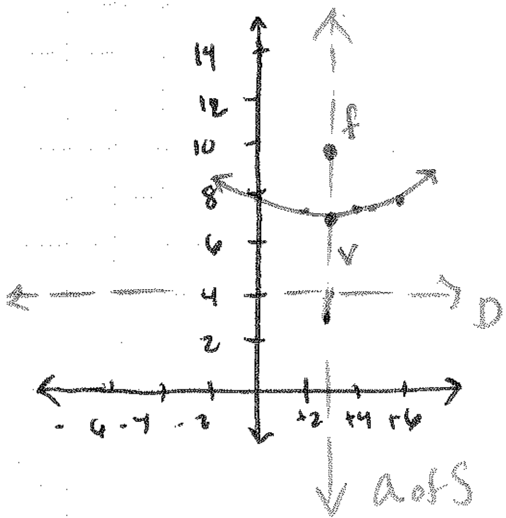
428 1, 3, 7, 9 13-18

1. $(x-3)^2 = 12(y-7)$ ↑ $h=3$ $k=7$ $p=3$

vertex $(3,7)$ focus $(3,10)$ dir. $y=4$ a of S = $x=3$

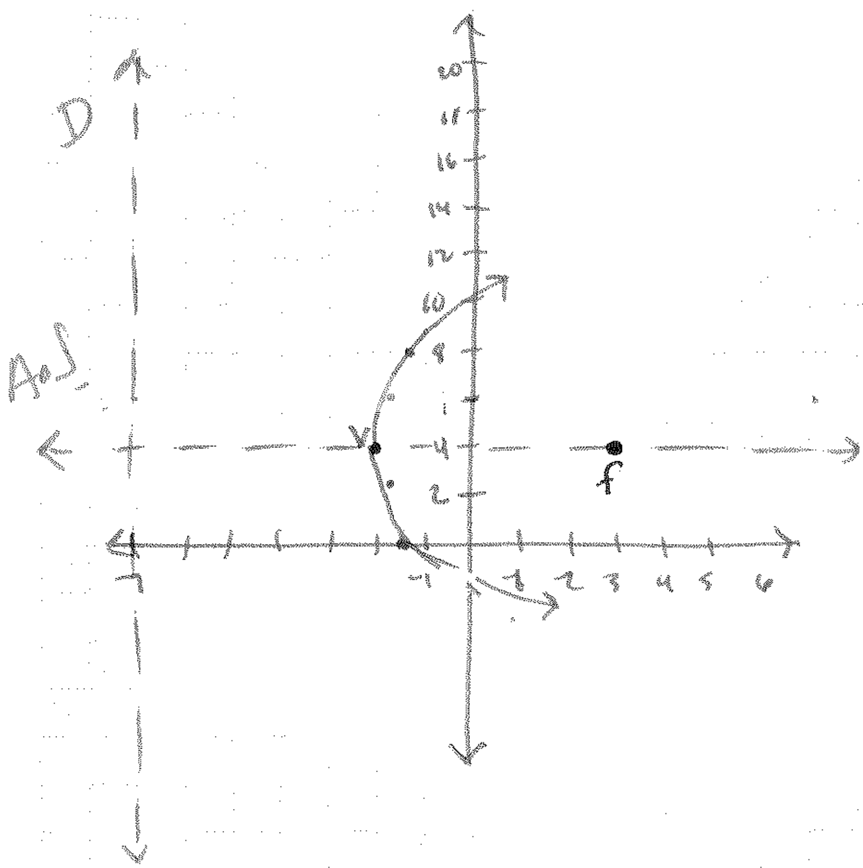


x	y
0	7.75
2	7.08
4	7.08
6	7.75

$$\frac{(x-3)^2}{12} + 7 = y$$

3. $(y-4)^2 = 20(x+2)$ → $h=2$ $k=4$ $p=5$

vertex $(-2,4)$ focus $(3,4)$ dir. $x=-7$ a of S $y=4$



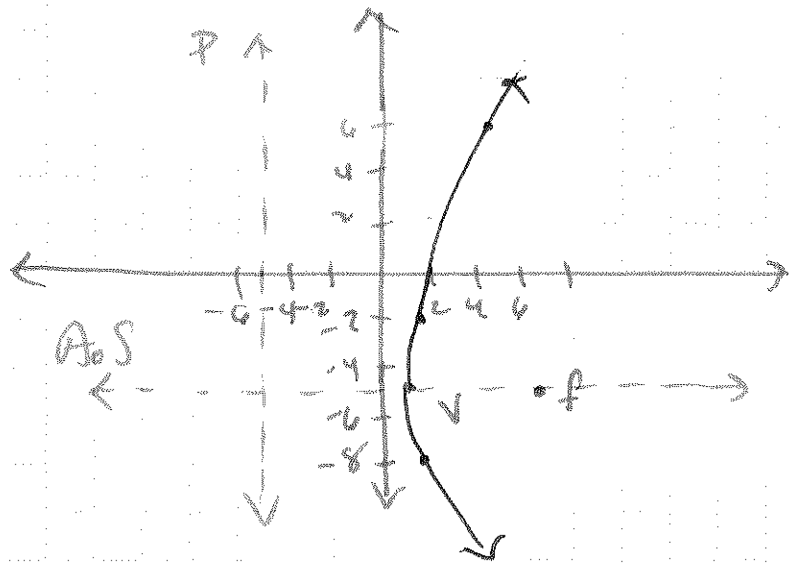
y	x
0	-1.2
2	-1.8
6	-1.8
8	-1.2

$$(y-4)^2 = 20x + 40$$

$$\frac{(y-4)^2}{20} - 2 = x$$

7. $(y+5)^2 = 24(x-1)$ $h=1$ $k=-5$ $p=6$ $\rightarrow$

vertex = $(1,-5)$ focus $(7,-5)$ directrix $x=-5$ AoS $y=-5$

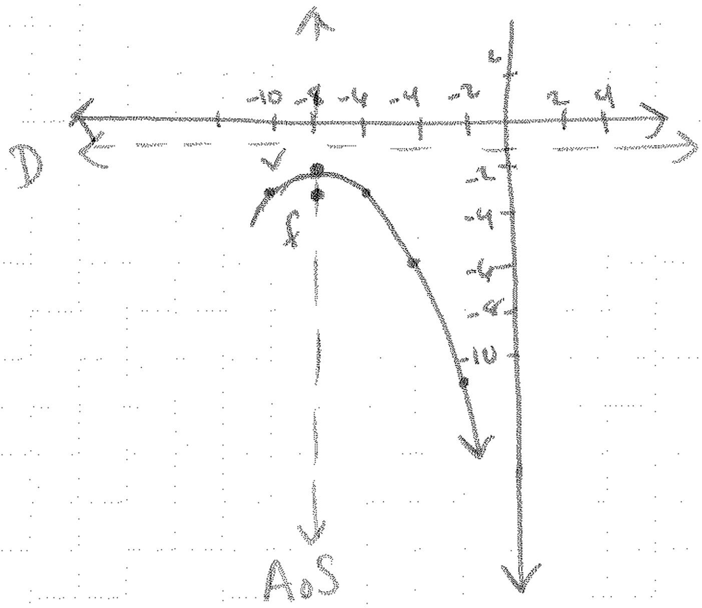


$\frac{(y+5)^2}{24}+1 = x$

Y	X
-2	-0.625
-8	-0.625
6	4.04

9. $-4(y+2) = (x+8)^2$ $h=-8$ $k=-2$ $p=-1$ $\downarrow$

vertex $(-8,-2)$ focus $(-8,-3)$ dir. $y=-1$ AoS $x=-8$



$\frac{(x+8)^2}{-4}-2 = y$

X	Y
-10	-3
-6	-3
-4	-6
-2	-11

13. a. $y^2 - 180x + 10y + 565 = 0$

$y^2 + 10y + 25 = 180x - 565 + 25$

$(y+5)^2 = 180x - 540$

$(y+5)^2 = 180(x-3)$

b rope → vertex to focus = p

$p = \frac{180}{4} = \underline{45 \text{ feet}}$

14. a. $y = -16x^2 + 64x + 6$

$y = -16(x^2 - 4x + 4 - 4) + 6$

$= -16((x-2)^2 - 4) + 6$

$= -16(x-2)^2 + 64 + 6 \qquad = -16(x-2)^2 + 70$

b. max height → y value of vertex (x, y)

$-16(x-2)^2 + 70 = y$

$-16(x-2)^2 \quad y - 70$

$(x-2)^2 = -\frac{1}{16}(y-70)$ K = 70 $\boxed{\text{70' feet high}}$

15. $x^2 - 17 = 8y + 39$ h = 0, k = -7 p = 2

$x^2 = 8y + 56$

$(x+0)^2 = 8(y+7)$ V: (0, -7) F: (0, -5) D: y = -9

A: x = 0

16. $y^2 + 33 = -8x - 23$ h = 0 k = -7 p = -2

$y^2 = -8x - 56$

$y^2 = -8(x+7)$ V: (0, -7) F: (-2, -7) D: x = 2 A: y = -7

17. $3x^2 + 72 = -72y$ h = 0 k = -1 p = -6

$x^2 + 24 = -24y$

$x^2 = -24y - 24$ V: (0, -1) F: (0, -7) D: y = 5 A: x = 0

$x^2 = -24(y+1)$

18. $-12y + 10 = x^2 - 4x + 14$

$-12y - 4 = x^2 - 4x + 4 \quad -4$

$-12y = (x-2)^2$

$h = 2 \quad k = 0 \quad p = -3$

V: $(2, 0)$ F: $(2, -3)$ D: $y = 3$ A: $x = 2$