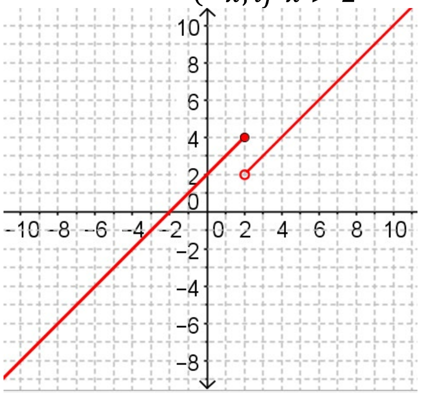
Name: ____________________

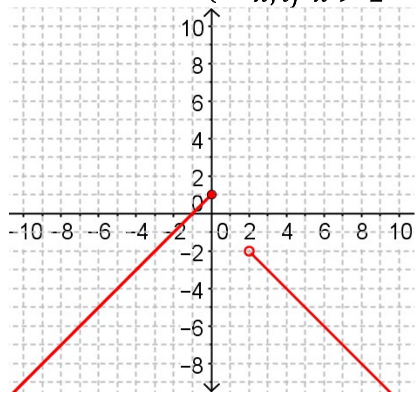
SM2 4.5: Piecewise Functions

Graph the following piecewise functions.

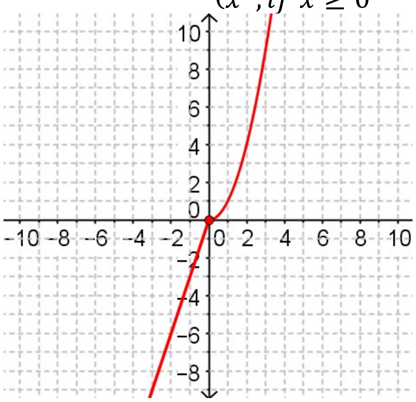
1) $y = \begin{cases} x+2, if\ x \le 2 \\ x, if\ x > 2 \end{cases}$



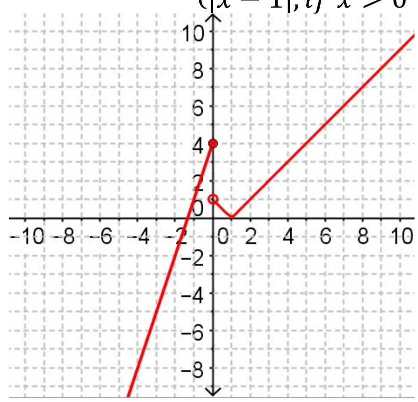
2) $y = \begin{cases} x+1, if\ x \le 0 \\ -x, if\ x > 2 \end{cases}$



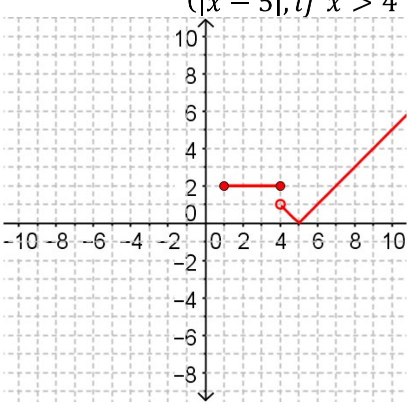
3) $y = \begin{cases} 3x, if\ x < 0 \\ x^2, if\ x \ge 0 \end{cases}$



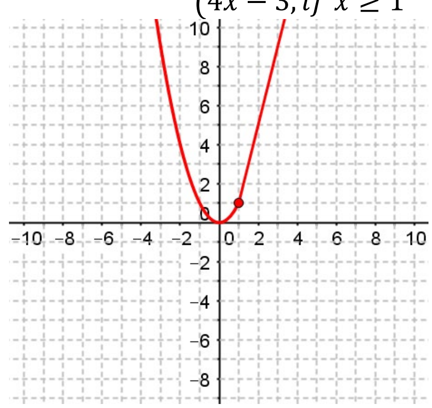
4) $y = \begin{cases} 3x+4, if\ x \le 0 \\ |x-1|, if\ x > 0 \end{cases}$



5) $y = \begin{cases} 2, if\ 1 \le x \le 4 \\ |x-5|, if\ x > 4 \end{cases}$

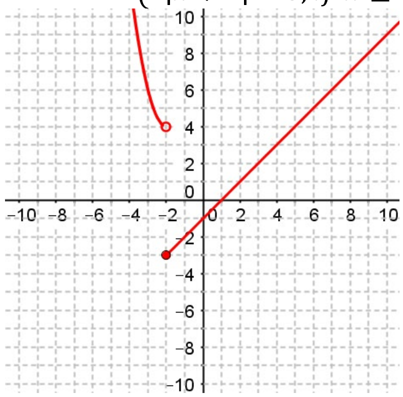


6) $y = \begin{cases} x^2, if\ x < 1 \\ 4x-3, if\ x \ge 1 \end{cases}$



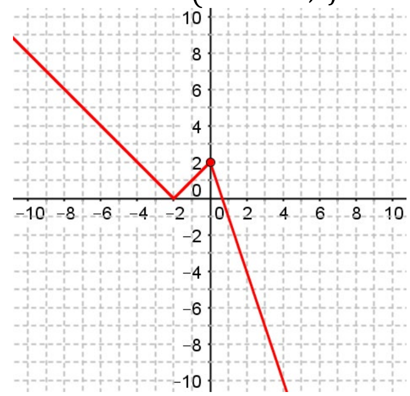
7)

$$y = \begin{cases} 2(x+2)^2 + 4, if\ x < -2 \\ |x+2| - 3, if\ x \geq -2 \end{cases}$$



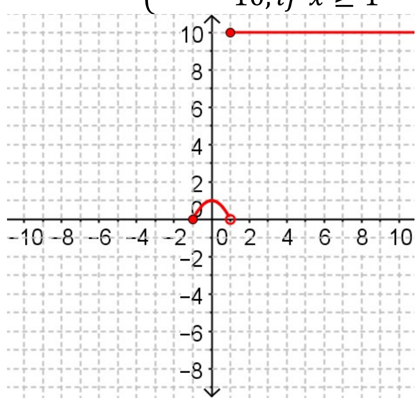
8)

$$y = \begin{cases} |x+2|, if\ x \leq 0 \\ -3x + 2, if\ x > 0 \end{cases}$$



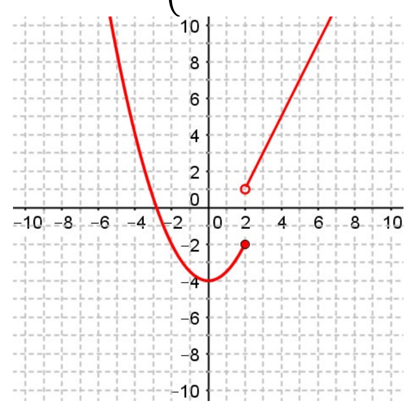
9)

$$y = \begin{cases} -x^2 + 1, if -1 \leq x < 1 \\ 10, if\ x \geq 1 \end{cases}$$



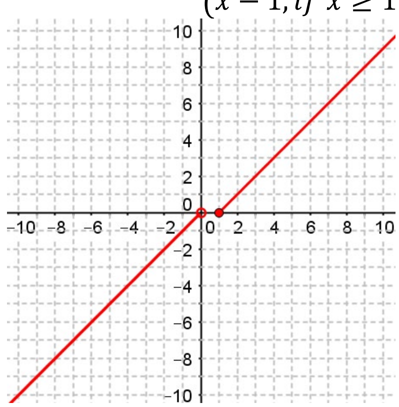
10)

$$y = \begin{cases} \frac{1}{2}x^2 - 4, if\ x \leq 2 \\ 2|x-2| + 1, if\ x > 2 \end{cases}$$



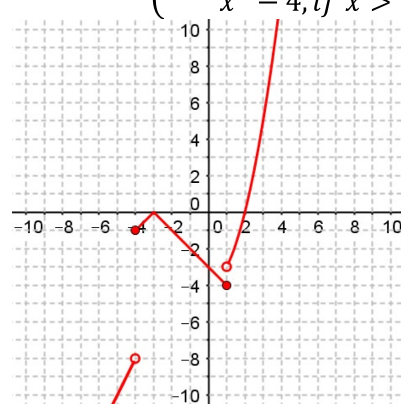
11)

$$y = \begin{cases} -|x|, if\ x < 0 \\ x - 1, if\ x \geq 1 \end{cases}$$



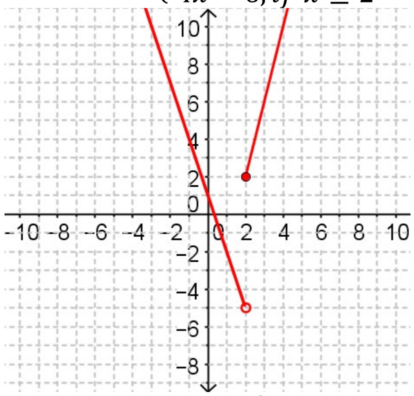
12)

$$y = \begin{cases} 2x, if\ x < -4 \\ -|x+3|, if -4 \leq x \leq 1 \\ x^2 - 4, if\ x > 1 \end{cases}$$



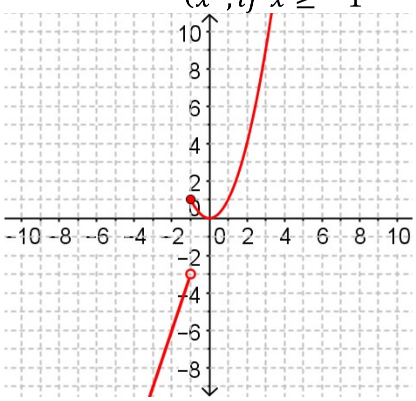
Graph the following piecewise functions and identify the given properties.

13) $y = \begin{cases} -3x + 1, if\ x < 2 \\ 4x - 6, if\ x \geq 2 \end{cases}$



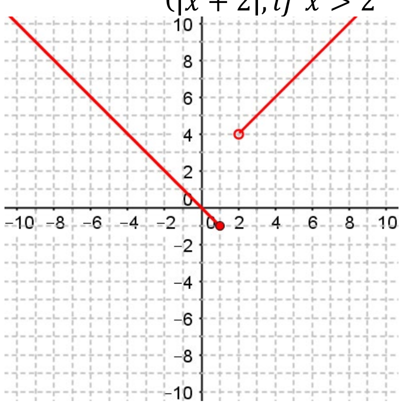
Domain:	$\mathbb{R}$ or $(-\infty, \infty)$
Range:	$(-5, \infty)$
Max/Min:	$\emptyset$
x-intercept(s):	$\left(\frac{1}{3}, 0\right)$
y-intercept:	$(0, 1)$
Increasing:	$(2, \infty)$
Decreasing:	$(-\infty, 2)$
Positive:	$\left(-\infty, \frac{1}{3}\right) \cup [2, \infty)$
Negative:	$\left(\frac{1}{3}, 2\right)$

14) $y = \begin{cases} 3x, if\ x < -1 \\ x^2, if\ x \geq -1 \end{cases}$



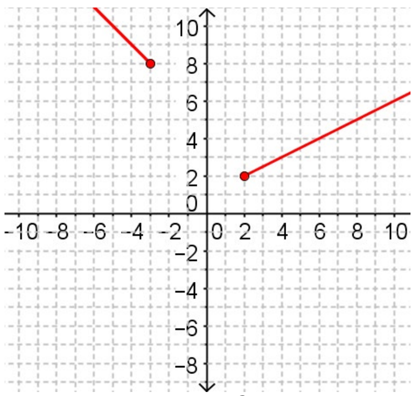
Domain:	$\mathbb{R}\ or\ (-\infty, \infty)$
Range:	$(-\infty, -3) \cup [0, \infty)$
Max/Min:	$\emptyset$
x-intercept(s):	$(0, 0)$
y-intercept:	$(0, 0)$
Increasing:	$(-\infty, -1) \cup (0, \infty)$
Decreasing:	$(-1, 0)$
Positive:	$[-1, 0) \cup (0, \infty)$
Negative:	$(-\infty, -1)$

15) $y = \begin{cases} -x, if\ x \leq 1 \\ |x + 2|, if\ x > 2 \end{cases}$



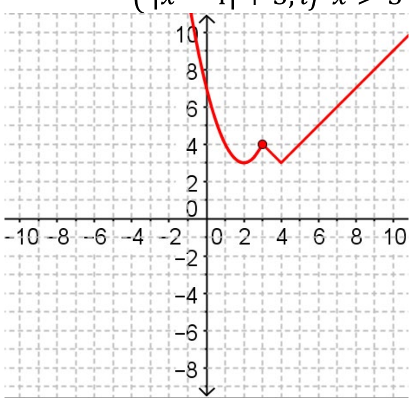
Domain:	$(-\infty, 1] \cup (2, \infty)$
Range:	$[-1, \infty)$
Max/Min:	$(1, -1)$
x-intercept(s):	$(0, 0)$
y-intercept:	$(0, 0)$
Increasing:	$(2, \infty)$
Decreasing:	$(-\infty, 1)$
Positive:	$(-\infty, 0) \cup (2, \infty)$
Negative:	$(0, 1]$

16) $y = \begin{cases} -x+5, if\ x \le -3 \\ \frac{1}{2}x+1, if\ x \ge 2 \end{cases}$



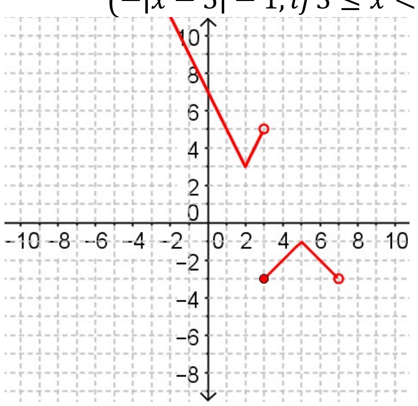
Domain:	$(-\infty, -3] \cup [2, \infty)$
Range:	$[2, \infty)$
Max/Min:	$(2, 2)$
x-intercept(s):	$\emptyset$
y-intercept:	$\emptyset$
Increasing:	$(2, \infty)$
Decreasing:	$(-\infty, -3)$
Positive:	$(-\infty, -3] \cup [2, \infty)$
Negative:	$\emptyset$

17) $y = \begin{cases} (x-2)^2+3, if\ x \le 3 \\ \lvert x-4\rvert+3, if\ x > 3 \end{cases}$



Domain:	$\mathbb{R}\ or\ (-\infty, \infty)$
Range:	$[3, \infty)$
Max/Min:	$(2, 3)\ and\ (4, 3)$
x-intercept(s):	$\emptyset$
y-intercept:	$(0, 7)$
Increasing:	$(2, 3) \cup (4, \infty)$
Decreasing:	$(-\infty, 2) \cup (3, 4)$
Positive:	$\mathbb{R}\ or\ (-\infty, \infty)$
Negative:	$\emptyset$

18) $y = \begin{cases} 2\lvert x-2\rvert+3\ , if\ x < 3 \\ -\lvert x-5\rvert-1, if 3 \le x < 7 \end{cases}$

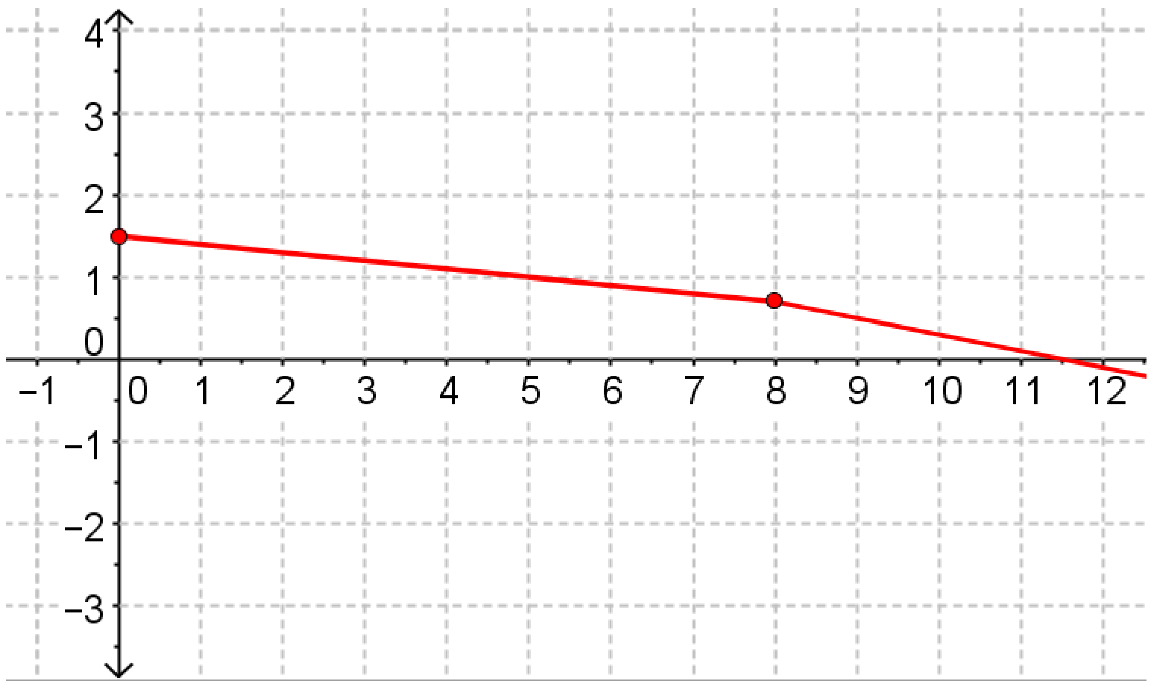


Domain:	$(-\infty, 7)$
Range:	$[-3, -1] \cup [3, \infty)$
Max/Min:	$(3, -3)$
x-intercept(s):	$\emptyset$
y-intercept:	$(0, 7)$
Increasing:	$(2, 3) \cup (3, 5)$
Decreasing:	$(-\infty, 2) \cup (5, 7)$
Positive:	$(-\infty, 3)$
Negative:	$[3, 7)$

19) Andrew is walking to school. He looks at his watch and realizes he is running late. He starts jogging. Andrew's distance to school, in miles, d, at any time in minutes, t, can be represented using the function

$$d = \begin{cases} -.1t + 1.5, if\ 0 \leq t < 8 \\ -.2t + 2.3, if\ t \geq 8 \end{cases}$$

a) Create a graph to show Andrew's distance from school at any time t.



b) How long does it take Andrew to reach school? How can you tell from the graph?
11.5 min, that is the x-intercept. That is when he has 0 distance left until school.