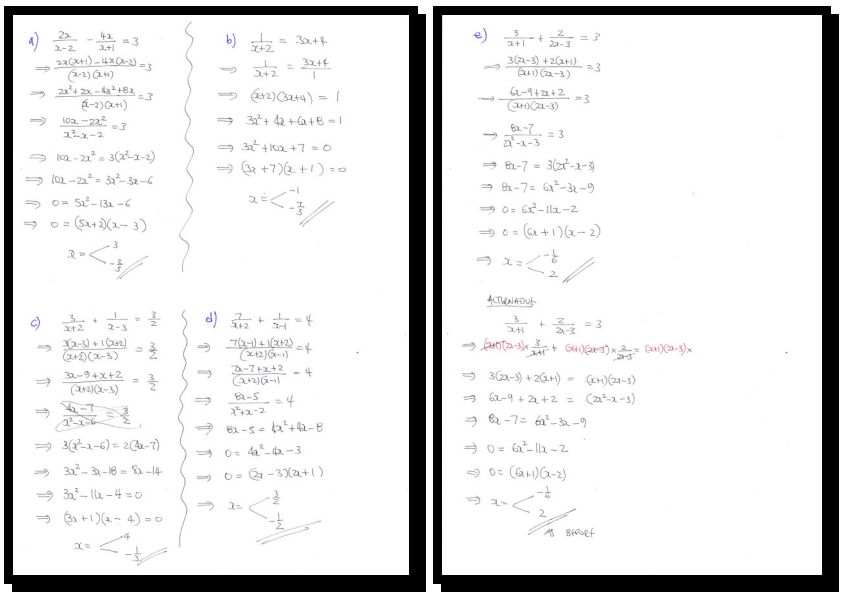
1. $\dfrac{2x}{x-2}-\dfrac{4x}{x+1}=3$ $\qquad$ $\boxed{x=-\dfrac{2}{5},3}$

2. $\dfrac{1}{x+2}=3x+4$ $\qquad$ $\boxed{x=-\dfrac{7}{3},-1}$

3. $\dfrac{3}{x+2}+\dfrac{1}{x-3}=\dfrac{3}{2}$ $\qquad$ $\boxed{x=-\dfrac{1}{3},4}$

4. $\dfrac{7}{x+2}+\dfrac{1}{x-1}=4$ $\qquad$ $\boxed{x=-\dfrac{1}{2},\dfrac{3}{2}}$

5. $\dfrac{3}{x+1}+\dfrac{2}{2x-3}=3$ $\qquad$ $\boxed{x=-\dfrac{1}{6},2}$



Question 11

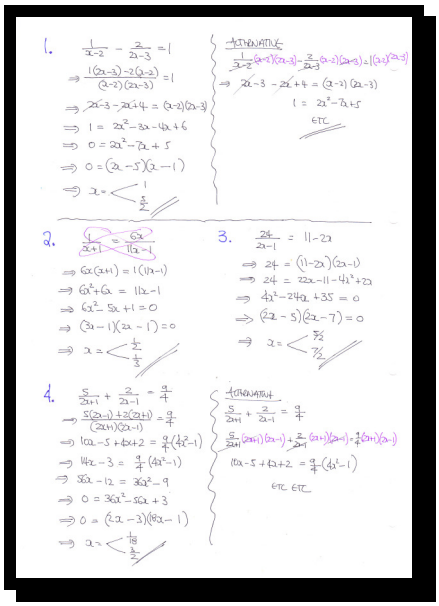
Solve each of the following fractional equations.

1. $\dfrac{1}{x-2}-\dfrac{2}{2x-3}=1$ $\boxed{x=1,\dfrac{5}{2}}$

2. $\dfrac{1}{x+1}=\dfrac{6x}{11x-1}$ $\boxed{x=\dfrac{1}{2},\dfrac{1}{3}}$

3. $\dfrac{24}{2x-1}=11-2x$ $\boxed{x=\dfrac{5}{2},\dfrac{7}{2}}$

4. $\dfrac{5}{2x+1}+\dfrac{2}{2x-1}=\dfrac{9}{4}$ $\boxed{x=\dfrac{3}{2},\dfrac{1}{18}}$



LINEAR SIMULTANEOUS EQUATIONS

Question 1

Solve each of the following sets of simultaneous equations.

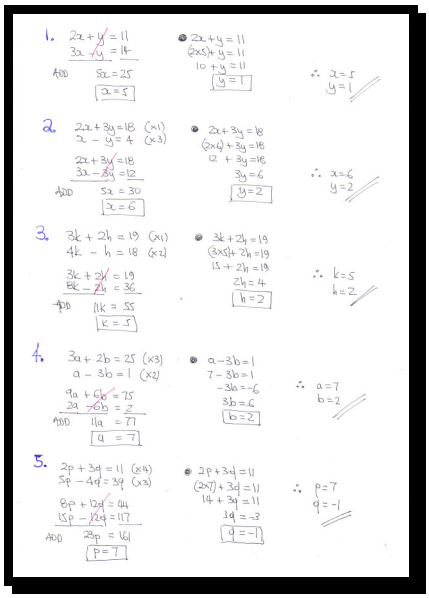
1. $2x + y = 11$
$3x - y = 14$ $\qquad \boxed{x = 5, \quad y = 1}$

2. $2x + 3y = 18$
$x - y = 4$ $\qquad \boxed{x = 6, \quad y = 2}$

3. $3k + 2h = 19$
$4k - h = 18$ $\qquad \boxed{k = 5, \quad h = 2}$

4. $3a + 2b = 25$
$a - 3b = 1$ $\qquad \boxed{a = 7, \quad b = 2}$

5. $2p + 3q = 11$
$5p - 4q = 39$ $\qquad \boxed{p = 7, \quad q = -1}$



Question 2

Solve each of the following sets of simultaneous equations.

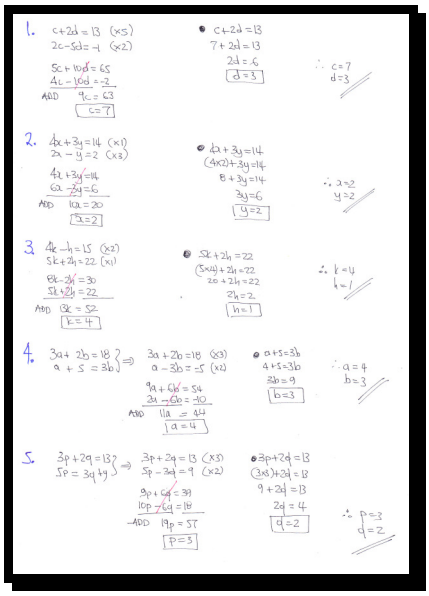
1. $c+2d=13$
$2c-5d=-1$ $\qquad \boxed{c=7,\ \ d=3}$

2. $4x+3y=14$
$2x-y=2$ $\qquad \boxed{x=2,\ \ y=2}$

3. $4k-h=15$
$5k+2h=22$ $\qquad \boxed{k=4,\ \ h=1}$

4. $3a+2b=18$
$a+5=3b$ $\qquad \boxed{a=4,\ \ b=3}$

5. $3p+2q=13$
$5p=3q+9$ $\qquad \boxed{p=3,\ \ q=2}$



Question 3

Solve each of the following sets of simultaneous equations.

1. $c+2d=9$
$2c=5d+9$

$\boxed{c=7,\ \ d=1}$

2. $2a+b=10$
$2a+3b=14$

$\boxed{a=4,\ \ b=2}$

3. $3x+2y=14$
$2x-y=7$

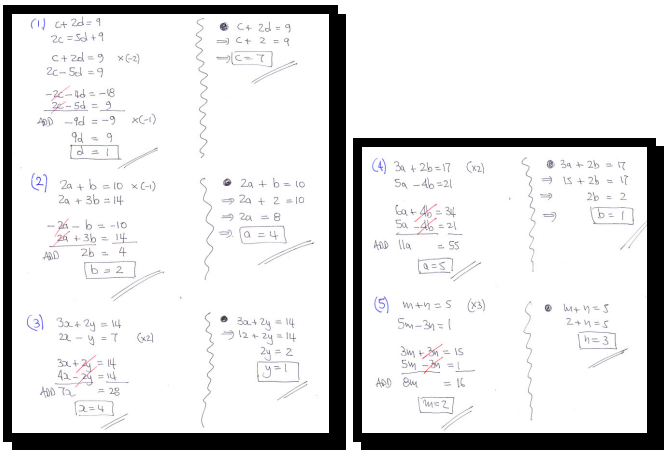
$\boxed{x=4,\ \ y=1}$

4. $3a+2b=17$
$5a-4b=21$

$\boxed{a=5,\ b=1}$

5. $m+n=5$
$5m-3n=1$

$\boxed{m=2,\ \ n=3}$



Question 4

Solve each of the following sets of simultaneous equations.

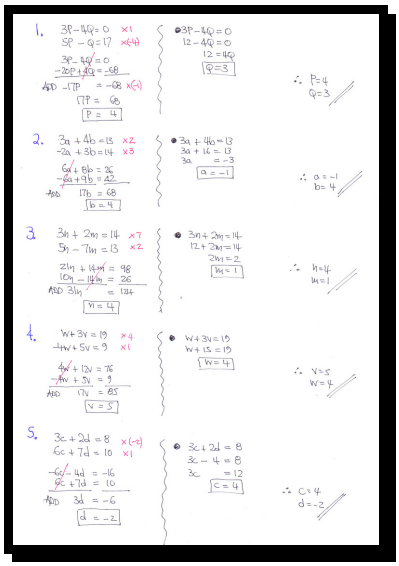
1. $3P-4Q=0$
$5P-Q=17$ $\boxed{P=4,\ \ Q=3}$

2. $3a+4b=13$
$-2a+3b=14$ $\boxed{a=-1,\ \ b=4}$

3. $3n+2m=14$
$5n-7m=13$ $\boxed{n=4,\ \ m=1}$

4. $w+3v=19$
$5v-4w=9$ $\boxed{v=5,\ \ w=4}$

5. $3c+2d=8$
$6c+7d=10$ $\boxed{c=4,\ \ d=-2}$



Question 5

Solve each of the following sets of simultaneous equations.

1. $7k+2h=22$

$3k-4h=7$

$\boxed{k=3,\ h=\frac{1}{2}}$

2. $4p-2q=10$

$7p-q=10$

$\boxed{p=1,\ q=-3}$

3. $9t+2r=-12$

$3r-2t=13$

$\boxed{t=-2,\ r=3}$

4. $x+2y=10$

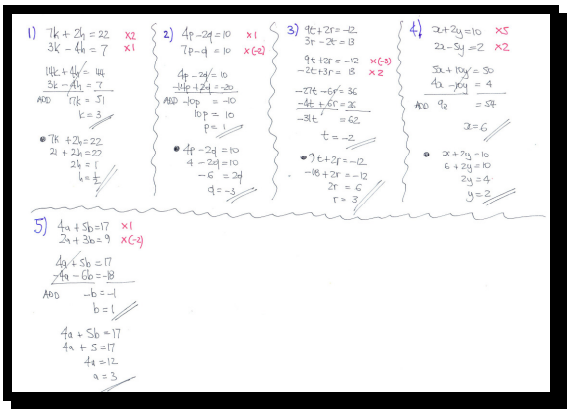
$2x-5y=2$

$\boxed{x=6,\ y=2}$

5. $4a+5b=17$

$2a+3b=9$

$\boxed{a=3,\ b=1}$



Question 6

Solve each of the following sets of simultaneous equations.

1. $4M + N = 13$
$2M + 3N = 19$
$\boxed{M = 2, N = 5}$

2. $7t + 2v = 15$
$3t - 4v = 4$
$\boxed{t = 2, v = \frac{1}{2}}$

3. $5x + 2y = 9$
$3x - 4y = 8$
$\boxed{x = 2,\ y = -\frac{1}{2}}$

4. $5P + 2Q = 16$
$3P - 4Q = 7$
$\boxed{P = 3, Q = \frac{1}{2}}$

5. $4x - y = 8$
$6x - 4y = 17$
$\boxed{x = \frac{3}{2},\ y = -2}$

Question 7

Solve each of the following sets of simultaneous equations.

1. $3k-2h=3$
$5k-h=12$ $\boxed{k=3, h=3}$

2. $4c+5d=16$
$-2c+3d=14$ $\boxed{c=-1, d=4}$

3. $5u-8v=6$
$2u-5v=6$ $\boxed{u=-2, v=-2}$

4. $3K+2L=2$
$2K-5L=14$ $\boxed{K=2, L=-2}$

5. $3a-5b=8$
$5a+4b=38$ $\boxed{a=6, b=2}$

Question 7

Solve each of the following sets of simultaneous equations.

1. $x+4y=3$

$3x+8y=10$

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

2. $3x+8y=16$

$7x-6y=25$

$\boxed{x=4,\ y=\frac{1}{4}}$

3. $x+2y=5$

$y=5x-1$

$\boxed{x=\frac{7}{11},\ y=\frac{24}{11}}$

NON LINEAR SIMULTANEOUS EQUATIONS

Question 1

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} y &= 2x+5 \\ y &= x^2-3 \end{aligned}$$

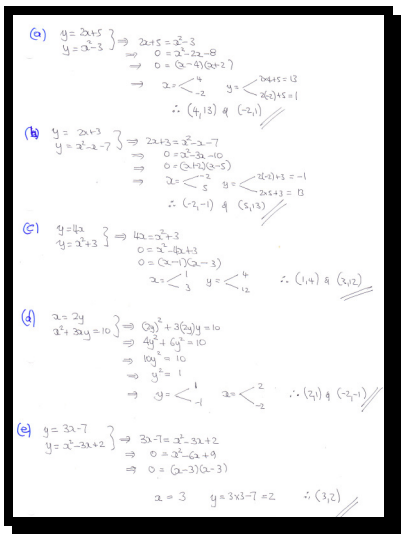
b)
$$\begin{aligned} y &= 2x+3 \\ y &= x^2-x-7 \end{aligned}$$

c)
$$\begin{aligned} y &= 4x \\ y &= x^2+3 \end{aligned}$$

d)
$$\begin{aligned} x &= 2y \\ x^2+3xy &= 10 \end{aligned}$$

e)
$$\begin{aligned} y &= 3x-7 \\ y &= x^2-3x+2 \end{aligned}$$

$\boxed{(-2,1),(4,13)}$, $\boxed{(-2,-1),(5,13)}$, $\boxed{(1,4),(3,12)}$, $\boxed{(2,1),(-2,-1)}$, $\boxed{(3,2)}$



Question 2

Solve each of the following sets of simultaneous equations.

a)
$$y = x^2 - 5x + 4$$
$$y = x - 1$$

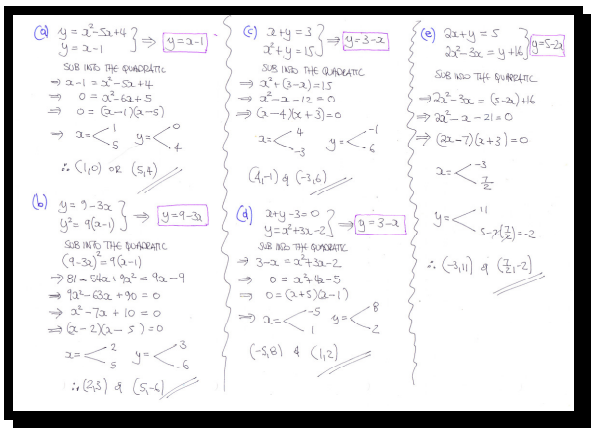
b)
$$y = 9 - 3x$$
$$y^2 = 9(x - 1)$$

c)
$$x + y = 3$$
$$x^2 + y = 15$$

d)
$$x + y - 3 = 0$$
$$y = x^2 + 3x - 2$$

e)
$$2x + y = 5$$
$$2x^2 - 3x = y + 16$$

$\boxed{(1,0),(5,4)}$, $\boxed{(2,3),(5,-6)}$, $\boxed{(-3,6),(4,-1)}$, $\boxed{(1,2),(-5,8)}$, $\boxed{\left(\frac{7}{2},-2\right),(-3,11)}$



Question 3

Solve each of the following sets of simultaneous equations.

a)
$$x^2-3y+11=0$$
$$2x-y+1=0$$

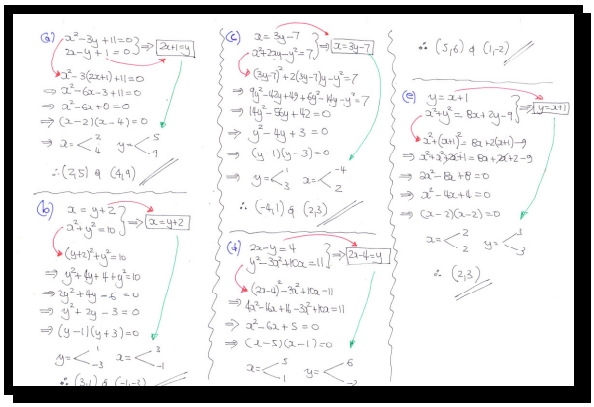
b)
$$x=y+2$$
$$x^2+y^2=10$$

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

d)
$$2x-y=4$$
$$y^2-3x^2+10x=11$$

e)
$$y=x+1$$
$$x^2+y^2=8x+2y-9$$

$\boxed{(2,5),(4,9)}$, $\boxed{(-1,-3),(3,1)}$, $\boxed{(2,3),(-4,1)}$, $\boxed{(1,-2),(5,6)}$, $\boxed{(2,3)}$



Question 4

Solve each of the following sets of simultaneous equations.

a) $\begin{aligned} x-y&=3 \\ x^2+y^2&=89 \end{aligned}$

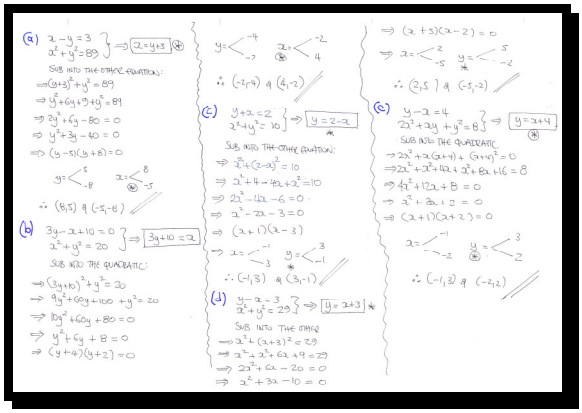
b) $\begin{aligned} 3y-x+10&=0 \\ x^2+y^2&=20 \end{aligned}$

c) $\begin{aligned} y+x&=2 \\ x^2+y^2&=10 \end{aligned}$

d) $\begin{aligned} y-x&=3 \\ x^2+y^2&=29 \end{aligned}$

e) $\begin{aligned} y-x&=4 \\ 2x^2+xy+y^2&=8 \end{aligned}$

$\boxed{(8,5),(-5,-8)}$, $\boxed{(4,-2),(-2,-4)}$, $\boxed{(-1,3),(3,-1)}$, $\boxed{(-5,-2),(2,5)}$, $\boxed{(-1,3),(-2,2)}$



Question 5

Solve each of the following sets of simultaneous equations.

a)
$$x+y=2$$
$$3x^2+y^2=2(x+1)$$

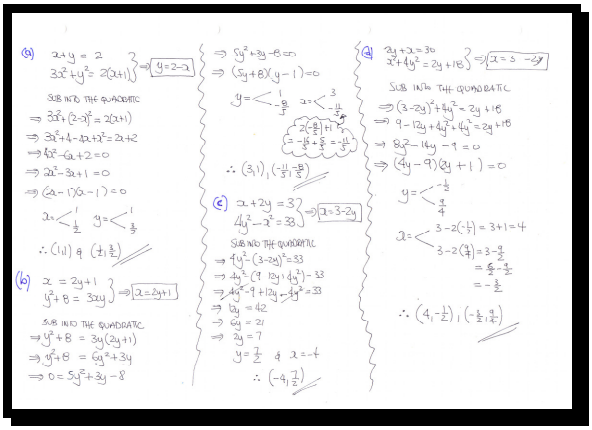
b)
$$x=2y+1$$
$$y^2+8=3xy$$

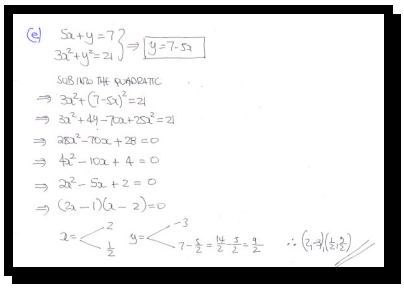
c)
$$x+2y=3$$
$$4y^2-x^2=33$$

d)
$$2y+x=3$$
$$x^2+4y^2=2y+18$$

e)
$$5x+y=7$$
$$3x^2+y^2=21$$

$$\boxed{(1,1),\left(\frac{1}{2},\frac{3}{2}\right)},\ \boxed{(3,1),\left(-\frac{11}{5},-\frac{8}{5}\right)},\ \boxed{\left(-4,\frac{7}{2}\right)},\ \boxed{\left(4,-\frac{1}{2}\right),\left(-\frac{3}{2},\frac{9}{4}\right)},\ \boxed{(2,-3),\left(\frac{1}{2},\frac{9}{2}\right)}$$





Question 6

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} 2y - x &= 6 \\ x^2 + y^2 &= 20 \end{aligned}$$

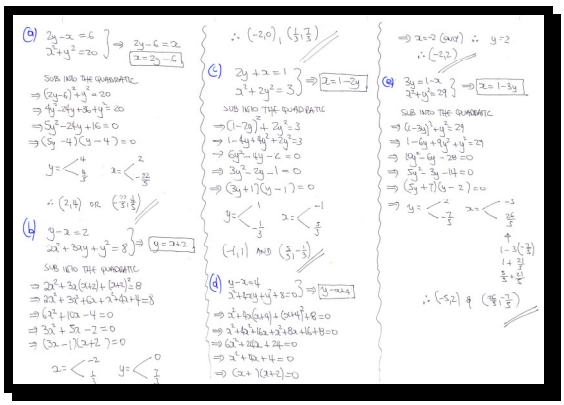
b)
$$\begin{aligned} y - x &= 2 \\ 2x^2 + 3xy + y^2 &= 8 \end{aligned}$$

c)
$$\begin{aligned} 2y + x &= 1 \\ x^2 + 2y^2 &= 3 \end{aligned}$$

d)
$$\begin{aligned} y - x &= 4 \\ x^2 + 4xy + y^2 + 8 &= 0 \end{aligned}$$

e)
$$\begin{aligned} 3y &= 1 - x \\ x^2 + y^2 &= 29 \end{aligned}$$

$\boxed{(2,4),\left(-\frac{22}{5},\frac{4}{5}\right)}$, $\boxed{(-2,0),\left(\frac{1}{3},\frac{7}{3}\right)}$, $\boxed{(-1,1),\left(\frac{5}{3},-\frac{1}{3}\right)}$, $\boxed{(-2,2)}$, $\boxed{(-5,2),\left(\frac{26}{5},-\frac{7}{5}\right)}$



Question 7

Solve each of the following sets of simultaneous equations.

a) $\begin{aligned} x^2-3xy+y^2&=11 \\ 3y-x&=1 \end{aligned}$

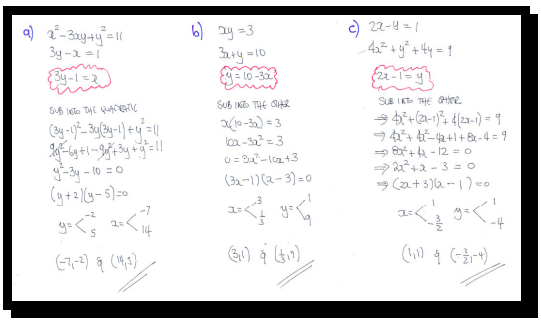
b) $\begin{aligned} xy&=3 \\ 3x+y&=10 \end{aligned}$

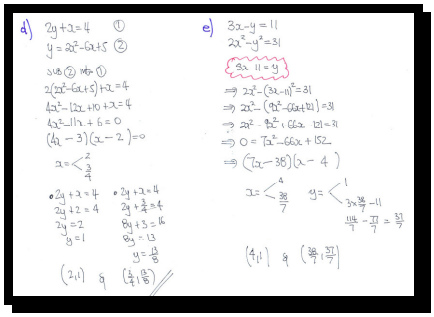
c) $\begin{aligned} 2x-y&=1 \\ 4x^2+y^2+4y&=9 \end{aligned}$

d) $\begin{aligned} 2y+x&=4 \\ y&=2x^2-6x+5 \end{aligned}$

e) $\begin{aligned} 3x-y&=11 \\ 2x^2-y^2&=31 \end{aligned}$

$\boxed{(14,5),(-7,-2)}$, $\boxed{(3,1),\left(\frac{1}{3},9\right)}$, $\boxed{(1,1),\left(-\frac{3}{2},-4\right)}$, $\boxed{(2,1),\left(\frac{3}{4},\frac{13}{8}\right)}$, $\boxed{(4,1),\left(\frac{38}{7},\frac{37}{7}\right)}$





Question 8

Solve each of the following sets of simultaneous equations.

a)
$$x = y + 3$$
$$x^2 + 3y^2 = 37$$

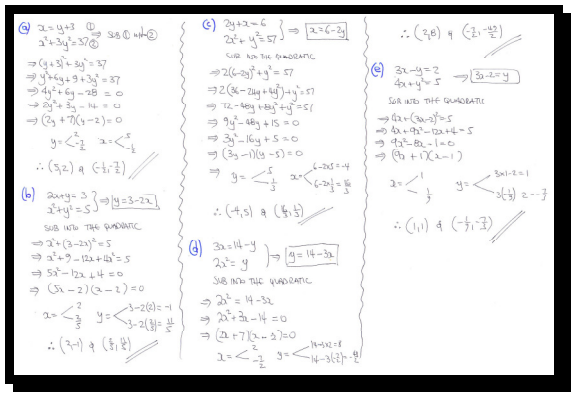
b)
$$2x + y = 3$$
$$x^2 + y^2 = 5$$

c)
$$2y + x = 6$$
$$2x^2 + y^2 = 57$$

d)
$$3x = 14 - y$$
$$2x^2 = y$$

e)
$$3x - y = 2$$
$$4x + y^2 = 5$$

$\boxed{(5,2),\left(-\frac{1}{2},-\frac{7}{2}\right)}$, $\boxed{(2,-1),\left(\frac{2}{5},\frac{11}{5}\right)}$, $\boxed{(-4,5),\left(\frac{1}{3},\frac{16}{3}\right)}$, $\boxed{(2,8),\left(-\frac{7}{2},\frac{49}{2}\right)}$, $\boxed{(1,1),\left(-\frac{1}{9},-\frac{7}{3}\right)}$



Question 9

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} y+2x-1&=0\\ x^2+y^2&=10 \end{aligned}$$

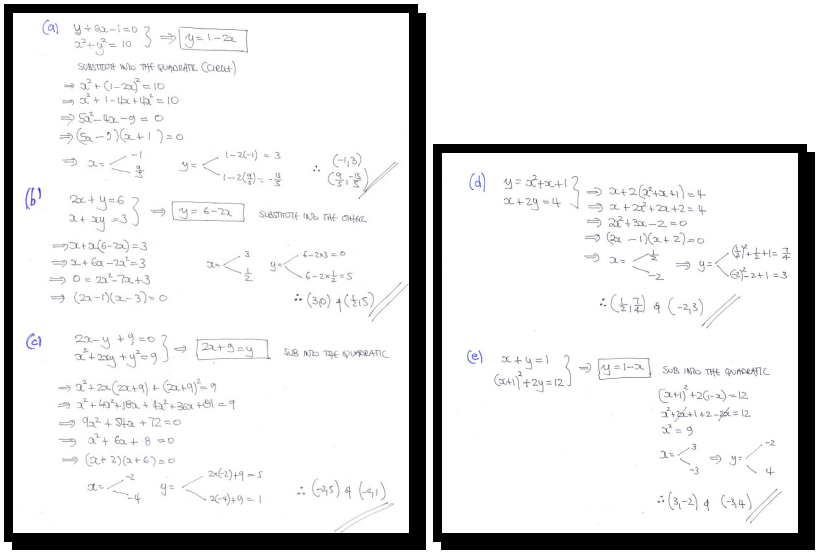
b)
$$\begin{aligned} 2x+y&=6\\ x+xy&=3 \end{aligned}$$

c)
$$\begin{aligned} 2x-y+9&=0\\ x^2+2xy+y^2&=9 \end{aligned}$$

d)
$$\begin{aligned} y&=x^2+x+1\\ x+2y&=4 \end{aligned}$$

e)
$$\begin{aligned} x+y&=1\\ (x+1)^2+2y&=12 \end{aligned}$$

$\boxed{(-1,3),\left(\frac{9}{5},-\frac{13}{5}\right)}$, $\boxed{(3,0),\left(\frac{1}{2},5\right)}$, $\boxed{(-2,5),(-4,1)}$, $\boxed{(-2,3),\left(\frac{1}{2},\frac{7}{4}\right)}$, $\boxed{(3,-2),(-3,4)}$



Question 10

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} 2x &= y+1 \\ x^2+y^2 &= 2 \end{aligned}$$

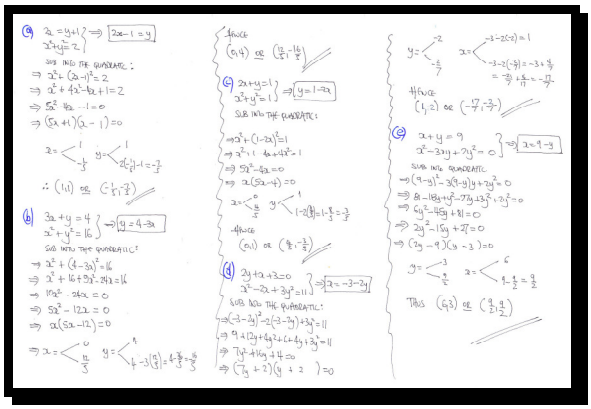
b)
$$\begin{aligned} 3x+y &= 4 \\ x^2+y^2 &= 16 \end{aligned}$$

c)
$$\begin{aligned} 2x+y &= 1 \\ x^2+y^2 &= 1 \end{aligned}$$

d)
$$\begin{aligned} 2y+x+3 &= 0 \\ x^2-2x+3y^2 &= 11 \end{aligned}$$

e)
$$\begin{aligned} x+y &= 9 \\ x^2-3xy+2y^2 &= 0 \end{aligned}$$

$\boxed{(1,1),\left(-\frac{1}{5},-\frac{7}{5}\right)}$, $\boxed{(0,4),\left(\frac{12}{5},-\frac{16}{5}\right)}$, $\boxed{(0,1),\left(\frac{4}{5},-\frac{3}{5}\right)}$, $\boxed{(1,-2),\left(-\frac{17}{7},-\frac{2}{7}\right)}$, $\boxed{(6,3),\left(\frac{9}{2},\frac{9}{2}\right)}$



Question 11

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} y+3&=2x \\ 16+y^2&=8x \end{aligned}$$

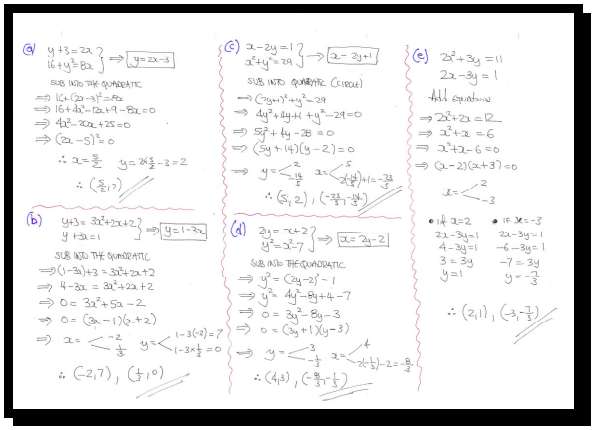
b)
$$\begin{aligned} y+3&=3x^2+2x+2 \\ y+3x&=1 \end{aligned}$$

c)
$$\begin{aligned} x-2y&=1 \\ x^2+y^2&=29 \end{aligned}$$

d)
$$\begin{aligned} 2y&=x+2 \\ y^2&=x^2-7 \end{aligned}$$

e)
$$\begin{aligned} 2x^2+3y&=11 \\ 2x-3y&=1 \end{aligned}$$

$$\boxed{\left(\frac{5}{2},2\right)},\ \boxed{(-2,7),\left(\frac{1}{3},0\right)},\ \boxed{(5,2),\left(-\frac{23}{5},-\frac{14}{5}\right)},\ \boxed{(4,3),\left(-\frac{8}{3},-\frac{1}{3}\right)},\ \boxed{(2,1),\left(-3,-\frac{7}{3}\right)}$$



Question 12

Solve each of the following sets of simultaneous equations.

a)
$$\begin{aligned} 3x+y&=8 \\ xy+y^2&=8 \end{aligned}$$

b)
$$\begin{aligned} 3x&=y-4 \\ x^2+y^2&=34 \end{aligned}$$

c)
$$\begin{aligned} 2x-y&=1 \\ x^2+2x+y^2&=1 \end{aligned}$$

d)
$$\begin{aligned} y-x-3&=0 \\ xy(y-x)&=30 \end{aligned}$$

e)
$$\begin{aligned} x-y&=6 \\ (x+y)^2&=4 \end{aligned}$$

$\boxed{(2,2),\left(\frac{14}{3},-6\right)}$, $\boxed{(-3,-5),\left(\frac{3}{5},\frac{29}{5}\right)}$, $\boxed{(0,-1),\left(\frac{2}{5},-\frac{1}{5}\right)}$, $\boxed{(2,5),(-2,-5)}$, $\boxed{(2,-4),(4,-2)}$

