12.1 - G11

§5.3

Solve. Graphical support, too.

Just set the equal & solve

Give x- and y-values as ordered pairs, in a solution set.

① $y = -x^2$

$y = -2x$

$y = y$

$-x^2 = -2x$

$-x^2 + 2x = 0$

$x^2 - 2x = 0$

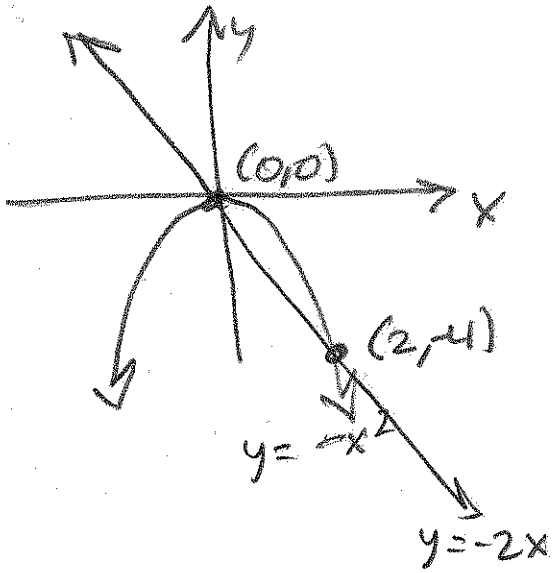
$x(x-2) = 0$

$x = 0$ OR $x = 2$

$-(0)^2 = 0 \rightsquigarrow (0,0)$

$-(2)^2 = -4 \rightsquigarrow (2,-4)$

$(x,y) \in \{(0,0), (2,-4)\}$



② $x + y = 10$

$xy = 21$

$10 - x = \frac{21}{x}$

$\frac{10x - x^2}{x} = \frac{21}{x}$

$10x - x^2 = 21$

$y = 10 - x$

$y = \frac{21}{x}$

$-x^2 + 10x - 21 = 0$

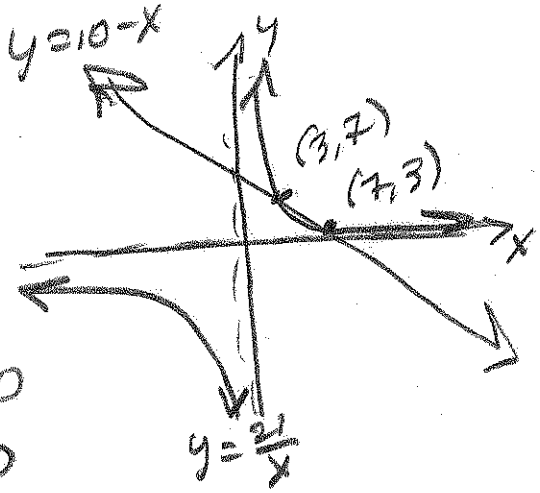
$x^2 - 10x + 21 = 0$

$(x-7)(x-3) = 0$

$x = 7, 3$

$y = 10 - 7 = 3 \rightsquigarrow (7,3)$

$y = 10 - 3 = 7 \rightsquigarrow (3,7)$



$(x,y) \in \{(3,7), (7,3)\}$

121-GH

8.5.3

(3) $y = x^2$

$x = y^2 \Longrightarrow y^2 = x$

$y = \pm\sqrt{x}$ NOT FUNC, BUT I can graph the two funcs.

(i) $y = \sqrt{x}$

$y = x^2$

$\sqrt{x} = x^2$

$x = x^4$

$x^4 - x = 0$

$x(x^3 - 1) = 0$

$x(x-1)(x^2+x+1)$ ← NO real roots, even

$x = 0$

$x = 1$

$y = \sqrt{0} = 0 \rightsquigarrow (0,0)$

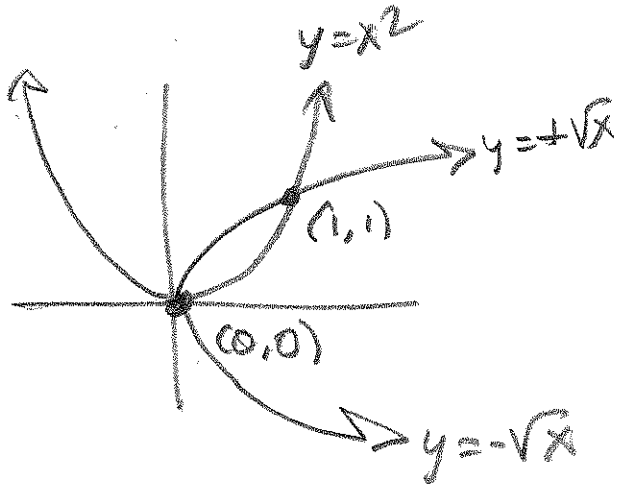
$y = \sqrt{1} = 1 \rightsquigarrow (1,1)$

(ii) $y = -\sqrt{x}$

$y = x^2$

$x^2 = -\sqrt{x}$

only @ $x = 0$!



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

MEMORIZE FOR FUTURE IN CALC.!

121 – G11 §5.3

(4) $x^2+y^2=25 \Rightarrow y=\pm\sqrt{25-x^2}$

$2x-3y=-6 \Rightarrow -3y=-2x-6$

$3y=2x+6$

$y=\frac{2}{3}x+2$

(i) $y=y$

$\sqrt{25-x^2}=\frac{2}{3}x+2$

$25-x^2=\left(\frac{2}{3}x\right)^2+2\left(\frac{2}{3}x\right)(2)+2^2$

$25-x^2=\frac{4}{9}x^2+\frac{8}{3}x+4$

$225-9x^2=4x^2+24x+36$

$-13x^2-24x+189=0$

$13x^2+24x-189=0$

$(13)(-189)=2457$

$24=30-6$ $\quad (30)(6)=180$

$=50-26$ $\quad (50)(26)=1300$

$=60-34$ $\quad (60)(34)=2040$

$=63-39$ $\quad (63)(39)=2457$

$13x^2+63x-39x-189=0$

$x(13x+63)-3(13x+63)=0$

$(x-3)(13x+63)=0$

$x=3,-\frac{63}{13}$

$-\sqrt{25-x^2}=\frac{2}{3}x+2$

$\sqrt{25-x^2}=-\left(\frac{2}{3}x+2\right)$

$25-x^2=\left(-\left(\frac{2}{3}x+2\right)\right)^2$

$=\left(\frac{2}{3}x+2\right)^2$, same.

So, $x=3$: $y=\frac{2}{3}(3)+2=4$

$\rightsquigarrow (3,4)$

$x=-\frac{63}{13}$: $y=\frac{2}{3}\left(-\frac{63}{13}\right)+2$

$=-\frac{2(21)}{13}+\frac{26}{13}=\frac{-42+26}{13}$

$=\frac{-16}{13} \rightsquigarrow \left(-\frac{63}{13},-\frac{16}{13}\right)$

$\therefore (x,y)\in\left\{(3,4),\left(-\frac{63}{13},-\frac{16}{13}\right)\right\}$

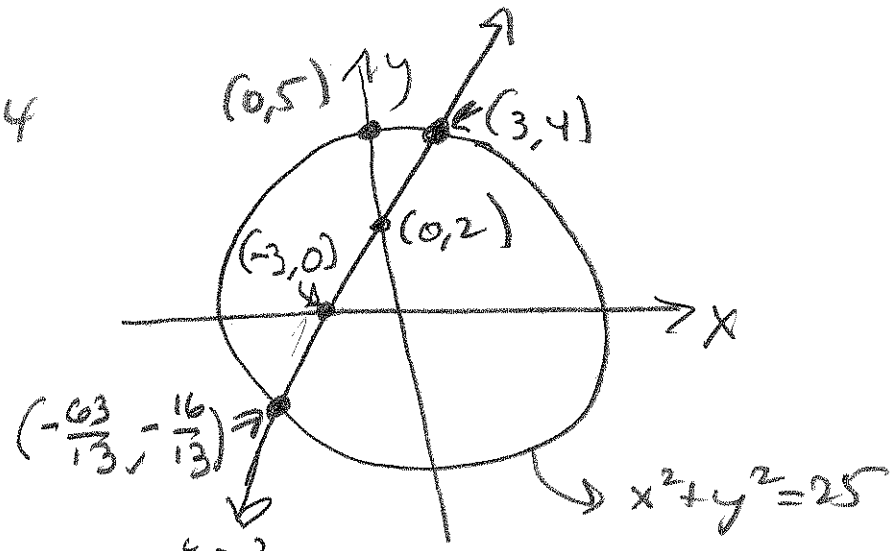
121 §5.3

Graph Pg 414 #4

$x^2 + y^2 = 25$

$(h,k) = (0,0)$

$r = 5$



$y = \frac{2}{3}x + 2$

OR

$2x - 3y = -6$

$\frac{2}{3}x + 2 = 0$

$2x + 6 = 0$

$2x = -6$

$x = -3$