MODULUS FUNCTION PRACTICE

MODULUS EQUATIONS

Question 1

Solve the following equations.

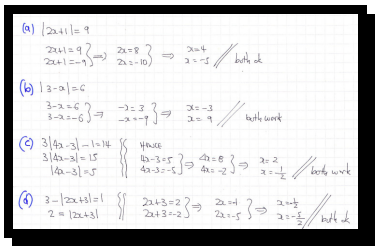
a) $|2x+1|=9$

b) $|3-x|=6$

c) $3|4x-3|-1=14$

d) $3-|2x+3|=1$

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



Question 2

Solve the following equations.

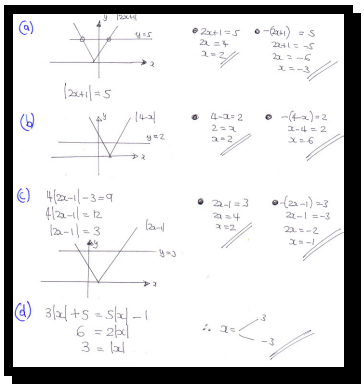
a) $|2x+1|=5$

b) $|4-x|=2$

c) $4|2x-1|-3=9$

d) $3|x|+5=5|x|-1$

$\boxed{x=2,-3}$, $\boxed{x=2,6}$, $\boxed{x=2,-1}$, $\boxed{x=3,-3}$



Question 3

Solve the following equations.

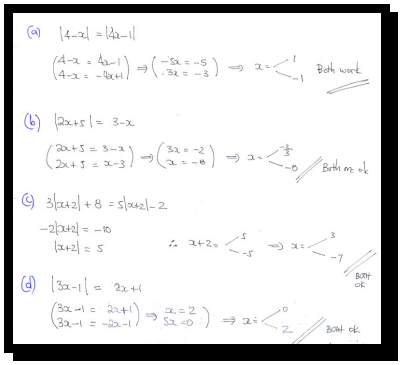
a) $|4-x|=|4x-1|$

b) $|2x+5|=3-x$

c) $3|x+2|+8=5|x+2|-2$

d) $|3x-1|=2x+1$

$\boxed{x=\pm 1}$, $\boxed{x=-\frac{2}{3},-8}$, $\boxed{x=3,-7}$, $\boxed{x=0,2}$



Question 4

Solve the following equations.

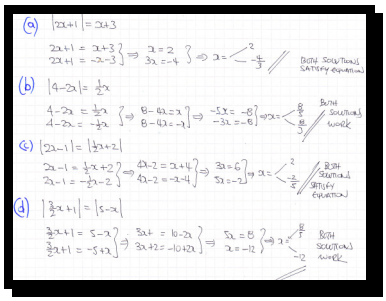
a) $|2x+1|=x+3$

b) $|4-2x|=\frac{1}{2}x$

c) $|2x-1|=\left|\frac{1}{2}x+2\right|$

d) $\left|\frac{3}{2}x+1\right|=|5-x|$

$\boxed{x=2,-\frac{4}{3}}$, $\boxed{x=\frac{8}{3},\frac{8}{5}}$, $\boxed{x=2,-\frac{2}{5}}$, $\boxed{x=-12,\frac{8}{5}}$



Question 5

Solve the following equations.

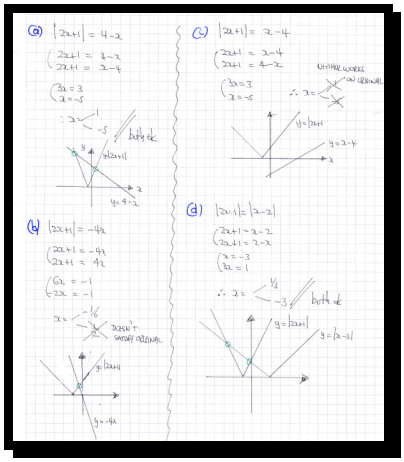
a) $|2x+1|=4-x$

b) $|2x+1|=-4x$

c) $|2x+1|=x-4$

d) $|2x+1|=|x-2|$

$\boxed{x=1,-5}$, $\boxed{x=-\frac{1}{6}}$, $\boxed{\text{no solutions}}$, $\boxed{x=-3,\frac{1}{3}}$



Question 6

Solve the following equations.

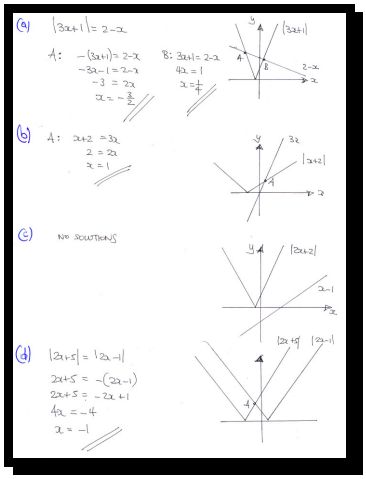
a) $|3x+1|=2-x$

b) $|x+2|=3x$

c) $|2x+2|=x-1$

d) $|2x+5|=|2x-1|$

$\boxed{x=\frac{1}{4},-\frac{3}{2}}$, $\boxed{x=1}$, $\boxed{\text{no solutions}}$, $\boxed{x=-1}$



Question 7

Solve the following equations.

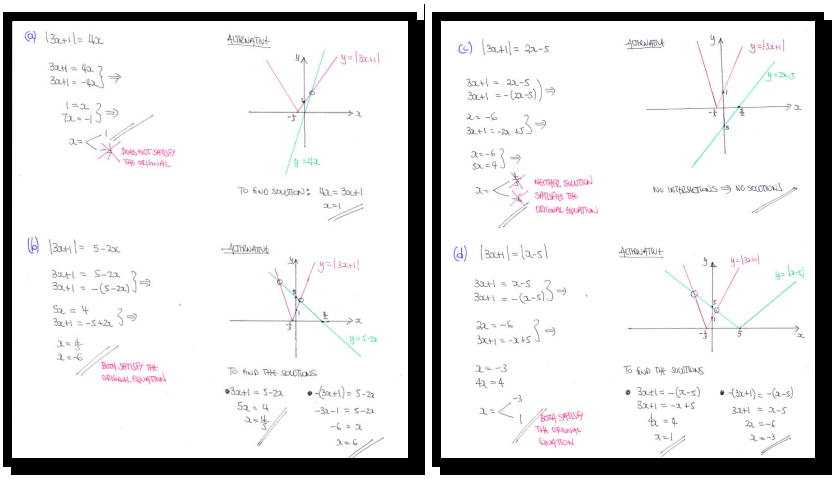
a) $|3x+1|=4x$

b) $|3x+1|=5-2x$

c) $|3x+1|=2x-5$

d) $|3x+1|=|x-5|$

$\boxed{x=1}$, $\boxed{x=-6,\frac{4}{5}}$, $\boxed{\text{no solutions}}$, $\boxed{x=-3,1}$



Question 8

Solve the following equations.

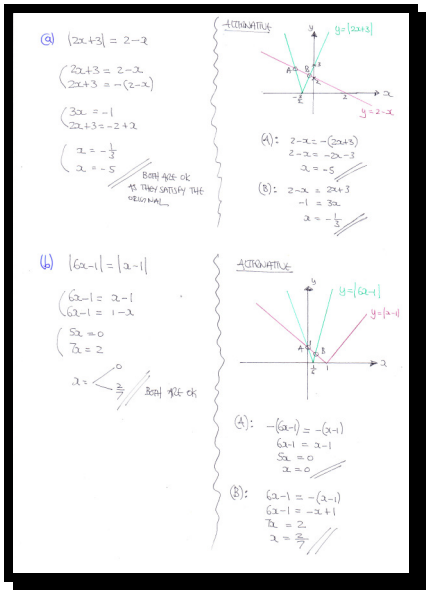
a) $|2x+3|=2-x$

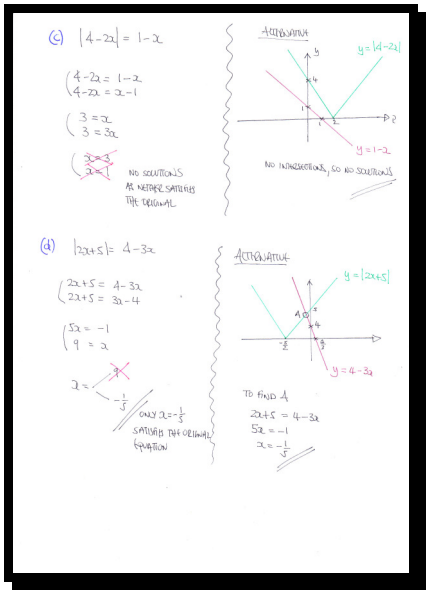
b) $|6x-1|=|x-1|$

c) $|4-2x|=1-x$

d) $|2x+5|=4-3x$

$\boxed{x=-5,-\frac{1}{3}}$, $\boxed{x=0,\frac{2}{7}}$, $\boxed{\text{no solutions}}$, $\boxed{x=-\frac{1}{5}}$





Question 9

Solve the following equations.

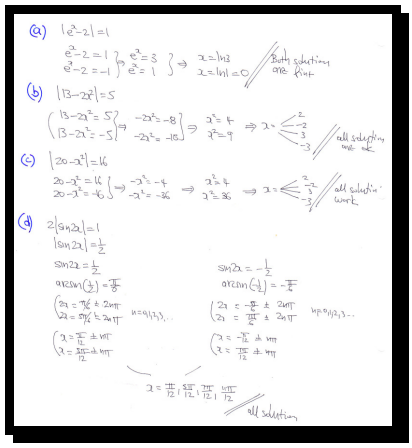
a) $\left|e^x-2\right|=1$

b) $\left|13-2x^2\right|=5$

c) $\left|20-x^2\right|=16$

d) $2\left|\sin 2x\right|=1, \quad 0\le x\le \pi$

$\boxed{x=0,\ln 3}$, $\boxed{x=\pm 2,\pm 3}$, $\boxed{x=\pm 2,\pm 6}$, $\boxed{x=\frac{\pi}{12},\frac{5\pi}{12},\frac{7\pi}{12},\frac{11\pi}{12}}$



MODULUS INEQUALITIES

Question 1

Solve the following inequalities.

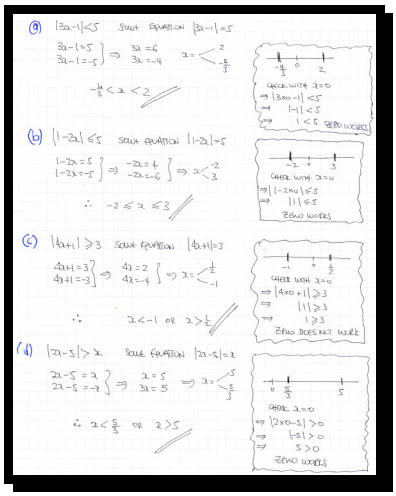
a) $|3x-1|<5$

b) $|1-2x|\leq 5$

c) $|4x+1|\geq 3$

d) $|2x-5|>x$

$\boxed{-\frac{4}{3}<x<2}$, $\boxed{-2\leq x\leq 3}$, $\boxed{x\leq -1 \text{ or } x\geq \frac{1}{2}}$, $\boxed{x<\frac{5}{3} \text{ or } x>5}$



Question 2

Solve the following inequalities.

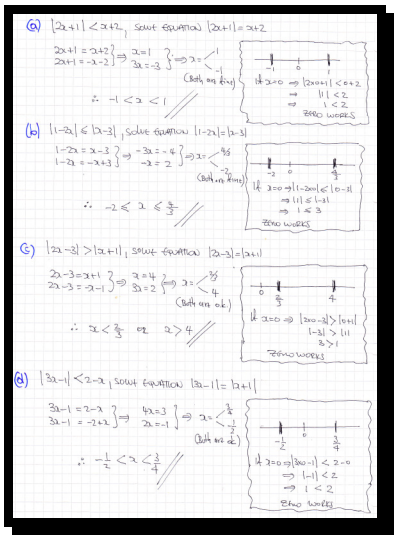
a) $|2x+1| < x+2$

b) $|1-2x| \le |x-3|$

c) $|2x-3| > |x+1|$

d) $|3x-1| < 2-x$

$\boxed{-1 < x < 1}$, $\boxed{-2 \le x \le \frac{4}{3}}$, $\boxed{x < \frac{2}{3} \text{ or } x > 4}$, $\boxed{-\frac{1}{2} < x < \frac{3}{4}}$



Question 3

Solve the following inequalities.

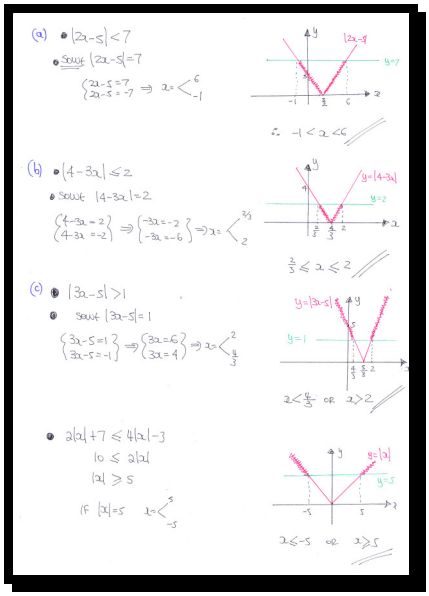
a) $|2x-5|<7$

b) $|4-3x|\le 2$

c) $|3x-5|>1$

d) $2|x|+7\le 4|x|-3$

$\boxed{-1<x<6}$, $\boxed{\frac{2}{3}\le x\le 2}$, $\boxed{x<\frac{4}{3} \text{ or } x>2}$, $\boxed{x\le -5 \text{ or } x\ge 5}$



Question 4

Solve the following inequalities.

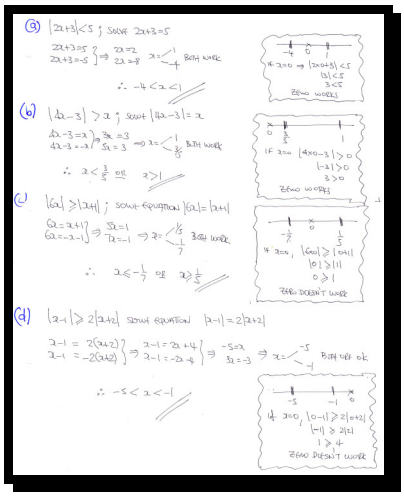
a) $|2x+3|<5$

b) $|4x-3|>x$

c) $|6x|\geq|x+1|$

d) $|x-1|\geq 2|x+2|$

$\boxed{-4<x<1}$, $\boxed{x<\frac{3}{5} \text{ or } x>1}$, $\boxed{x<-\frac{1}{7} \text{ or } x>\frac{1}{5}}$, $\boxed{-5<x<-1}$



Question 5

Solve the following inequalities.

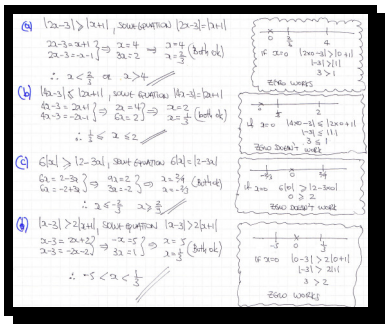
a) $|2x-3|>|x+1|$

b) $|4x-3|\le|2x+1|$

c) $6|x|\ge|2-3x|$

d) $|x-3|>2|x+1|$

$\boxed{x<\frac{2}{3}\ \text{or}\ x>4}$, $\boxed{\frac{1}{3}\le x\le 2}$, $\boxed{x\le-\frac{2}{3}\ \text{or}\ x\ge\frac{2}{9}}$, $\boxed{-5<x<\frac{1}{3}}$



Question 6

Solve the following inequalities.

a) $|2x-5| \leq 9$

b) $|x-1| \leq 4$

c) $8x > |x-8|$

d) $2|x+1| + x > 1$

$\boxed{-2 \leq x \leq 7}$, $\boxed{-3 \leq x \leq 5}$, $\boxed{x > \frac{8}{9}}$, $\boxed{x < -3 \text{ or } x > -\frac{1}{3}}$

