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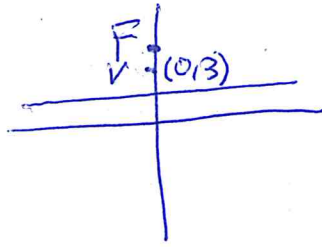
Use Scrap
Graph Paper

Date _____
Algebra II

Definition of a Parabola Regents Practice

1. Which equation represents a parabola with a focus of (0, 4) and a directrix of $y = 2$?

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



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

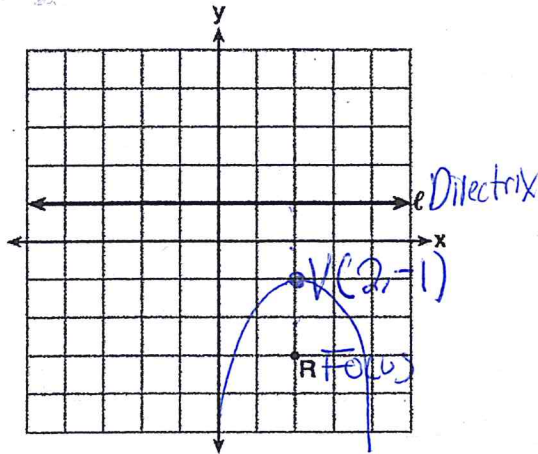
$$\frac{(x-0)^2}{4(1)} = y-3$$

$$p = 1$$

$$h = 0$$

$$k = 3$$

2. Which equation represents the set of points equidistant from line l and point R shown on the graph below?



$$\frac{x^2}{4} = y - 3$$

$$\frac{x^2}{4} + 3 = y$$

$$p = -2$$

$$h = 2$$

$$k = -1$$

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

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

$$\frac{(x-2)^2}{-8} = y+1$$

(1) $y = -\frac{1}{8}(x+2)^2 + 1$ (3) $y = -\frac{1}{8}(x-2)^2 + 1$

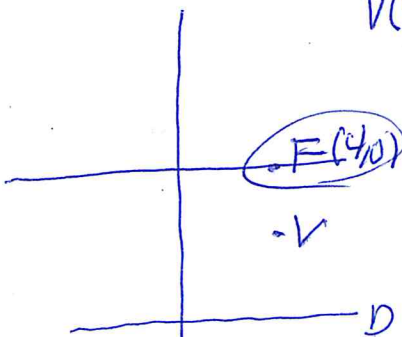
(2) $y = -\frac{1}{8}(x+2)^2 - 1$ (4) $y = -\frac{1}{8}(x-2)^2 - 1$

3. The directrix of the parabola $12(y+3) = (x-4)^2$ has the equation $y = -6$. Find the coordinates of the focus of the parabola.

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

$$V(4, -3)$$

$$\frac{(x-4)^2}{-8} - 1 = y$$



4. Write an equation for the set of points equidistant from $y = 3$ and $(5, 8)$.

directrix focus

$(5, 5.5)$ $p=2.5$
 $v=5$ $t=5.5$ $\frac{(x-v)^2}{4p} = y-t$ $\frac{(x-5)^2}{4(2.5)} = y-5.5$
 $\frac{(x-5)^2}{10} = y-5.5$

5. Which equation represents a parabola with the focus at $(0, -1)$ and the directrix of $y = 1$?

1) $x^2 = -8y$ 2) $x^2 = -4y$ 3) $x^2 = 8y$ 4) $x^2 = 4y$

$p = -1$
 $v = 0$
 $t = 0$

$\frac{(x-v)^2}{4p} = y-t$
 $\frac{(x-0)^2}{4(-1)} = y-0$ ~~$\frac{x^2}{4} = y$~~ $-4y = x^2$

6. A parabola has its focus at $(1, 2)$ and its directrix is $y = -2$. The equation of this parabola could be

1) $y = 8(x+1)^2$ 2) $y = \frac{1}{8}(x+1)^2$ 3) $y = 8(x-1)^2$ 4) $y = \frac{1}{8}(x-1)^2$

$p=2$
 $v=1$
 $t=0$

$\frac{(x-v)^2}{4p} = y-t$ $\frac{(x-1)^2}{4(2)} = y-0$ $\frac{(x-1)^2}{8} = y$

pick an arbitrary x value

7. Write a possible equation of the parabola with the following conditions and sketch it on the accompanying set of axes.

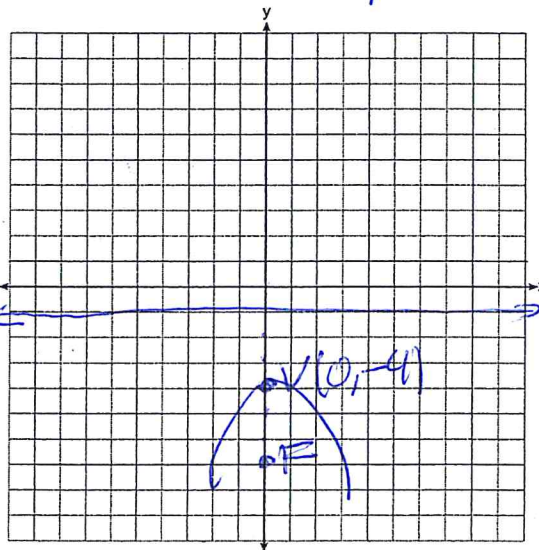
The distance between the focus and the directrix is 6
 The parabola opens downward $p = -$
 The directrix is $y = -1$

$\frac{(x-v)^2}{4p} = y-t$

$\frac{(x-0)^2}{4(-3)} = y+4$

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

$p = -3$
 $v = 0$
 $t = -4$



8. Write the equation of a parabola with a directrix of $y = -4$ and a vertex of $(2, 0)$ in standard form

$\frac{(x-v)^2}{4p} = y-t$

x	$x-2$
x^2	$-2x$
$2x$	-4

$x^2 - 2x - 4$
 $\frac{x^2 - 2x - 4}{16} = y$

$p = 4$
 $v = 2$
 $t = 0$

$\frac{(x-2)^2}{4(4)} = y-0$

$\frac{(x-2)^2}{16} = y$

$\frac{1}{16}x^2 - \frac{1}{4}x + \frac{1}{4} = y$

