

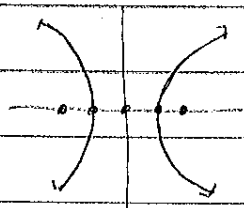
HONORS PRE-CALCULUS

Problem-set 10.3: # 5-21, 29-37, 57-71 odd

⑤ center:  $(0,0)$   $a=3$   $b=5$   
 transverse axis is vertical [B]

⑦ center:  $(1,0)$  [A]  
 transverse axis is horizontal  $a=4$   $b=2$

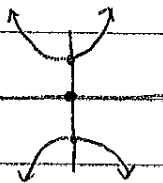
⑨  $\frac{x^2}{1} - \frac{y^2}{1} = 1$  center:  $(0,0)$   $a=1$   $b=1$   
 $c=\sqrt{2}$



vertices:  $(1,0)$   $(-1,0)$   
 foci:  $(\sqrt{2},0)$   $(-\sqrt{2},0)$

asymptotes:  $y = k \pm \frac{b}{a}(x-h)$   
 $y = 0 \pm \frac{1}{1}(x-0)$   
 $y = \pm x$

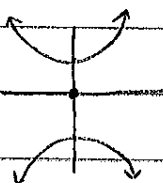
⑪  $\frac{y^2}{25} - \frac{x^2}{81} = 1$  center:  $(0,0)$   
 $a=5$   $b=9$   $c=\sqrt{106}$



vertices:  $(0,5)$   $(0,-5)$   
 foci:  $(0,\sqrt{106})$   $(0,-\sqrt{106})$

asymptotes:  $y = k \pm \frac{a}{b}(x-h)$   
 $y = 0 \pm \frac{5}{9}(x-0)$   
 $y = \pm \frac{5}{9}x$

⑬  $\frac{y^2}{1} - \frac{x^2}{4} = 1$  center:  $(0,0)$



$a=1$   $b=2$  vertices:  $(0,1)$   $(0,-1)$   
 $c^2=1+4$   $c=\sqrt{5}$  foci:  $(0,\sqrt{5})$   $(0,-\sqrt{5})$

$y = k \pm \frac{a}{b}(x-h)$   
 $y = 0 \pm \frac{1}{2}(x-0)$   
 $y = \pm \frac{1}{2}x$

⑮  $\frac{(x-1)^2}{4} - \frac{(y+2)^2}{1} = 1$  center:  $(1,-2)$



$a=2$   $b=1$  vertices:  $(3,-2)$   $(-1,-2)$   
 $c=\sqrt{5}$  foci:  $(1+\sqrt{5},-2)$   $(1-\sqrt{5},-2)$

$y = k \pm \frac{b}{a}(x-h)$   $y = -2 \pm \frac{1}{2}(x-1)$

$$(17) \frac{(y+6)^2}{1/9} - \frac{(x-2)^2}{1/4} = 1$$

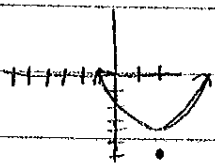
$$a = 1/3 \quad b = 1/2$$

$$c = \sqrt{13}/6$$

$$y = k \pm \frac{a}{b}(x-h)$$

$$y = -6 \pm \frac{1/3}{1/2}(x-2)$$

$$y = -6 \pm \frac{2}{3}(x-2)$$



$$\text{center: } (2, -6)$$

$$\text{vertices: } (2, -6 + 1/3) \Rightarrow (2, -19/3)$$

$$(2, -6 - 1/3) \Rightarrow (2, -19/3)$$

$$\text{foci: } (2, -6 + \sqrt{13}/6) \quad (2, -6 - \sqrt{13}/6)$$

$$(19) 9x^2 - y^2 - 36x - 6y + 18 = 0$$

$$(9x^2 - 36x) + (-y^2 - 6y) = -18$$

$$9(x^2 - 4x + 4) - 1(y^2 + 6y + 9) = -18 + 36 - 9$$

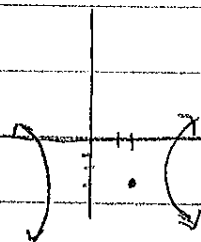
$$\frac{9(x-2)^2}{9} - \frac{1(y+3)^2}{9} = \frac{9}{9}$$

$$\frac{(x-2)^2}{1} - \frac{(y+3)^2}{9} = 1$$

$$\text{center: } (2, -3)$$

$$a = 1 \quad b = 3$$

$$c = \sqrt{10}$$



$$\text{vertices: } (3, -3) \quad (1, -3)$$

$$\text{foci: } (2 + \sqrt{10}, -3) \quad (2 - \sqrt{10}, -3)$$

$$y = k \pm \frac{b}{a}(x-h)$$

$$y = -3 \pm 3(x-2)$$

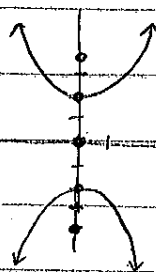
$$(21) x^2 - 9y^2 + 2x - 54y - 80 = 0$$

$$(x^2 + 2x + 1) - 9(y^2 + 6y + 9) = 80 + 1 - 81$$

$$(x+1)^2 - 9(y+3)^2 = 0$$

Not a hyperbola

$$(22) \text{ center: } (0, 0)$$



$$a = 2$$

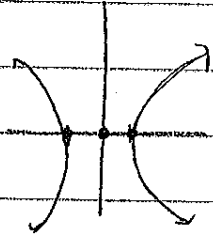
$$c = 4$$

$$\frac{y^2}{4} - \frac{x^2}{12} = 1$$

$$c^2 = a^2 + b^2 \quad 16 = 4 + b^2$$

$$b = \sqrt{12}$$

(31) center: (0,0)



$$y = \pm 5x$$

$$y = k \pm \frac{b}{a}(x-h)$$

$$a = 1$$

$$y = \pm \frac{b}{a}x$$

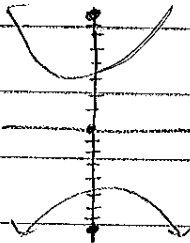
$$\frac{b}{a} = 5$$

$$\frac{b}{1} = 5 \quad b = 5$$

$$b = 5$$

$$\boxed{\frac{x^2}{1} - \frac{y^2}{25} = 1}$$

(33) center: (0,0)



$$y = \pm 4x$$

$$y = k \pm \frac{a}{b}(x-h)$$

$$\frac{a}{b} = 4$$

$$c = 8$$

$$a = 4b$$

$$a^2 = 16b^2 \quad a^2 = 16\left(\frac{64}{17}\right)$$

$$16b^2 + b^2 = 64$$

$$a^2 = \frac{1024}{17}$$

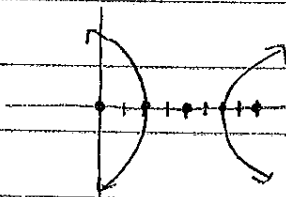
$$17b^2 = 64$$

$$b^2 = \frac{64}{17}$$

$$b = \frac{8}{\sqrt{17}}$$

$$\boxed{\frac{y^2}{1024/17} - \frac{x^2}{64/17} = 1}$$

(35)



center: (4,0)

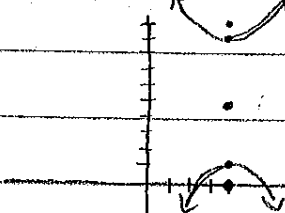
$$a = 2$$

$$\boxed{\frac{(x-4)^2}{4} - \frac{y^2}{12} = 1}$$

$$c = 4$$

$$16 = 4 + b^2 \quad b = \sqrt{12}$$

(37)



center: (4,5)

$$a = 4$$

$$\boxed{\frac{(y-5)^2}{16} - \frac{(x-4)^2}{9} = 1}$$

$$c = 5$$

$$25 = 16 + b^2 \quad b = 3$$

$$(57) \quad (9x^2 - 18x) + (4y^2 + 16y) = 119$$

$$9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 119 + 9 + 16$$

$$9(x-1)^2 + 4(y+2)^2 = 144 \quad \boxed{\text{ellipse}}$$

$$(59) \quad 4x^2 - y^2 - 4x - 3 = 0$$

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

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

$$4\left(x - \frac{1}{2}\right)^2 - y^2 = 4 \quad \boxed{\text{hyperbola}}$$

$$(61) \quad y^2 - 4x^2 + 4x - 2y - 4 = 0$$

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

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

$$-4\left(x - \frac{1}{2}\right)^2 + (y - 1)^2 = 4 \quad \boxed{\text{hyperbola}}$$

$$(63) \quad \boxed{\text{parabola}}$$

$$(65) \quad 4x^2 + 3y^2 + 8x - 24y + 51 = 0 \quad \boxed{\text{ellipse}}$$

$$(67) \quad \boxed{\text{parabola}}$$

$$(69) \quad \boxed{\text{parabola}}$$

$$(71) \quad \boxed{\text{circle}}$$