$<, >$ open circle $\Leftrightarrow$ (,) parentheses $\quad \leq, \geq$ closed circle $\Leftrightarrow$ [,] brackets

Graphing Piecewise Functions

Honors Advanced Algebra

Name: Key

Period: _____ Date: _____

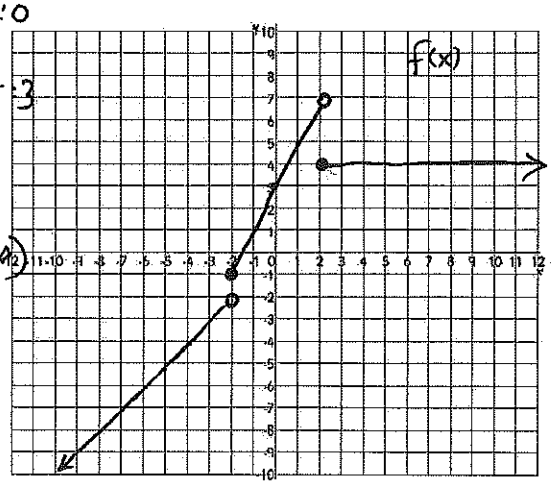
Graph each of the following piecewise functions under the given condition(s). State the domain and range of each.

Example: $f(x) = \begin{cases} x, & x < -2 \\ 2x+3, & -2 \leq x < 2 \\ 4, & x \geq 2 \end{cases}$

Slope: $\frac{+1}{1\rightarrow}$ y-int: 0

Slope: $\frac{2}{1}$ y-int: 3

↳ $y=4$ horizontal line

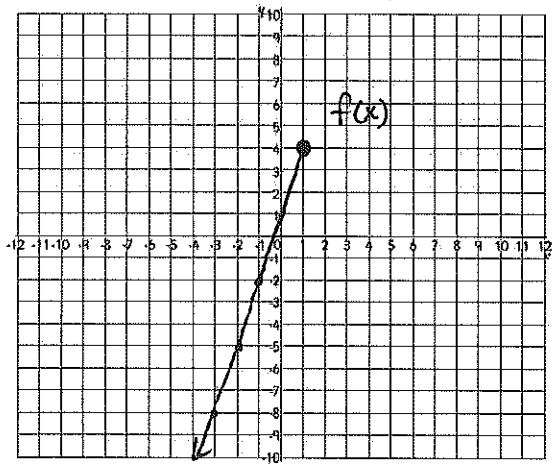


Interval Notation:

- Domain: $(-\infty, -2) \cup [-2, 2) \cup [2, +\infty) = (-\infty, \infty)$
- Range: $(-\infty, -2) \cup [-1, 7)$

1. $f(x) = 3x + 1, x \leq 1$

Slope: $\frac{3}{1}$ y-int: 1

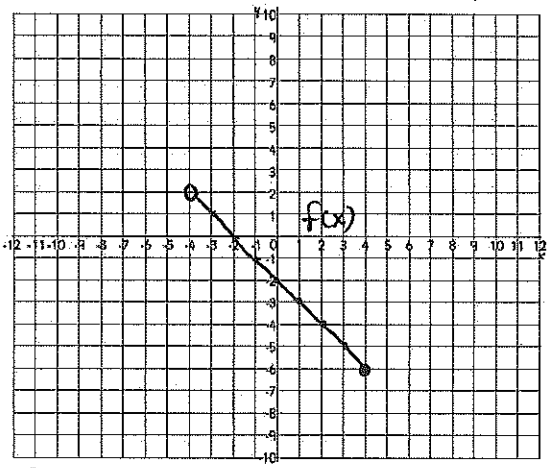


Domain: $(-\infty, 1]$

Range: $(-\infty, 4]$

2. $f(x) = -x - 2, \ -4 < x \leq 4$

Slope: $\frac{-1}{1}$ y-int: -2

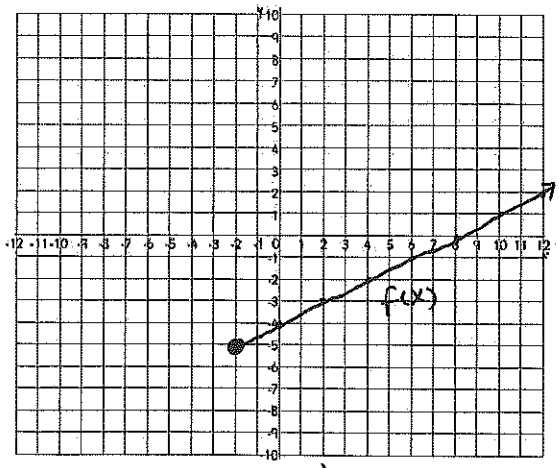


Domain: $(-4, 4]$

Range: $[-6, 2)$

3. $f(x) = \frac{1}{2}x - 4, x \geq -2$

Slope: $\frac{1}{2}$ y-int: -4

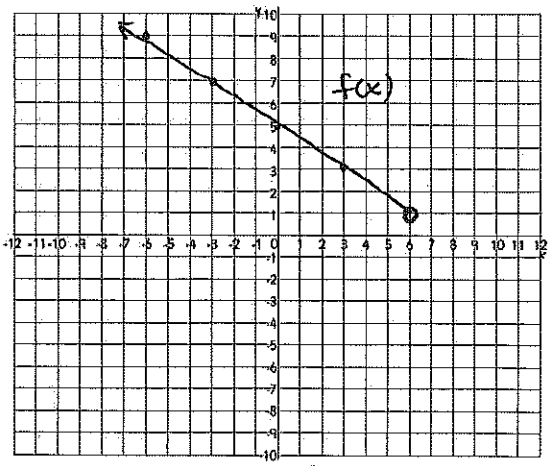


Domain: $[-2, +\infty)$

Range: $[-5, +\infty)$

4. $f(x) = -\frac{2}{3}x + 5, x < 6$

Slope: $\frac{-2}{3}$ y-int: 5

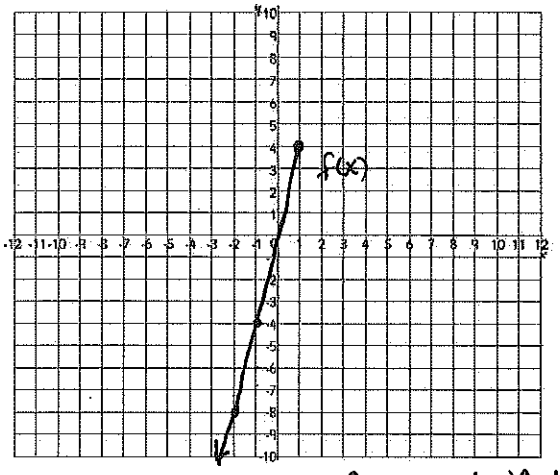


Domain: $(-\infty, 6)$

Range: $(1, +\infty)$

5. $f(x) = 4x, x \leq 1$

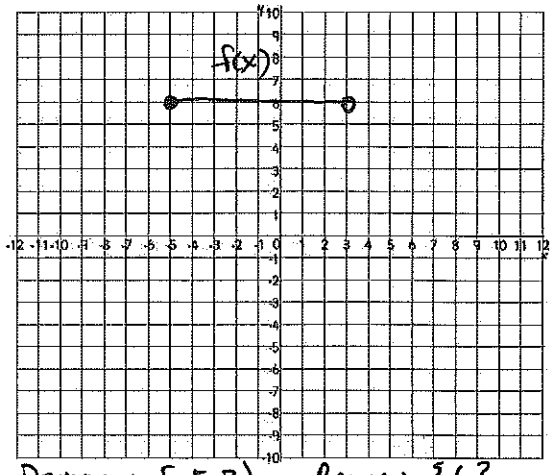
Slope: $\frac{4}{1}$ ↑ →
y-int: 0



Domain: $(-\infty, 1]$ Range: $(-\infty, 4]$

6. $f(x) = 6, -5 \leq x < 3$

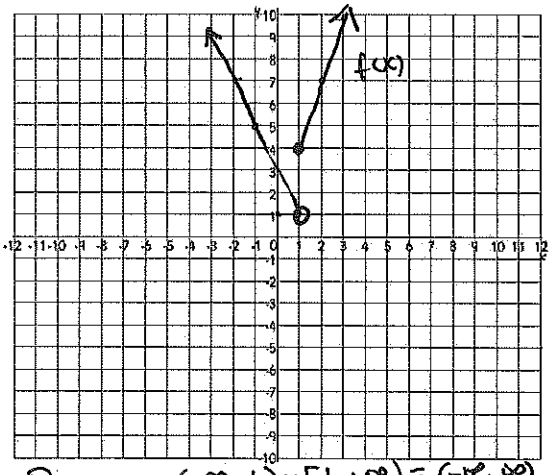
Slope = 0
Horizontal line



Domain: $[-5, 3)$ Range: $\{6\}$

7. $f(x) = \begin{cases} 3x + 1, & x \geq 1 \\ -2x + 3, & x < 1 \end{cases}$

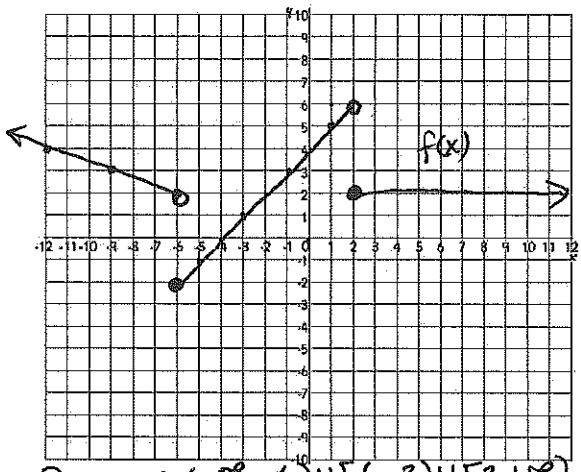
Slope: $\frac{3}{1}$ ↑ → y-int: 1
Slope: $-\frac{2}{1}$ ↓ → y-int: 3



Domain: $(-\infty, 1) \cup [1, +\infty) = (-\infty, \infty)$
Range: $(1, +\infty)$

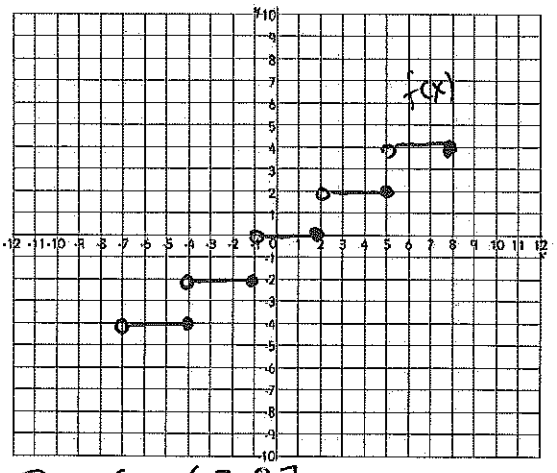
8. $f(x) = \begin{cases} -\frac{1}{3}x, & x < -6 \\ x + 4, & -6 \leq x < 1 \\ 2, & x \geq 1 \end{cases}$

Slope: $-\frac{1}{3}$ ↓ → y-int: 0
Slope: $\frac{1}{1}$ ↑ → y-int: 4
Horizontal line at $y = 2$



Domain: $(-\infty, -6) \cup [-6, 2) \cup [2, +\infty) = (-\infty, \infty)$
Range: $[-2, +\infty)$

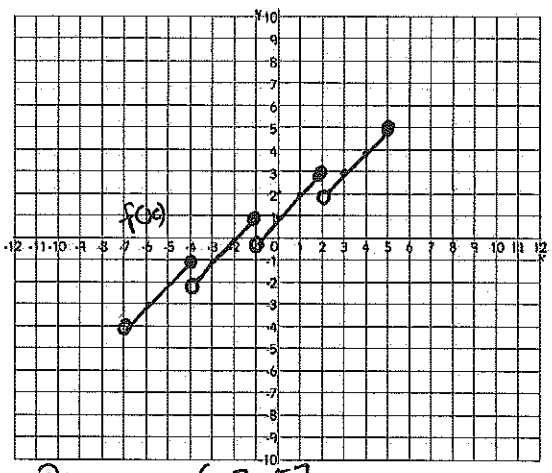
9. $f(x) = \begin{cases} -4, & -7 < x \leq -4 \\ -2, & -4 < x \leq -1 \\ 0, & -1 < x \leq 2 \\ 2, & 2 < x \leq 5 \\ 4, & 5 < x \leq 8 \end{cases}$



Domain: $(-7, 8]$
Range: $\{-4, -2, 0, 2, 4\}$

10. $f(x) = \begin{cases} x + 3, & -7 < x \leq -4 \\ x + 2, & -4 < x \leq -1 \\ x + 1, & -1 < x \leq 2 \\ x, & 2 < x \leq 5 \end{cases}$

Slope $\frac{1}{1}$ ↑ → y-int: 3
Slope $\frac{1}{1}$ ↑ → y-int: 2
Slope $\frac{1}{1}$ ↑ → y-int: 1
Slope $\frac{1}{1}$ ↑ → y-int: 0



Domain: $(-7, 5]$
Range: $(-4, 5]$