

099 §3.6 I #s 9, 12, 14, 16, 18, 20

#s 9-16 Graph each piecewise-defined function. Use the graph to determine the (domain and) range. (Don't need graph for domain)

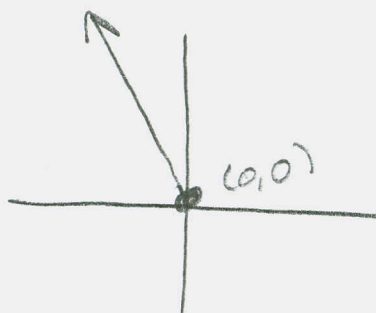
$$9) f(x) = \begin{cases} -2x & \text{if } x \leq 0 \\ 2x+1 & \text{if } x > 0 \end{cases}$$

$$y = -2x, \quad \underline{x \leq 0}$$

$$x = 0 \Rightarrow$$

$$y = -2(0) = 0$$

$$\leadsto (0, 0) \bullet$$

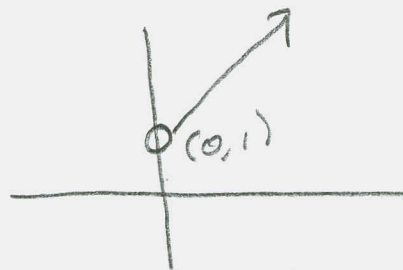


$$y = 2x+1, \quad x > 0$$

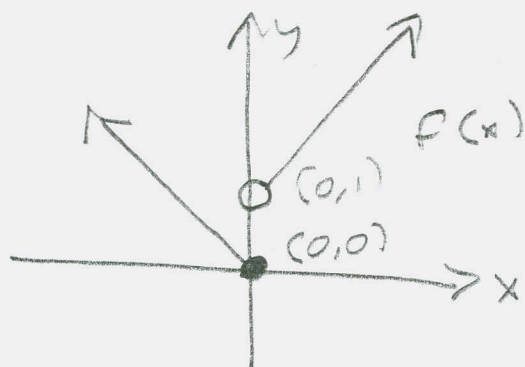
$$x = 0 \Rightarrow$$

$$y = 2(0) + 1 = 1$$

$$\leadsto (0, 1) \circ$$



Combine



$$\mathcal{R} = [0, \infty)$$

$$\text{Domain: } \{x \mid x \leq 0 \text{ OR } x > 0\} = \underbrace{(-\infty, 0] \cup (0, \infty)}_{\mathbb{R}} = \mathbb{R}$$



$$(-\infty, 0] \cup (0, \infty) = (-\infty, \infty)$$

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(12) $f(x) = \begin{cases} 4x-4 & \text{if } x < 2 \\ -x+1 & \text{if } x \geq 2 \end{cases}$

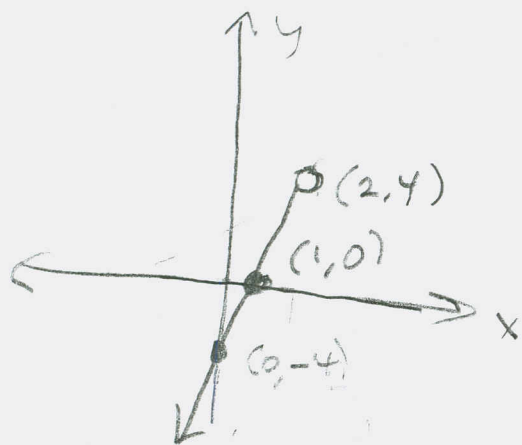
$y = 4x - 4, x < 2$

$x = 2 \rightarrow$

$y = 4(2) - 4 =$

$= 8 - 4 = 4$

$\rightarrow (2, 4) \circ$



$(0, b) = (0, -4)$

we'll need the

x-intercept:

$y = 4x - 4 = 0$

$4x = 4$

$x = 1 \rightarrow (1, 0)$

Domain: $x < 2$ OR $x \geq 2$

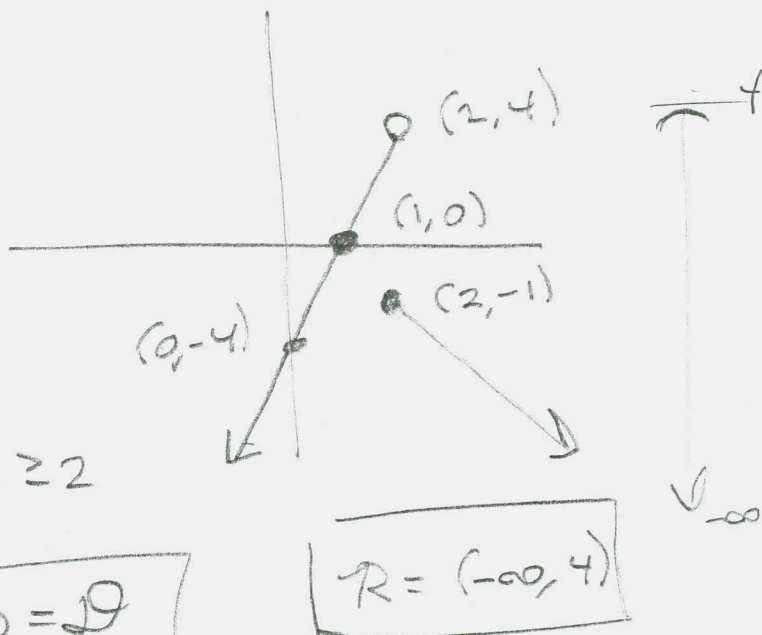
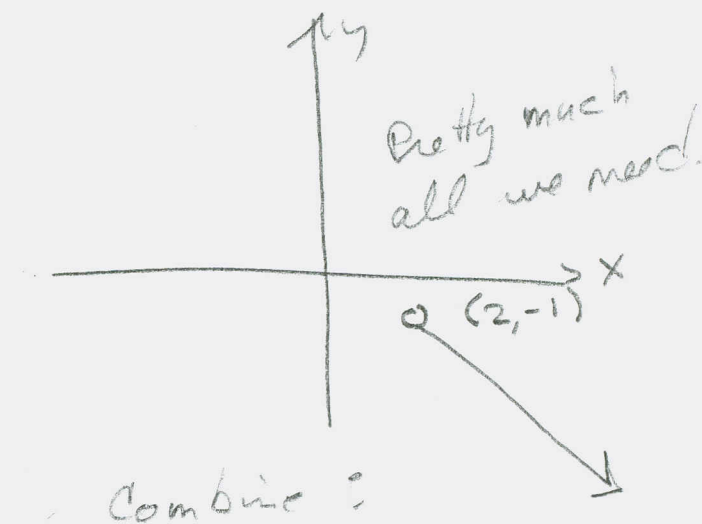
$(-\infty, 2) \cup [2, \infty) \neq (-\infty, \infty) = \mathcal{D}$

$y = -x + 1, x \geq 2$

$x = 2 \rightarrow$

$y = -2 + 1 = -1$

$\rightarrow (2, -1)$



$R = (-\infty, 4)$

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(14) $h(x) = \begin{cases} x+2 & \text{if } x < 1 \\ 2x+1 & \text{if } x \geq 1 \end{cases}$ Try in one go!

$y = x+2, x < 1$

$x=1 \Rightarrow$

$y = 1+2=3$

$\leadsto (1,3)$

$y = 2x+1, x \geq 1$

$x=1 \rightarrow$

$y = 2(1)+1=3$

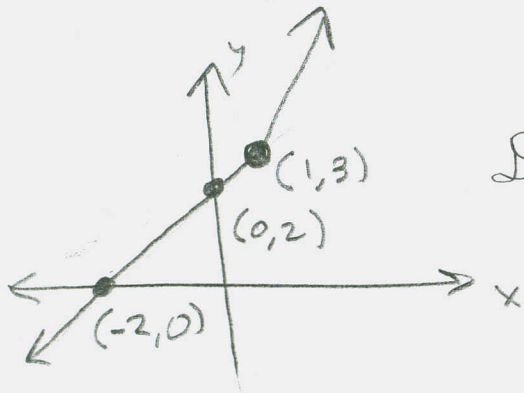
$(1,3)$

x-intercept: $y = x+2 \stackrel{\text{SET}}{=} 0$

$x+2=0$

$x=-2$

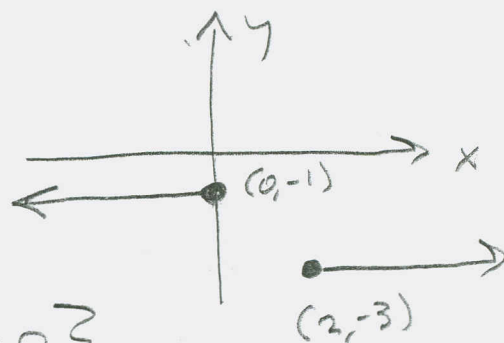
$\leadsto (-2,0)$



$D = (-\infty, \infty)$

$R = (-\infty, \infty)$

(16) $f(x) = \begin{cases} -1 & \text{if } x \leq 0 \\ -3 & \text{if } x \geq 2 \end{cases}$



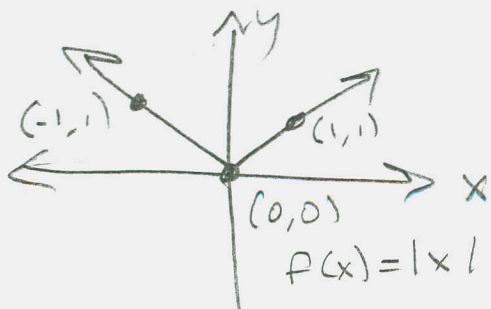
$D = \{x \mid x \leq 0 \text{ OR } x \geq 2\}$

$D = (-\infty, 0] \cup [2, \infty)$

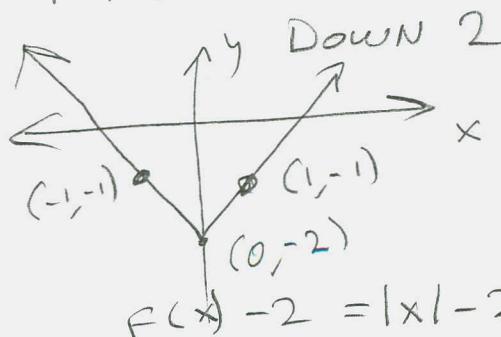
$R = \{-1, -3\}$ (Just the two y-values)

(18) $g(x) = |x| - 2$

If $f(x) = |x|$, then $g(x) = |x| - 2 = f(x) - 2$



Down 2



$f(x) - 2 = |x| - 2$

099 § 3.6 I # 20

(20) $g(x) = \sqrt{x} + 3$

If $f(x) = \sqrt{x}$, then $g(x) = \sqrt{x} + 3 = f(x) + 3$
up 3

