5/3 FRI

9.3 (part 2) The Parabola (continued ...)

$(x-h)^2 = 4p(y-k)$

$(y-k)^2 = 4p(x-h)$

v: (h,k)

* dist from v → f: p
* dist from v → d: p

ex 1) $(x-2)^2 = 4(y+1)$. Graph & ID v, f, d.

$(x-h)^2 = 4p(y-k)$

$4p = 4 \Rightarrow p = 1$

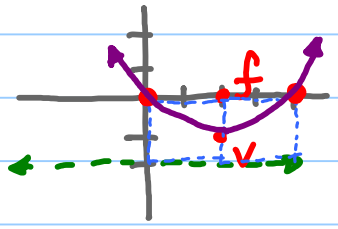
"2 boxes"

→ length: $2(1) = 2$

v: $(2,-1)$

f: $(2,0)$

d: $y = -2$



ex 2) $(y+3)^2 = 12(x+1)$

$(y-k)^2 = 4p(x-h)$

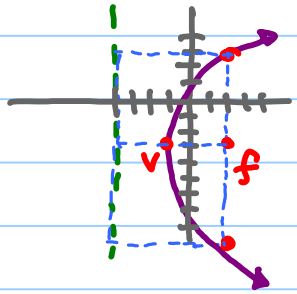
$4p = 12 \Rightarrow p = 3$

v: $(-1,-3)$

f: $(-1+3, -3) = (2,-3)$

d: $x = -1-3$ ($-p$)

$x = -4$



ex 3) $\left[-\frac{1}{8}(y+1)^2 = x\right] \cdot -8$

$(y-k)^2$

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

$(y-k)^2 = 4(x-h)$

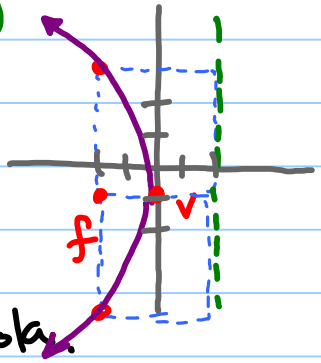
$4p = -8 \Rightarrow p = -2$

v: $(0,-1)$

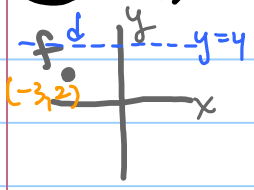
f: $(0-2,-1) = (-2,-1)$

d: $x = 0 - -2$

$x = 2$



ex 4) focus: $(-3,2)$, directrix $y = 4$. Find eqn of parabola.



$(x-h)^2 = 4p(y-k)$

p? dist d → f: 2 units

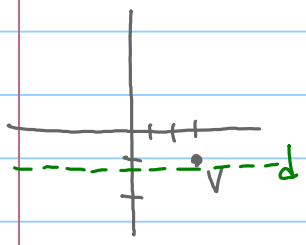
length of box ... p = 1 ... p = -1

v: halfway of d & focus: $(-3,3)$

$\therefore (x+3)^2 = -4(y-3)$

ex 5) vertex $(3,-1)$, directrix: $y = -\frac{5}{4}$

h k



$(x-h)^2 = 4p(y-k)$

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

-4

$(x-3)^2 = 4\left(\frac{1}{4}\right)(y+1)$

$\therefore (x-3)^2 = (y+1)$

dist v → d: $\frac{1}{4}$

ex 6) $y^2+2y+4x-7=0$ * complete the square

$y^2+2y+1-1+4x-7=0$

PST $\left(\frac{2}{2}\right)^2$

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

$(y+1)^2=-4x+8$ * GCF?

$(y+1)^2=-4(x-2)$

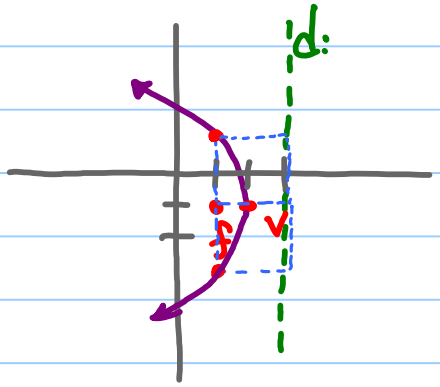
$(y-k)^2=4p(x-h)$ $p=-1$

v: $(2,-1)$

f: $(2-1,-1)$

$\rightarrow(1,-1)$

d: $x=2--1=3$



ex 7) $x^2-6x+10y=1$. Find the domain & range. Is it a function?

$x^2-6x+9+10y=1+9$

$-10y \quad -10y$

$(x-3)^2=-10y+10$

$(x-3)^2=-10(y-1)$

$(x-h)^2=4p(y-k)$ $p=-\frac{5}{2}$

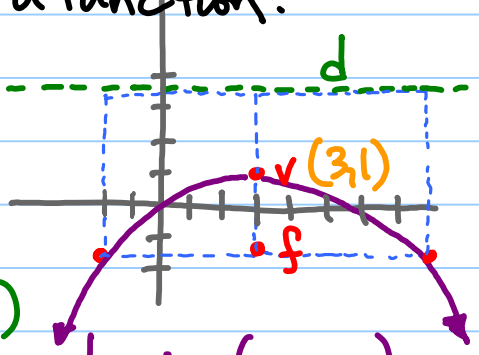
v: $(3,1)$

f: $(3,1-\frac{5}{2})$

$(3,-\frac{3}{2})$

d: $y=1-\frac{5}{2}$

$y=\frac{7}{2}$



domain: $(-\infty,\infty)$

range: ~~$y\leq 1$~~ $(-\infty,1]$

HW
p 909
#32-54 (even)