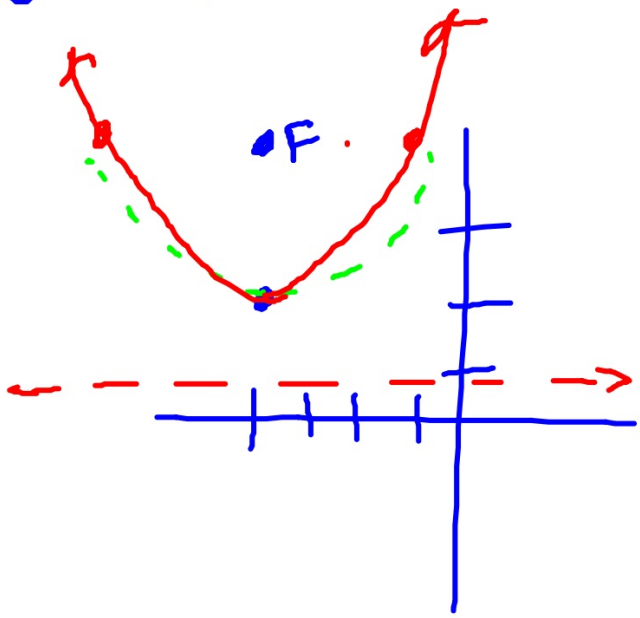
12.) $(x+4)^2 = 6(y-2)$

vertex: $(-4, 2)$

focus: $(-4, 3.5)$

Dir: $y = \frac{1}{2}$



$4p = 6$

$p = \frac{3}{2} = 1.5$

8.2 Parabolas - cont.

ex: Sketch.

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

vertex : $(0, 3)$

focus : $(-1, 3)$

Directrix : $x = 1$

$4p = -4$

$p = -1$

REVIEW

ex: Complete the square.

a) $x^2 - 8x + 13$

$x^2 - 8x + 16 + 13 - 16$ $\left(\frac{b}{2}\right)^2$

$(x-4)^2 - 3$

b) $x^2 + 10x - 1$

$x^2 + 10x + 25 - 1 - 25$

$(x+5)^2 - 26$

ex: Complete the square.

c) $2x^2 - 12x - 7$

$2(x^2 - 6x + 9) - 7 - 18$

$2(x-3)^2 - 25$

d) $-3x^2 + 12x + 5$

$-3(x^2 - 4x + 4) + 5 + 12$

$-3(x-2)^2 + 17$

ex: Rewrite in standard form, then sketch.

a) $y^2 + 2x + 6y + 1 = 0$

$\underbrace{y^2 + 6y + \underline{9}} + 2x + 1 \underline{-9} = 0$

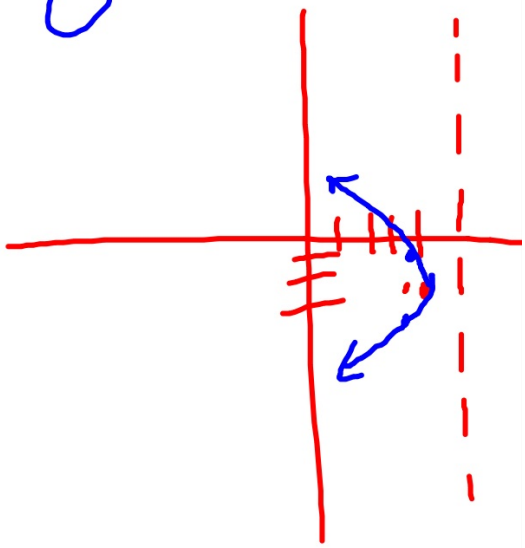
$(y+3)^2 = -2x + 8$

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

V: $(4, -3)$

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

dir: $x = 4\frac{1}{2}$



ex: Rewrite in standard form, then sketch. $(x-h)^2 = 4p(y-k)$

b) $4x^2 + 8x - 5y - 6 = 0$

$4(x^2 + 2x \underline{+1}) - 5y - 6 \underline{-4} = 0$

V: $(-1,-2)$

F: $(-1,-1\frac{11}{16})$

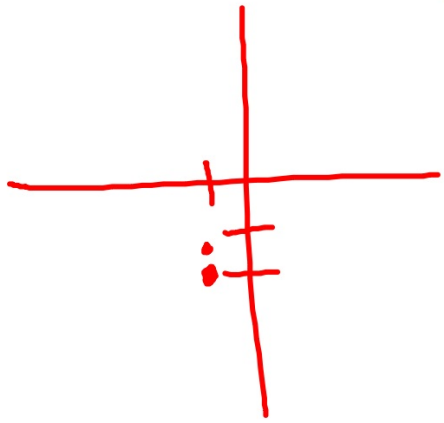
$4(x+1)^2 = 5y + 10$

$(x+1)^2 = \frac{5}{4}(y+2)$

$4p$

$4p = \frac{5}{4}$

$p = \frac{5}{16}$



ex: Rewrite in standard form, then sketch.

c) $y^2 + 12x - 6y - 27 = 0$

$y^2 - 6y \underline{+9} + 12x - 27 \underline{-9} = 0$

$(y-3)^2 = -12x + 36$

$(y-3)^2 = -12(x-3)$

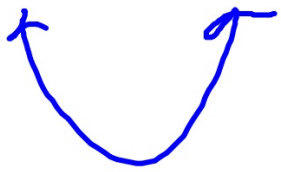
ex: Write an equation in standard form of the parabola with the given characteristics.

a)

vertex: (3, -7)
latus rectum length: 42
opens left

$$(y+7)^2 = -42(x-3)$$

ex: Write an equation in standard form of the parabola with the given characteristics.

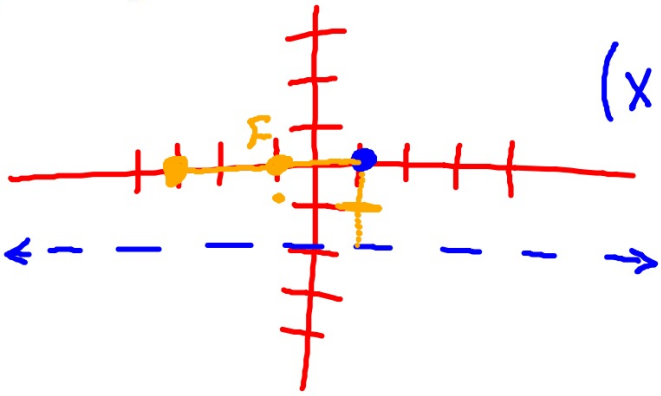


$p=1$

b)

directrix: y=-2

right endpoint of the latus rectum: (1,0)



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

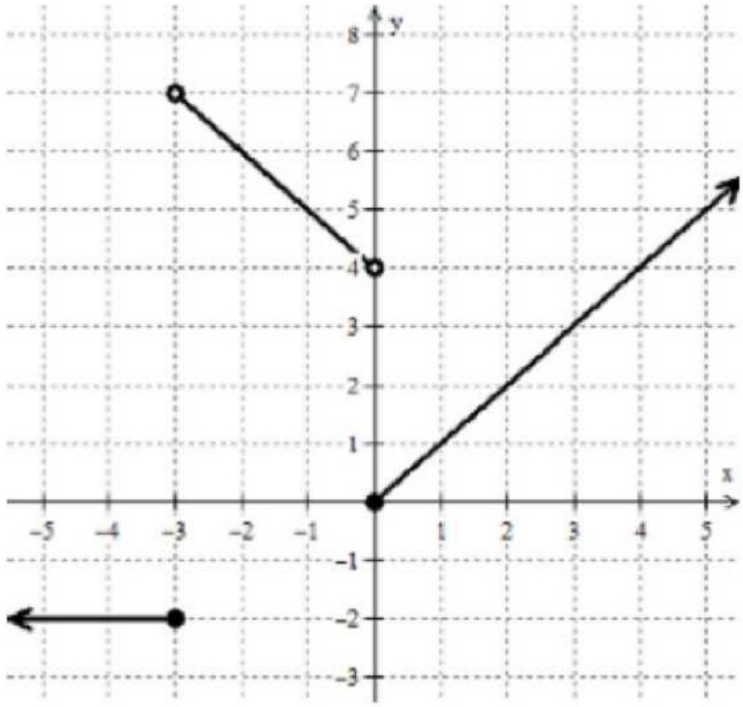
REVIEW

ex: Describe the transformations.

$$y = -\frac{1}{2}\sqrt{\frac{x}{3}+1}+5$$

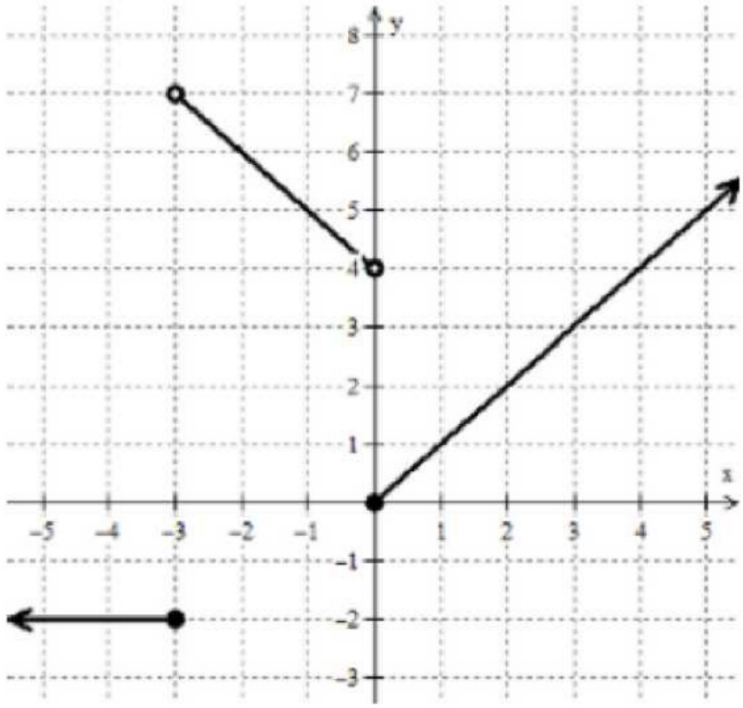
REVIEW

ex: State the domain and range.



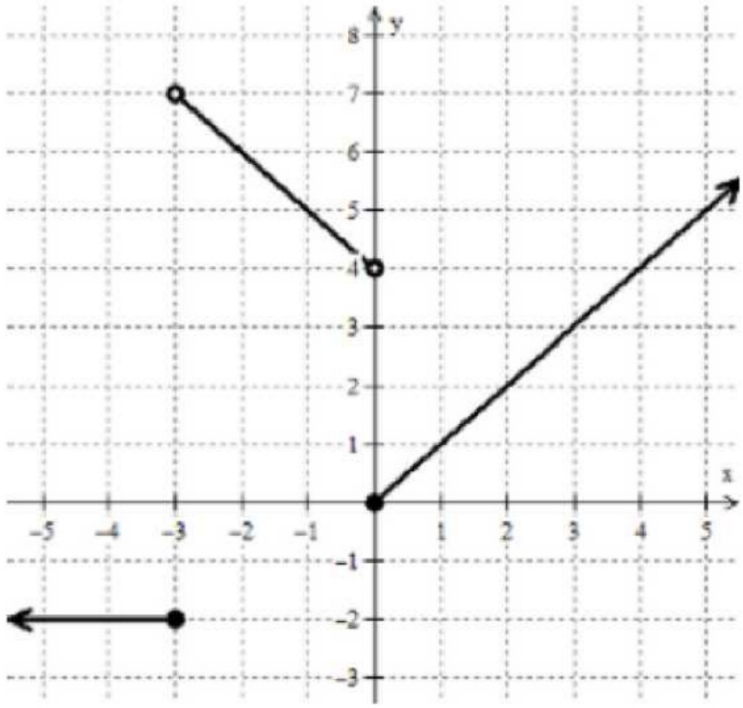
REVIEW

ex: Determine the open intervals on which the function below is increasing and decreasing.



REVIEW

ex: Determine the open intervals on which the function below is positive and negative.



REVIEW

ex: Determine what type of function the data below represents.

x	y
−3	6
−2	0
−1	−4
0	−6
1	−6
2	−4
3	0
4	6

REVIEW

ex: Evaluate.

$$f(x)=\begin{cases}\log_2(x+4), & x>0\\ [x], & -2\le x<0\\ 3^x, & x<-2\end{cases}$$

-1.5

$\log_3 3 < \log_3 7 < \log_3 9$

$1 < \log_3 7 < 2$

a) $f(-1.23456) = -2$

b) $f(-\log_3 7)$ -2

c) $f(12) = 4$

REVIEW

ex: Sketch and state the D/R.

$$f(x) = 1 - \frac{2}{(x-3)^2}$$

REVIEW

ex: Determine if f(x) has x-axis, y-axis, y=x or origin symmetry.

$$f(x) = 1 - \frac{2}{(x-3)^2}$$

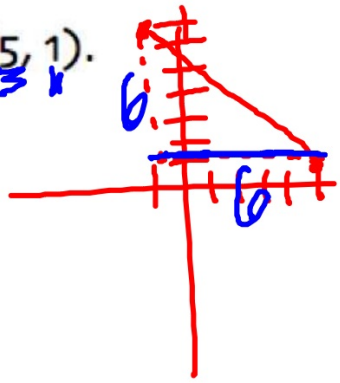
REVIEW

ex: Determine if f(x) is even, odd or neither. Justify your answer.

$$f(x) = 1 - \frac{2}{(x-3)^2}$$

REVIEW

ex: Find the distance between (-1, 7) and (5, 1).



$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$d = \sqrt{(-1-5)^2 + (7-1)^2}$$

$$d = \sqrt{36+36} = \sqrt{72} = 6\sqrt{2}$$

REVIEW

ex: Find the midpoint of the line segment joining (-1, 7) and (5, 1).

$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = (2, 4)$$

$$A = \frac{1}{2}\pi p\,(7r - p)$$

$$\frac{A}{\frac{1}{2}} = A \cdot \frac{2}{1}$$

$$p + \frac{A}{\frac{1}{2}\pi p} = 7r - \cancel{p} + \cancel{p}$$

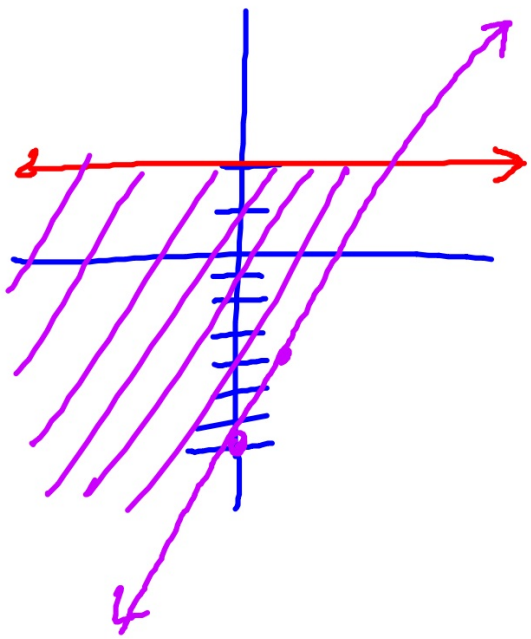
$$\frac{\left(p + \frac{A}{\frac{1}{2}\pi p}\right)}{7} = r$$

$$\frac{p + \frac{2A}{\pi p}}{7} = \frac{\pi p^2 + 2A}{\pi p} \cdot \frac{1}{7}$$

$$r = \frac{\pi p^2 + 2A}{7\pi p}$$

$y \leq 2$

$y \geq 3x - 7$



$$y = \frac{7x}{3x+1}$$

$$y(3x+1) = 7x$$

$$3xy + y = 7x$$

$$3xy - 7x = -y$$

$$x(3y-7) = -y$$

$$x = \frac{-y}{3y-7}$$

$$(x+4)^2 + (y-1)^2 = \overset{r^2}{25}$$

$r : 5$

center: $(-4, 1)$

$$\frac{(x+4)^2}{25} + \frac{(y-1)^2}{25} = 1$$