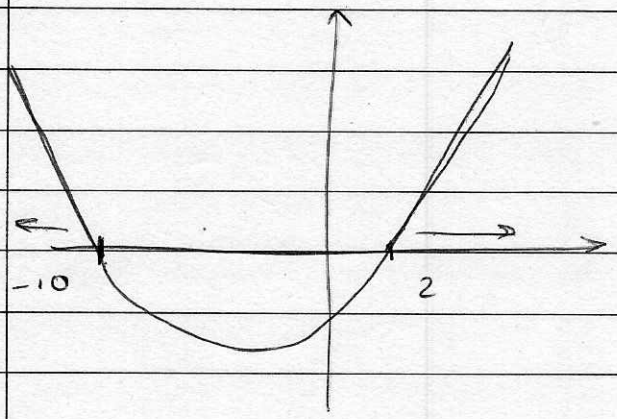
1a) $x^2 + 8x > 20$

$x^2 + 8x - 20 > 0$

$(x + 10)(x - 2) > 0$

$x = -10 \quad x = 2$



$x < -10$ or $x > 2$

b) $18 + 3x < 23 + x$

$18 + 2x < 23$

$2x < 5$

$x < 5/2$

$x < -10$ or $2 < x < 5/2$

2/ $(x+5)(x+1) < 32$

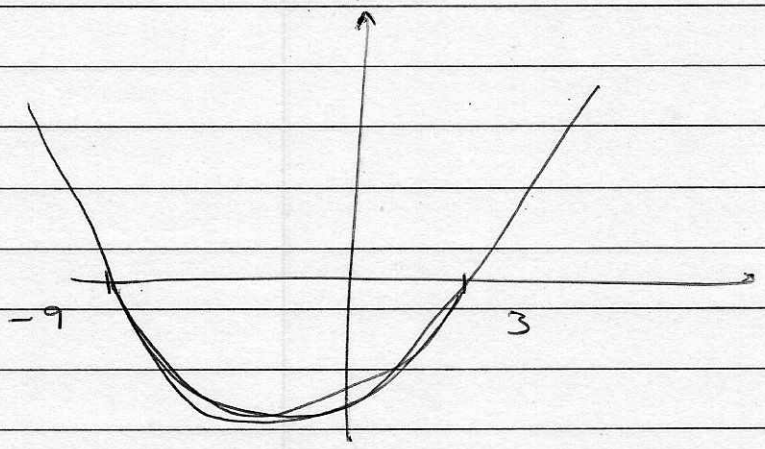
$x^2 + x + 5x + 5 < 32$

$x^2 + 6x + 5 < 32$

$x^2 + 6x - 27 < 0$

$(x+9)(x-3) < 0$

$x = -9 \quad x = 3$



$-9 < x < 3$

3 $x + y = 3$ $\quad y = 3 - x$

$x^2 + 2y^2 - 8x = 6$

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

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

$x^2 + 2(9 - 3x - 3x + x^2) - 8x = 6$

$x^2 + 2(9 - 6x + x^2) - 8x = 6$

~~x^2~~

$x^2 + 18 - 12x + 2x^2 - 8x = 6$

$3x^2 - 20x + 18 = 6$

$3x^2 - 20x + 12 = 0$

$(3x - 2)(x - 6) = 0$

$x = \frac{2}{3}$ $\quad x = 6$

$y = 3 - \frac{2}{3}$ $\quad y = 3 - 6$

$= \frac{7}{3}$ $\quad = -3$

$x = \frac{2}{3}, y = \frac{7}{3}$ or $x = 6, y = -3$

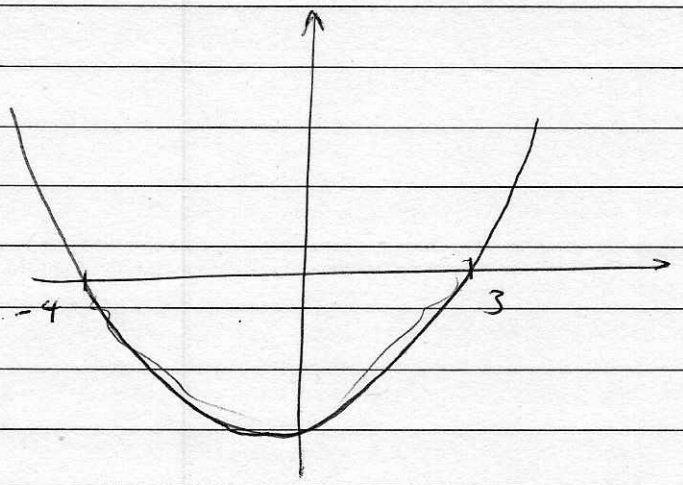
4/ $x(x+1) \leq 12$

$x^2 + x \leq 12$

$x^2 + x - 12 \leq 0$

$(x+4)(x-3) \leq 0$

$x = -4 \qquad x = 3$



$-4 \leq x \leq 3$

5) $x^2 + y^2 - 2x = 19$

$y = 3x - 1$

$x^2 + (3x-1)^2 - 2x = 19$

$x^2 + (3x-1)(3x-1) - 2x = 19$

$x^2 + 9x^2 - 3x - 3x + 1 - 2x = 19$

$10x^2 - 8x + 1 = 19$

$10x^2 - 8x - 18 = 0$

$5x^2 - 4x - 9 = 0$

$(5x - 9)(x + 1) = 0$

$x = \frac{9}{5}$ $\quad x = -1$

$y = 3(\frac{9}{5}) - 1$ $\quad y = 3(-1) - 1$

$= \frac{22}{5}$ $\quad = -4$

$(\frac{9}{5}, \frac{22}{5})$ and $(-1, -4)$

6) $y = x^2 - 2x + 7$

$x + y = 7$

$y = 7 - x$

$7 - x = x^2 - 2x + 7$

$0 = x^2 - x$

$0 = x(x - 1)$

$x = 0 \quad x = 1$

$y = 7 \quad y = 6$

$(0, 7)$ and $(1, 6)$

7/ $x + 2y = 3$

$x^2 + y^2 - 2xy = 6$

$x = (3 - 2y)$

$(3-2y)^2 + y^2 - 2y(3-2y) = 6$

$(3-2y)(3-2y) + y^2 - 6y + 4y^2 = 6$

$9 - 6y - 6y + 4y^2 + y^2 - 6y + 4y^2 = 6$

$9y^2 - 18y + 9 = 6$

$9y^2 - 18y + 3 = 0$

$3y^2 - 6y + 1 = 0$

$a = 3 \quad b = -6 \quad c = 1$

$$y = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(3)(1)}}{2(3)}$$

$y = \frac{3+\sqrt{6}}{3}$ $\quad$ $y = \frac{3-\sqrt{6}}{3}$

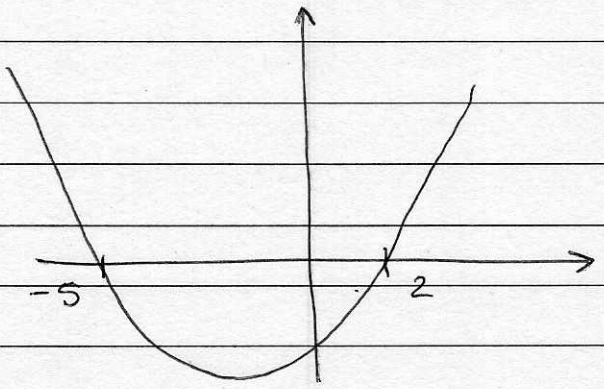
$x = \frac{3-2\sqrt{6}}{3}$ $\quad$ $x = \frac{3+2\sqrt{6}}{3}$

OR $\quad y = 1.82 \quad x = -0.633 \quad$ $y = 0.184 \quad x = 2.63 \quad$ (3 sf)

8) a) $x^2 + 3x - 10 < 0$

$(x + 5)(x - 2) < 0$

$x = -5 \quad x = 2$



$-5 < x < 2$

b) $9 + 3x \leq 12 + x$

$9 + 2x \leq 12$

$2x \leq 3$

$x \leq 3/2$

For both:

$-5 < x \leq 3/2$