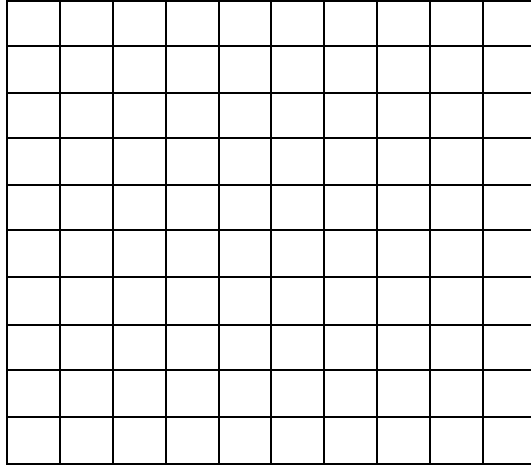


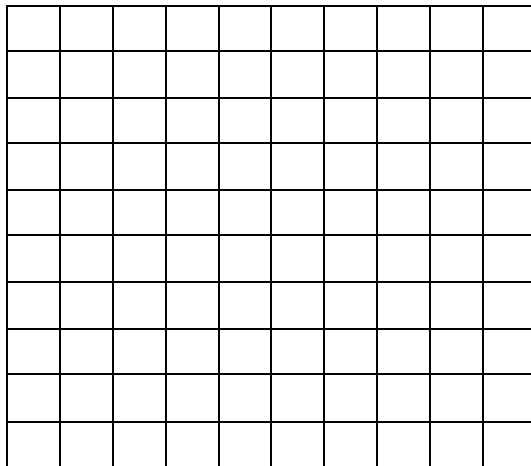
**Worksheet – Piecewise functions**  
**Mr. Chvatal**

Please graph the following piecewise functions.

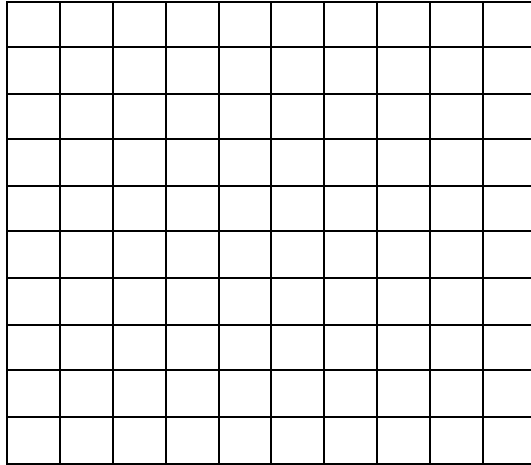
$$1. \quad f(x) = \begin{cases} 2x+6 & \text{if } -5 < x < -3 \\ -\frac{2}{3}x-1 & \text{if } -3 \leq x < 3 \\ x-5 & \text{if } x \geq 3 \end{cases}$$



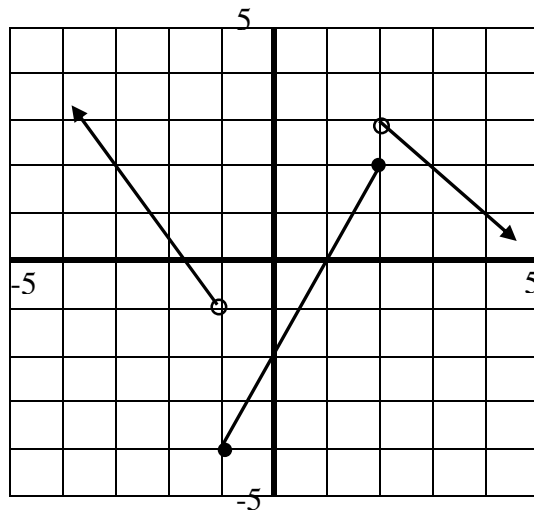
$$2. \quad f(x) = \begin{cases} \frac{1}{2}x+5 & \text{if } x \leq -2 \\ -\frac{2}{3}x-2 & \text{if } -2 < x < 0 \\ 4x-4 & \text{if } x \geq 0 \end{cases}$$



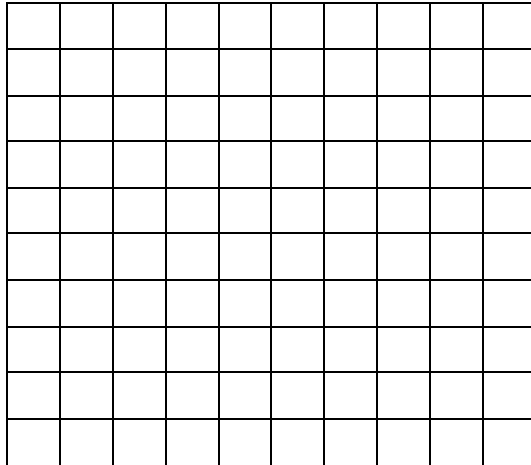
3. 
$$f(x) = \begin{cases} x^2 - 2x + 1 & \text{if } -1 \leq x < 2 \\ \frac{1}{2}x + 1 & \text{if } x \geq 2 \end{cases}$$



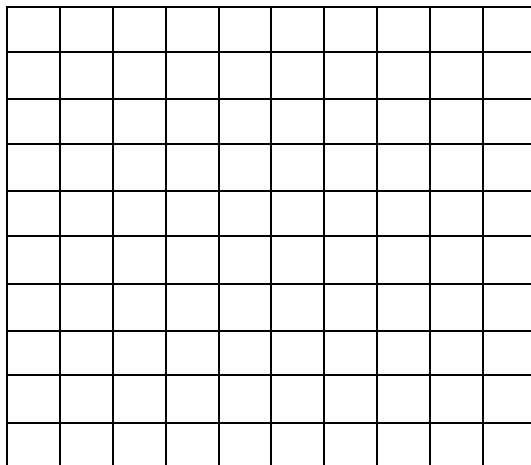
4. Please model a piecewise function from the graph below.



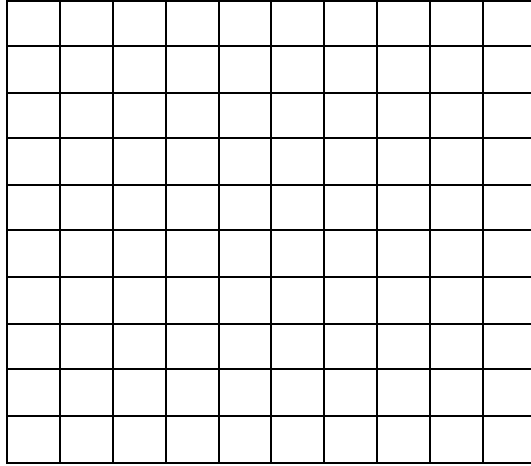
5. Volume purchasing allows a manufacturer to reduce its production costs. If the company buys less than 20 red widgets, a key component of their product, they pay \$10 per piece. The price drops to \$8 if they purchase any amount from 20 to less than 50. The best price they can get is \$7 per red widget for orders of 50 or more. Model a piecewise function and graph below.



6. A planetary explorer module enters the atmosphere of the planet Goobertron at a speed of 500 km/hr and immediately begins decelerating by 50 km/hr. After one hour, the propulsion system slows it to a deceleration rate of 150 km/hr. After another two hours, the rate of deceleration becomes 300 km/hr. Please model its speed vs. time with a piecewise function and graph below. After how many hours does the module hit the planet surface?



7. The rate of decay of a certain sub-atomic particle at a temperature of  $0^\circ\text{C}$  and lower is modeled by the equation  $f(x) = x^2 + 4x$ . At temperatures above  $0^\circ\text{C}$  its rate of decay is modeled by the equation  $f(x) = -x^2 + 4x + 2$ . Please model the rate of decay with a piecewise function and graph below.



8. Create your own real-world problem, model it with a piecewise function and graph below.

