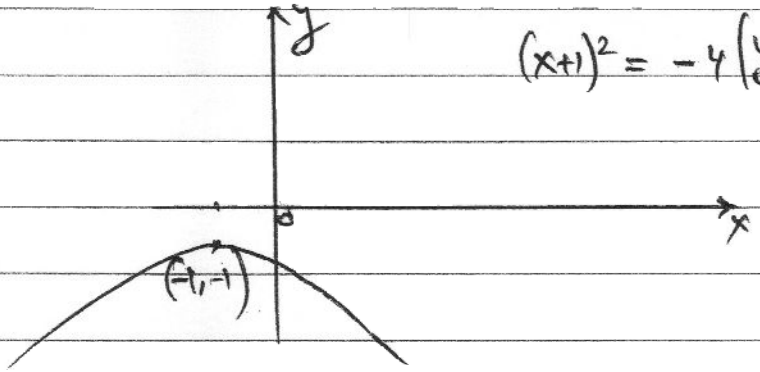
Section 10.2 — Dr. ABDALLE

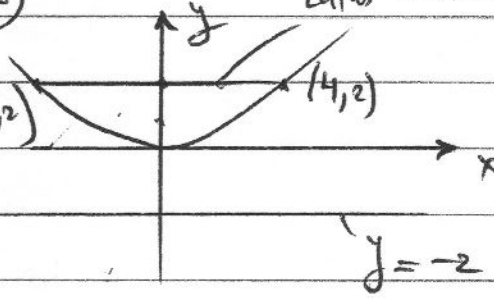
#15) 

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

#20) Focus $(0,2)$, Vertex $(0,0)$

$x^2 = 4py$, $p = 2$

$x^2 = 8y$

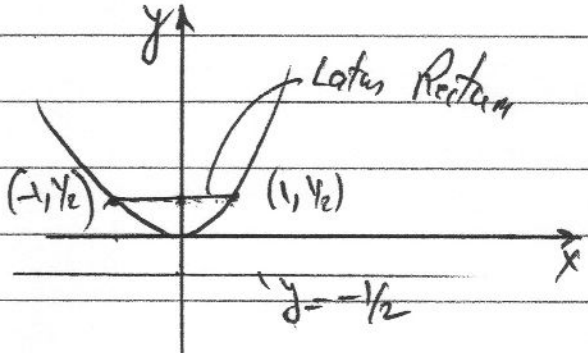


#25) Directrix line $y = -1/2$, Vertex $(0,0)$

$x^2 = 4py$; $p = 1/2$

$x^2 = 2y$

Directrix $y = -1/2$

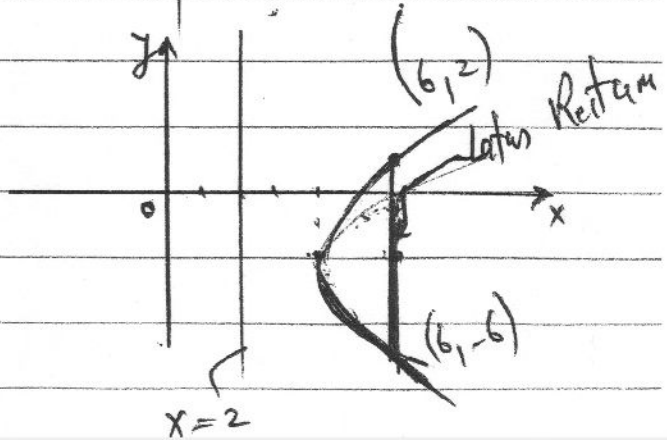


#30) Vertex $(4,-2)$, focus $(6,-2)$

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

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

Directrix , $x = 2$



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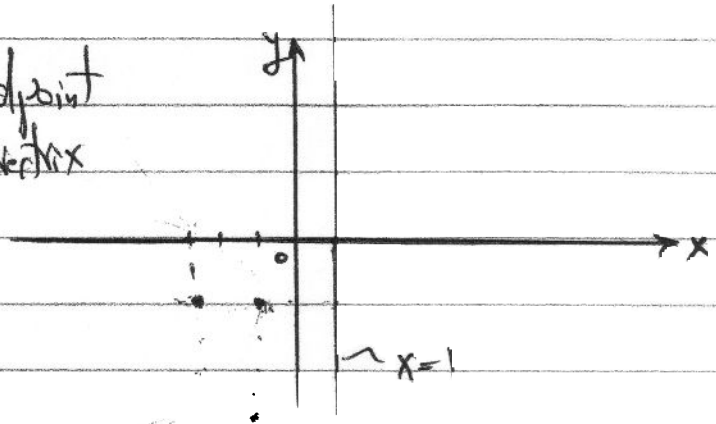
35) Focus $(-3,-2)$, Directrix : $x=1$

→ Vertex is the midpoint between focus & directrix

→ Center $(-1,-2)$



∴ Eq of parabola:

$$(y+2)^2 = 4p(x+1) \quad , p=2$$
$$(y+2)^2 = 8(x+1)$$

Remember that p = Distance from Vertex to Focus
p = Distance from Vertex to Directrix

Let Let $Y = y+2$, $X = x+1$

We have $(-1,-2)$

$$Y^2 = -8X \quad , p=2$$

@ $X=2 \Rightarrow Y^2 = 16 \rightarrow Y = \pm 4$

& Latus Rectum $(-2, \pm 4)$

From original xy system, the Latus Rectum points are $(-3,-6)$, $(-3,2)$

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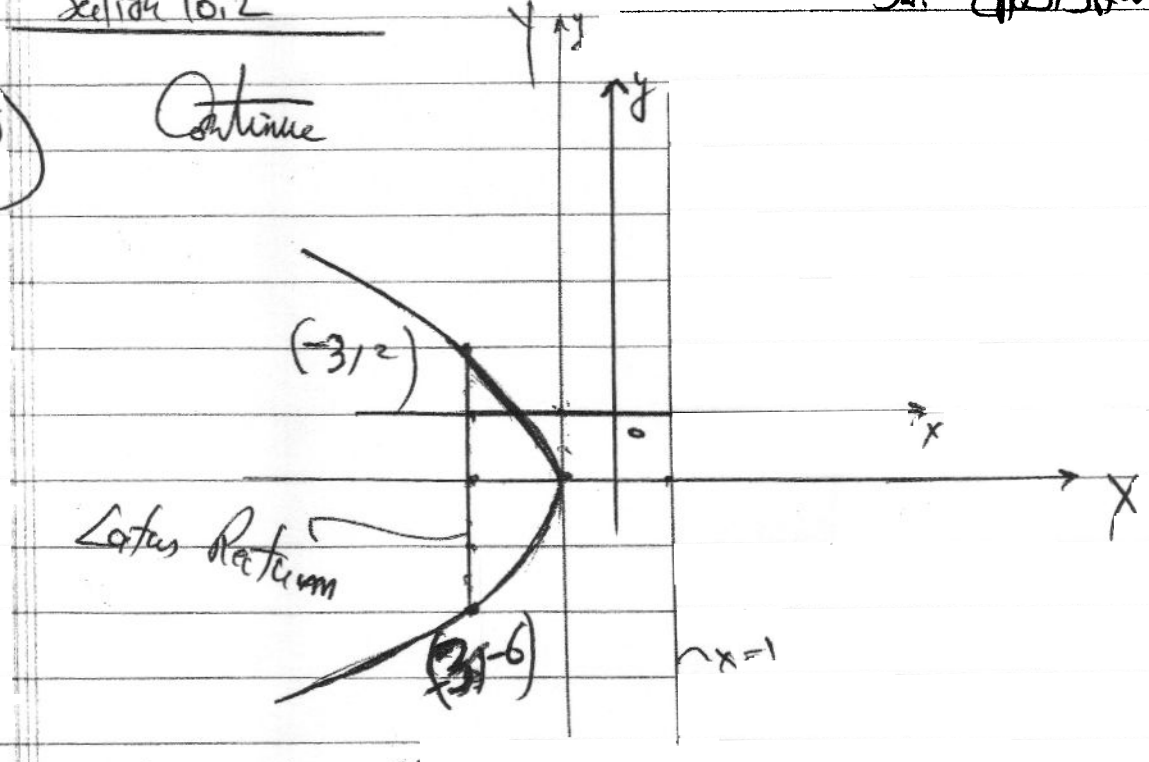
#35) Continue

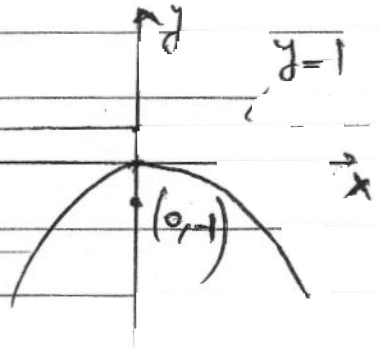


#40) $x^2 = -4y = 4py \implies p = 1$

Parabola: Vertex $(0,0)$

Focus $(0,-1)$

Directrix, $y = 1$



#45) $(y+3)^2 = 8(x-2)$

Parabola with Vertex $(2, -3)$

Let $Y = y+3$, $X = x-2$

From $(2, -3)$ we have:

$Y^2 = 8X = 4pX \implies 4p = 8 \implies p = 2$

Vertex $(0,0)$

Focus: $(2,0)$

Directrix: $X = -2$

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Exercise # 45)

From the original xy system we have

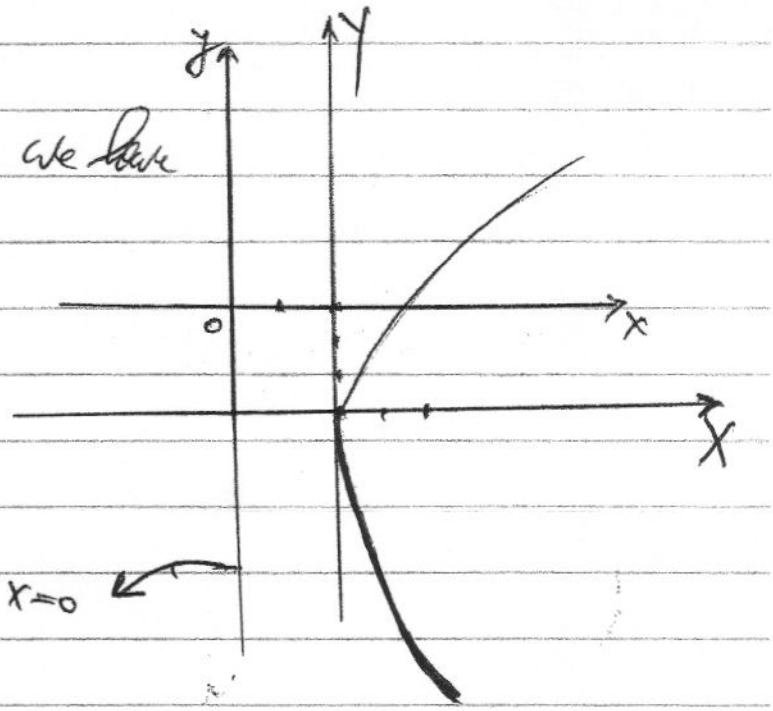
$(y+3)^2 = 8(x-2)$

Parabola:

Vertex $(2,-3)$

Focus $(4,-3)$

Directrix: $x=0$



#50)

$Y^2 - 2Y = 8X - 1$

$Y^2 - 2Y + 1 - 1 = 8X - 1$

$Y^2 - 2Y + 1 = 8X$

$(Y-1)^2 = 8X$

Parabola:

Vertex $(0,1)$; Let $Y = y+1$, $X = x$

From $(0,1)$ we have

$Y^2 = 8X = 4pX$

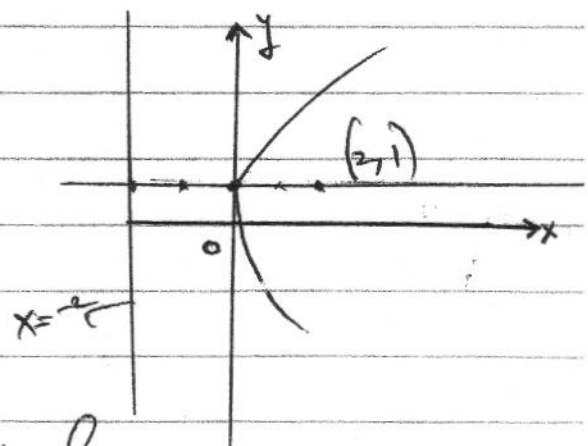
Parabola:

Vertex $(0,0)$

$4p = 8 \Rightarrow p = 2$

$\Rightarrow$ Focus $(2,0)$

Directrix: $X = -2$



From the original xy system, we have:

Parabola: Vertex $(0,1)$, Focus $(2,1)$; Directrix: $X = -2$

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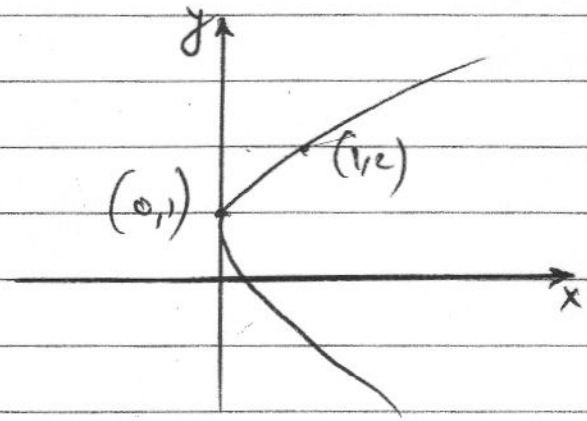
#55)

Parabola:

Vertex $(0,1)$



$$(y-1)^2 = 4px$$

$(1,2) \in$ Parabola

$\Rightarrow x=1,\ y=2$

$$(2-1)^2 = 4p \cdot 1$$

$$1 = 4p \Rightarrow p = \tfrac{1}{4}$$

$\therefore$ Equation of Parabola is $(y-1)^2 = x$

#60)

Parabola:

Vertex $(1,-1)$

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

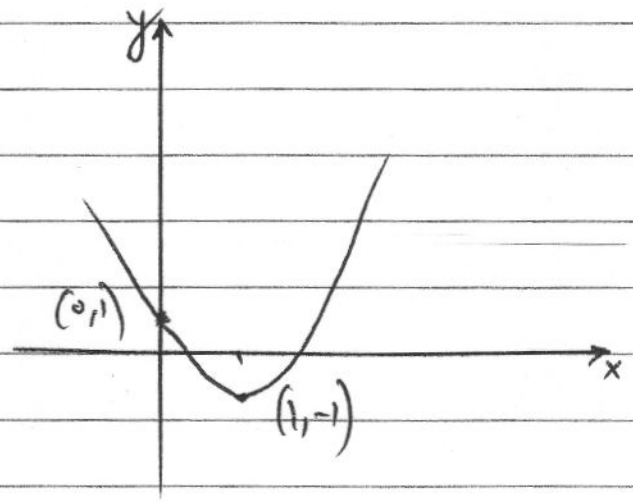
$(0,1) \in$ Parabola

$\Rightarrow$ when $x=0,\ y=1$

$$(-1)^2 = 4p(1+1) = 8p$$

$$1 = 8p$$

$$\Rightarrow p = \tfrac{1}{8}$$



$\therefore$ Eq of parabola is: $(x-1)^2 = \frac{1}{2}(y+1)$