Inequalities Practice

Name: _____ Date: _____

Question 1

Solve (interval and set notation)

I. $3x + 2 < 7$

II. $2x - 5 \geq 7$

III. $-7x \leq 21$

IV. $4x + 7 > 9x - 3$

V. $\frac{5x + 13}{4} > -2$

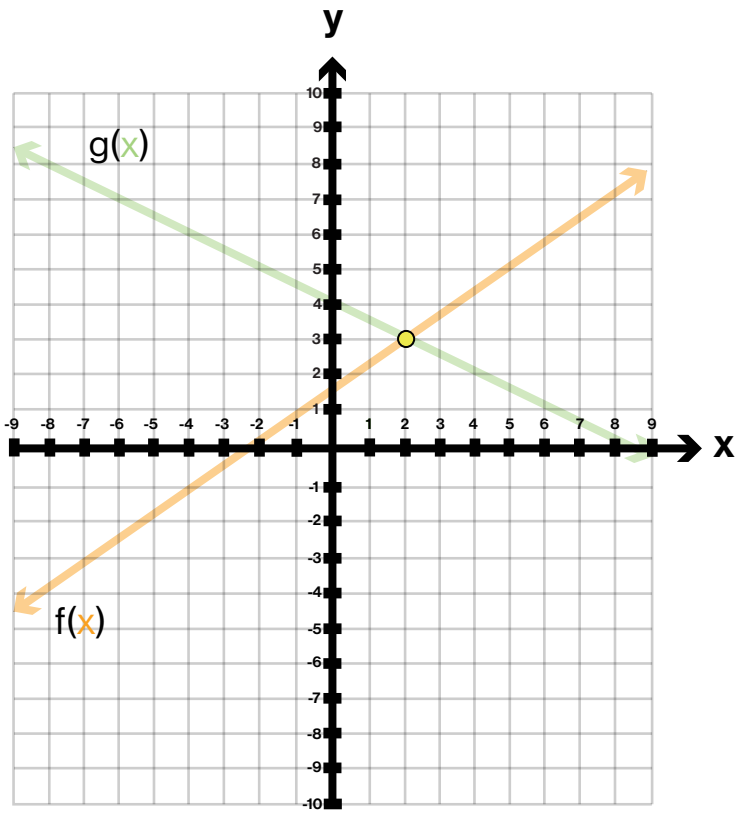
VI. $\frac{-2x - 9}{-3} > 7$

Inequalities Practice

Question 2

Solve

I.

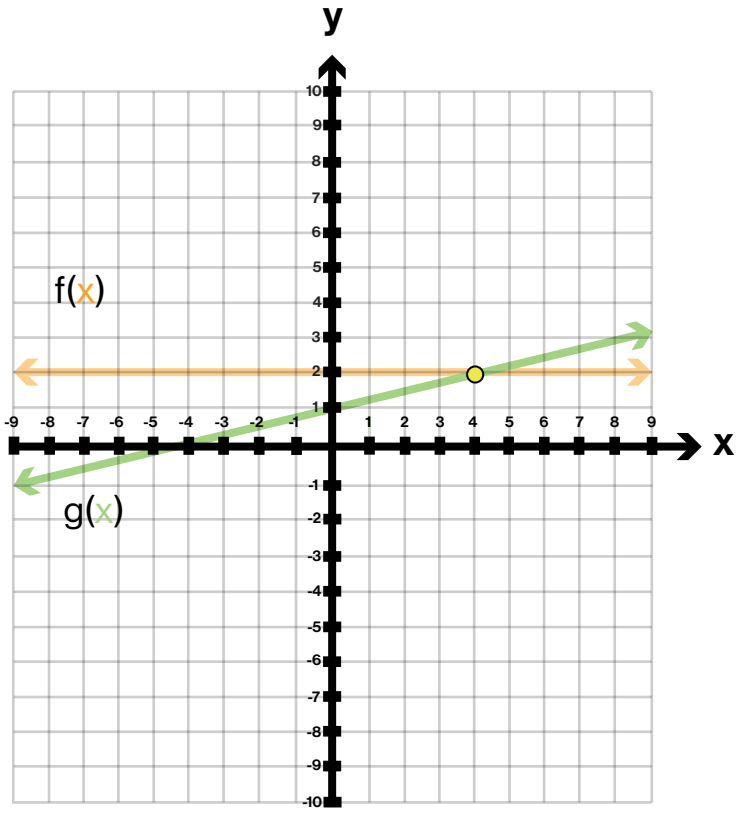


Interval Notation :

Set Notation :

$f(x) \geq g(x)$

II.



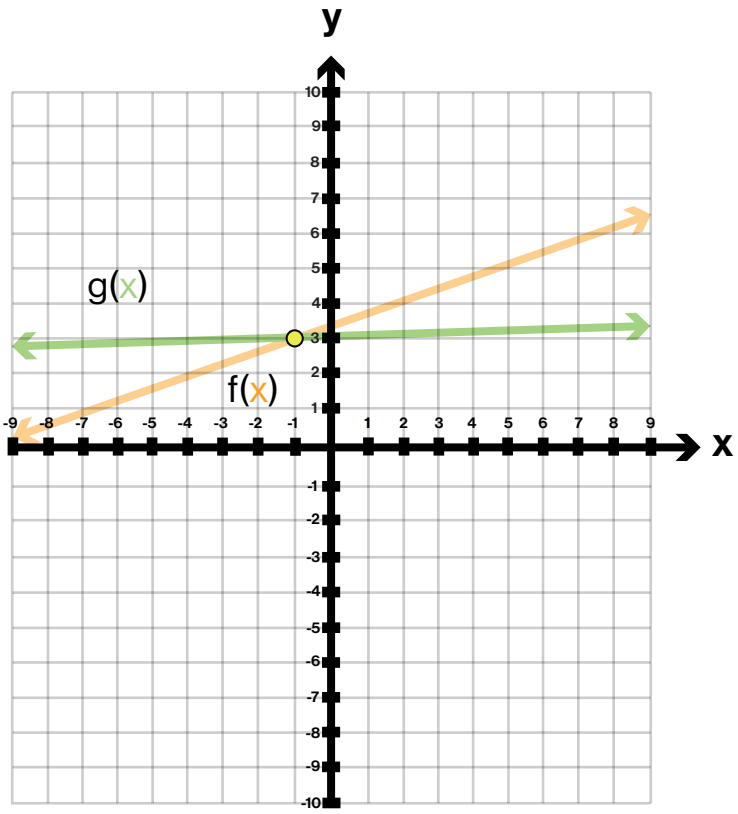
Interval Notation :

Set Notation :

$f(x) \geq g(x)$

Inequalities Practice

III.



Interval Notation :

Set Notation :

$f(x) < g(x)$

Question 3

Solve (interval and set notation)

I. $f(x) = 2x + 1$ $g(x) = -0.5x + 6$ $f(x) < g(x)$

Interval Notation :

Set Notation :

Inequalities Practice

Question 4

Solve

I. $\{4, 6, 8\} \cup \{1, 5, 8\}$

II. $\{4, 6, 8\} \cap \{1, 5, 8\}$

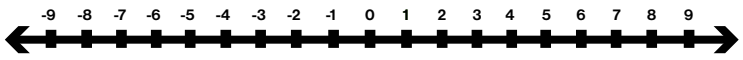
III. $\{x, y, z\} \cup \{x, r, t\}$

IV. $\{x, y, z\} \cap \{x, r, t\}$

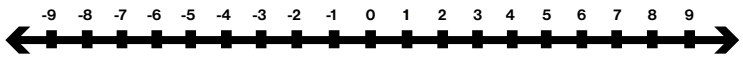
Question 5

Graph

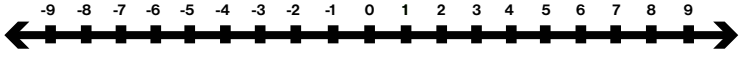
I. $-6 \leq x \leq 0$



II. $x > -7$ and $x < -2$



III. $5 > x$ or $x > 7$



Inequalities Practice

Question 6

Express the domain in interval notation

I. $f(x) = \frac{9}{x + 6}$

II. $g(x) = \frac{x - 1}{3x + 6}$

III. $h(x) = \neg\sqrt{\ 2x - 10}$

IV. $j(x) = \neg\sqrt{\ 8 - 2x}$

Question 7

Solve (set notation)

I. $|x| = 10$

II. $|x| = -1$

III. $|x| = 0$

IV. $5|x| + 2 = 17$

V. $|5x + 2| = 7$

VI. $\left|\frac{2x - 1}{3}\right| = 4$

Inequalities Practice

Question 8

Solve (set notation)

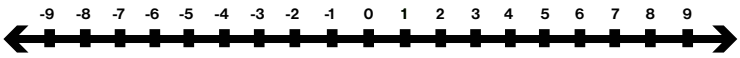
I. $|3x - 1| = |2x + 4|$

II. $|5x + 7| = |4x + 3|$

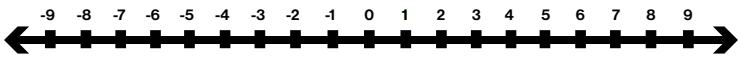
Question 9

Solve (interval and set notation) and graph

I. $|x| \leq 3$

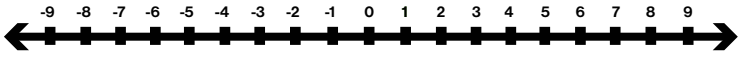


II. $|x| > 0$



III. $|3x + 4| + 2 \geq 8$

IV. $|x - 3| < 4$

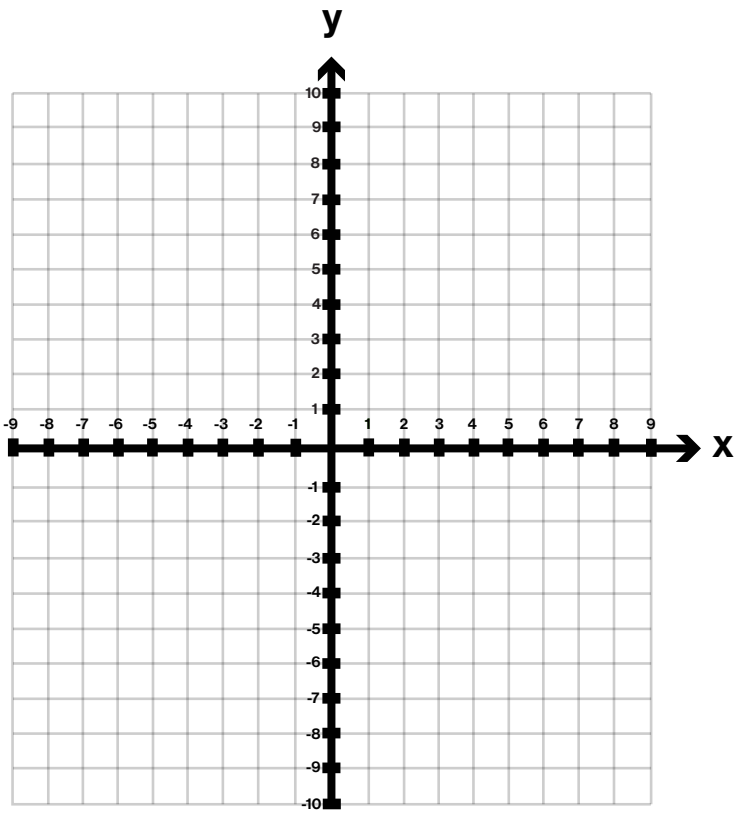


Inequalities Practice

Question 10

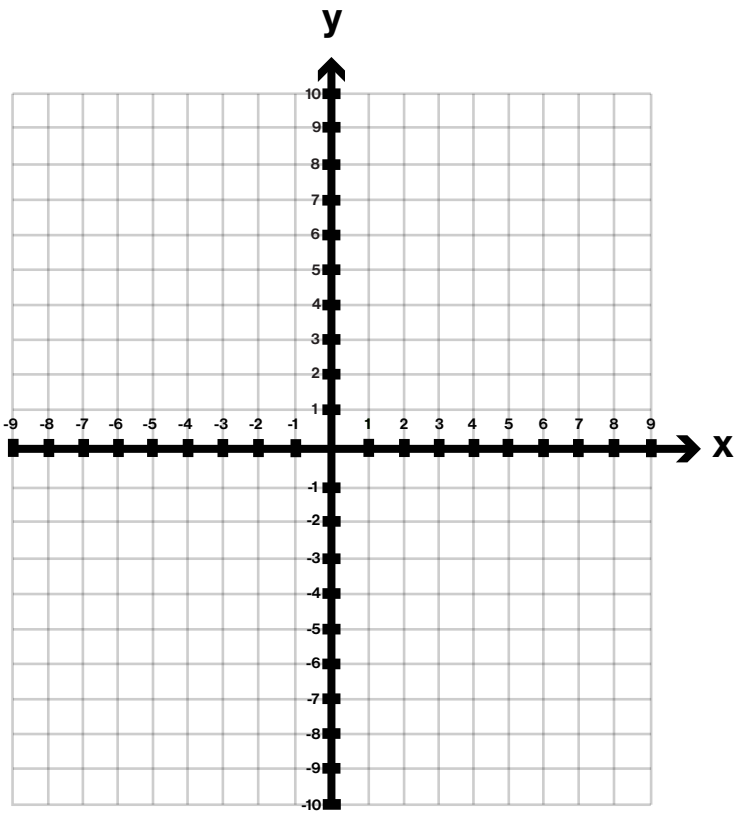
Graph

I.



$y \leq 3x$

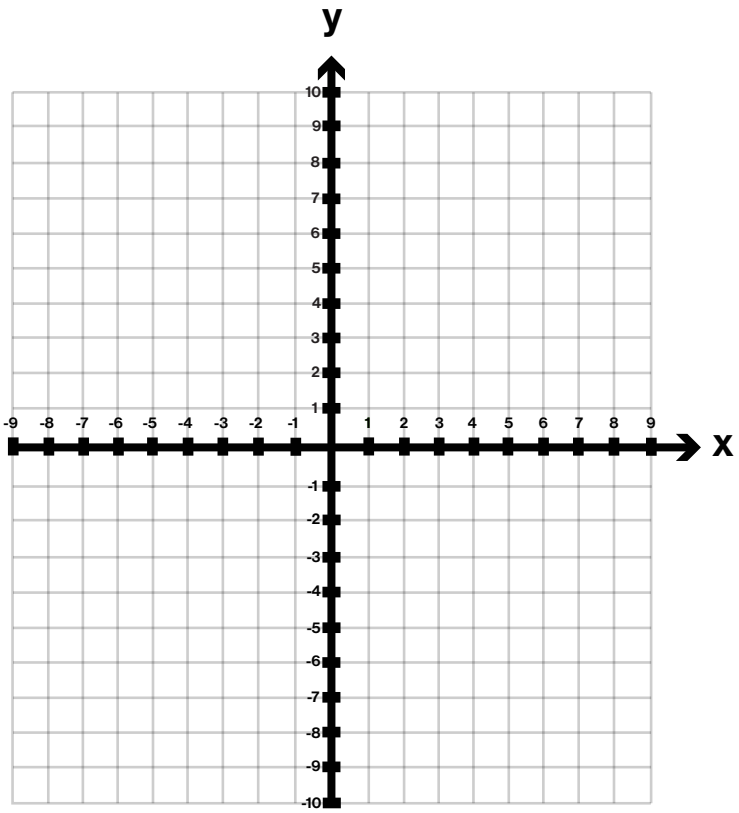
II.



$6 > 2x + 3y$

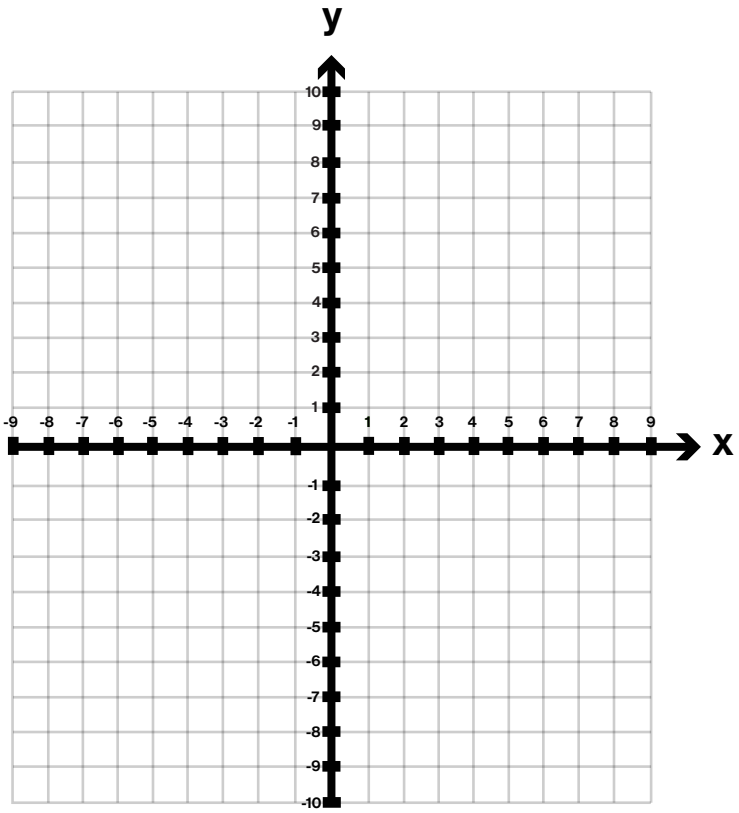
Inequalities Practice

III.



$-2 < y < 7$

IV.



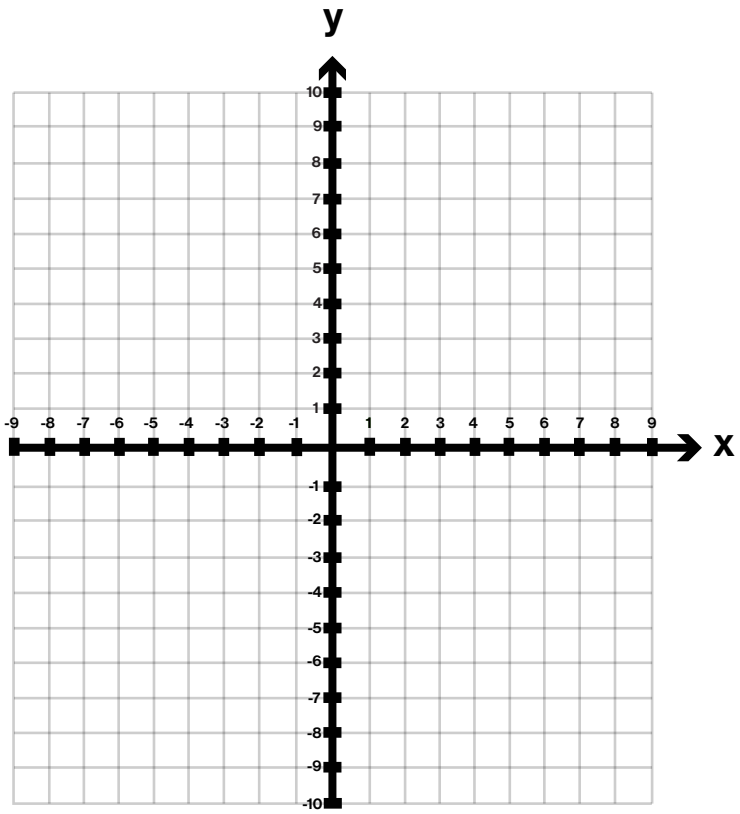
$0 \leq x \leq 6$

Inequalities Practice

Question 11

Graph and find the solution area

I.



$x + y \leq 6$

$x - y \leq 4$

Inequalities Practice

Name: **Key** Date: _____

Question 1

Solve (interval and set notation)

I. $3x + 2 < 7$

$\downarrow$

$3x < 5$

$\downarrow$

$x < 5/3$

$\downarrow$

$(-\infty, 5/3)$

$\{x \mid x < 5/3\}$

II. $2x - 5 \geq 7$

$\downarrow$

$2x \geq 12$

$\downarrow$

$x \geq 6$

$\downarrow$

$[6, \infty)$

$\{x \mid x \geq 6\}$

III. $-7x \leq 21$

$\downarrow$

$x \geq -3$

$\downarrow$

$[-3, \infty)$

$\{x \mid x \geq -3\}$

IV. $4x + 7 > 9x - 3$

$\downarrow$

$-5x + 7 > -3$

$\downarrow$

$-5x > -10$

$\downarrow$

$x < 2$

$\downarrow$

$(-\infty, 2)$

$\{x \mid x < 2\}$

V. $\frac{5x + 13}{4} > -2$

$\downarrow$

$5x + 13 > -8$

$\downarrow$

$5x > -21$

$\downarrow$

$x > -21/5$

$\downarrow$

$(-21/5, \infty)$

$\{x \mid x > -21/5\}$

VI. $\frac{-2x - 9}{-3} > 7$

$\downarrow$

$-2x - 9 < -21$

$\downarrow$

$-2x < -12$

$\downarrow$

$x > 6$

$\downarrow$

$(6, \infty)$

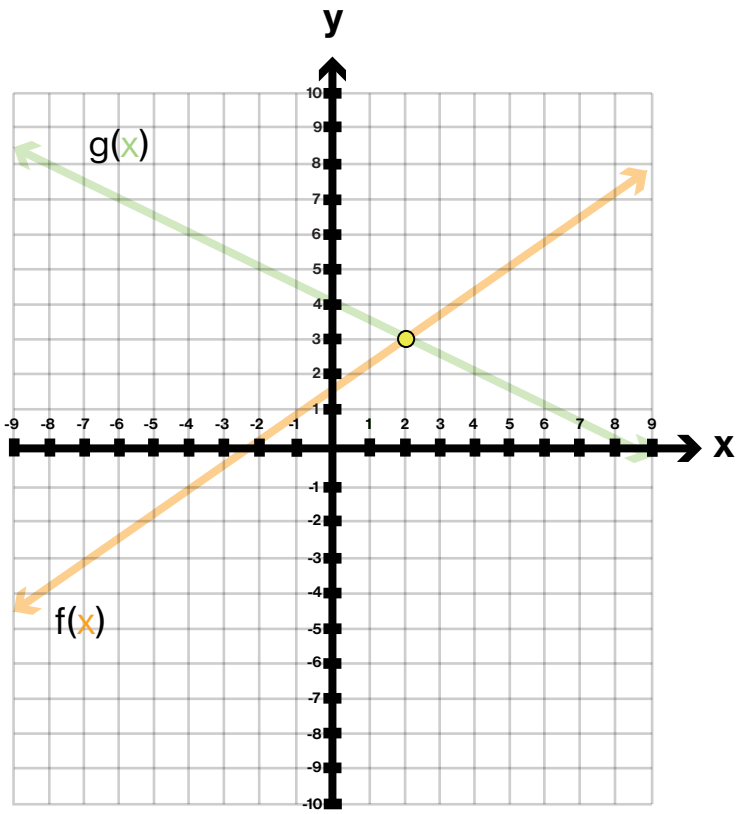
$\{x \mid x > 6\}$

Inequalities Practice

Question 2

Solve

I.



$f(x) \geq g(x)$

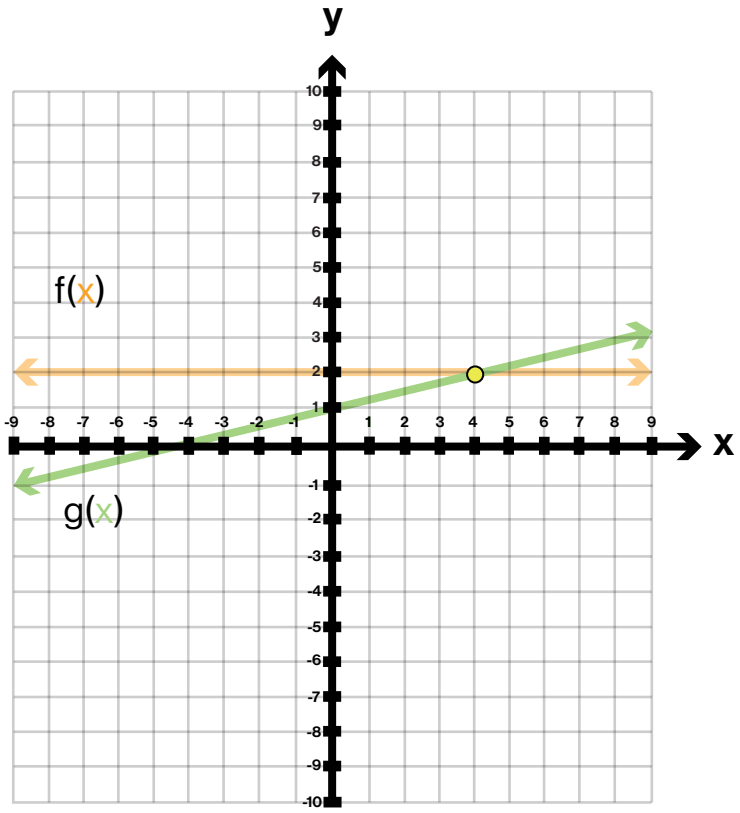
Interval Notation:

$[2, \infty)$

Set Notation:

$\{x \mid x \geq 2\}$

II.



$f(x) \geq g(x)$

Interval Notation:

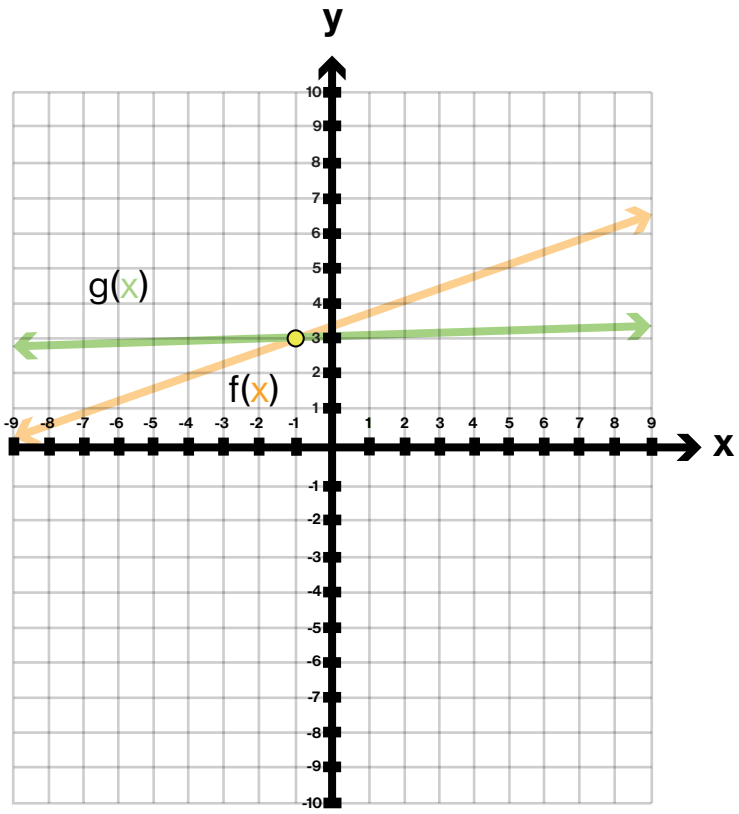
$(-\infty, 4]$

Set Notation:

$\{x \mid x \leq 4\}$

Inequalities Practice

III.



$f(x) < g(x)$

Interval Notation:

$(-\infty, -1)$

Set Notation:

$\{x \mid x < -1\}$

Question 3

Solve (interval and set notation)

I. $f(x) = 2x + 1$ $g(x) = -0.5x + 6$ $f(x) < g(x)$

$2x + 1 < -0.5x + 6 \longrightarrow 2.5x + 1 < 6 \longrightarrow 2.5x < 5 \longrightarrow x < 2$

Interval Notation:

$(-\infty, 2)$

Set Notation:

$\{x \mid x < 2\}$

Inequalities Practice

Question 4

Solve

I. $\{4,6,8\} \cup \{1,5,8\} \longrightarrow \{1,4,5,6,8\}$

II. $\{4,6,8\} \cap \{1,5,8\} \longrightarrow \{8\}$

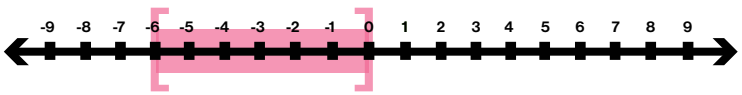
III. $\{x,y,z\} \cup \{x,r,t\} \longrightarrow \{r,t,x,y,z\}$

IV. $\{x,y,z\} \cap \{x,r,t\} \longrightarrow \{x\}$

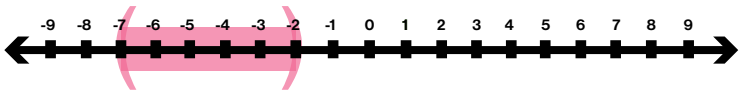
Question 5

Graph

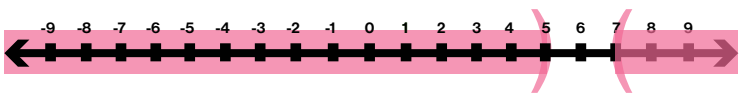
I. $-6 \leq x \leq 0$



II. $x > -7$ and $x < -2$



III. $5 > x$ or $x > 7$



Inequalities Practice

Question 6

Express the domain in interval notation

I. $f(x) = \frac{9}{x+6} \longrightarrow \begin{matrix} x+6=0 \\ x=-6 \end{matrix} \longrightarrow f = \{x \mid x \text{ is a real number and } x \neq -6\} \longrightarrow (-\infty, -6) \cup (-6, \infty)$

II. $g(x) = \frac{x-1}{3x+6} \longrightarrow \begin{matrix} 3x+6=0 \\ 3x=-6 \\ x=-2 \end{matrix} \longrightarrow g = \{x \mid x \text{ is a real number and } x \neq -2\} \longrightarrow (-\infty, -2) \cup (-2, \infty)$

III. $h(x) = \sqrt{2x-10} \longrightarrow \begin{matrix} 2x-10 \geq 0 \\ 2x \geq 10 \\ x \geq 5 \end{matrix} \longrightarrow h = \{x \mid x \geq 5\} \longrightarrow [5, \infty)$

IV. $j(x) = \sqrt{8-2x} \longrightarrow \begin{matrix} 8-2x \geq 0 \\ -2x \geq -8 \\ x \leq 4 \end{matrix} \longrightarrow j = \{x \mid x \leq 4\} \longrightarrow (-\infty, 4]$

Question 7

Solve (set notation)

I. $|x| = 10 \longrightarrow \{-10, 10\}$

II. $|x| = -1 \longrightarrow \emptyset$

III. $|x| = 0 \longrightarrow \{0\}$

IV. $5|x| + 2 = 17 \longrightarrow 5|x| = 15 \longrightarrow |x| = 3 \longrightarrow \{-3, 3\}$

V. $|5x+2| = 7 \longrightarrow \begin{matrix} 5x+2=7 \\ 5x+2=-7 \end{matrix} \longrightarrow \begin{matrix} x=1 \\ x=-9/5 \end{matrix} \longrightarrow \{-9/5, 1\}$

VI. $\left|\frac{2x-1}{3}\right| = 4 \longrightarrow \begin{matrix} \frac{2x-1}{3}=4 \\ \frac{2x-1}{3}=-4 \end{matrix} \longrightarrow \begin{matrix} x=13/2 \\ x=-11/2 \end{matrix} \longrightarrow \{-11/2, 13/2\}$

Inequalities Practice

Question 8

Solve (set notation)

I. $|3x - 1| = |2x + 4|$

$3x - 1 = 2x + 4$ $\longrightarrow$ $x = 5$

$3x - 1 = -(2x + 4)$ $\longrightarrow$ $x = -3/5$ $\longrightarrow$ $\{-3/5, 5\}$

II. $|5x + 7| = |4x + 3|$

$5x + 7 = 4x + 3$ $\longrightarrow$ $x = -4$

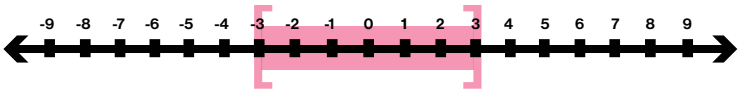
$5x + 7 = -(4x + 3)$ $\longrightarrow$ $x = -10/9$ $\longrightarrow$ $\{-4, -10/9\}$

Question 9

Solve (interval and set notation) and graph

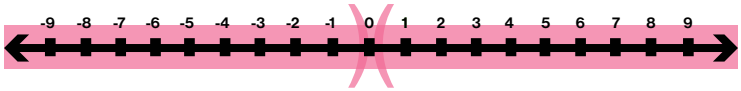
I. $|x| \leq 3$

$-3 \leq x \leq 3$ $\{x \mid -3 \leq x \leq 3\}$ $[-3, 3]$



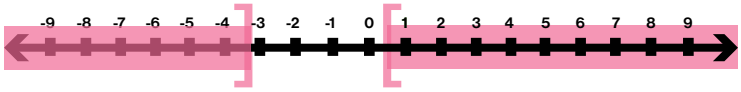
II. $|x| > 0$

$x < 0$ or $x > 0$ $\{x \mid x < 0 \text{ or } x > 0\}$ $(-\infty, 0) \cup (0, \infty)$



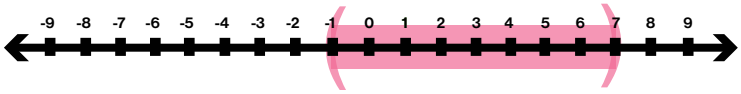
III. $|3x + 4| + 2 \geq 8 \longrightarrow |3x + 4| \geq 6 \longrightarrow 3x + 4 \geq 6$ or $3x + 4 \leq -6$

$x \geq 2/3$ or $x \leq -10/3$ $\{x \mid x \geq 2/3 \text{ or } x \leq -10/3\}$ $(-\infty, -10/3] \cup [2/3, \infty)$



IV. $|x - 3| < 4 \longrightarrow -4 < x - 3 < 4$

$-1 < x < 7$ $\{x \mid -1 < x < 7\}$ $(-1, 7)$

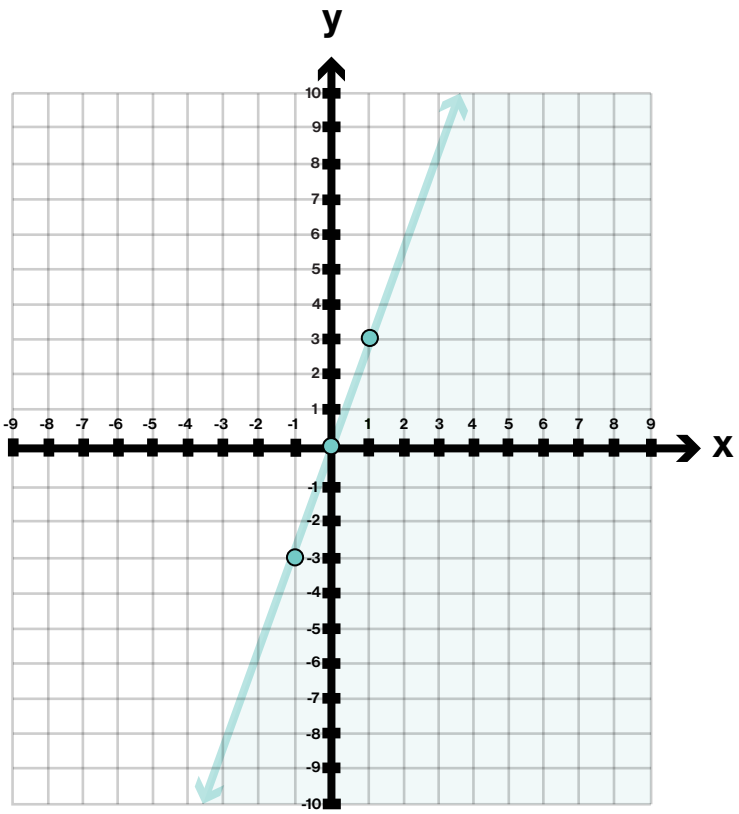


Inequalities Practice

Question 10

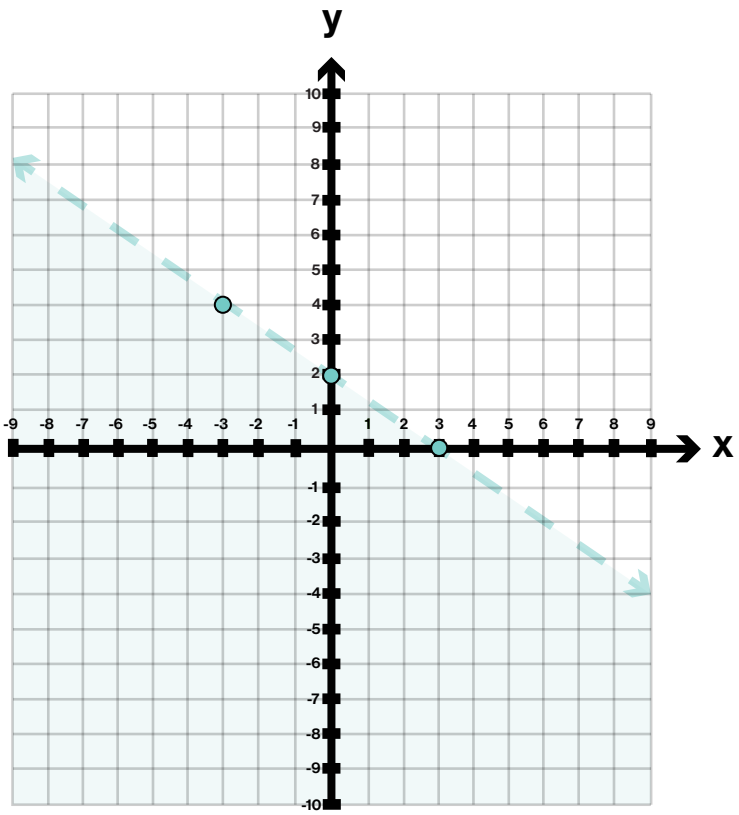
Graph

I.



$y \leq 3x$

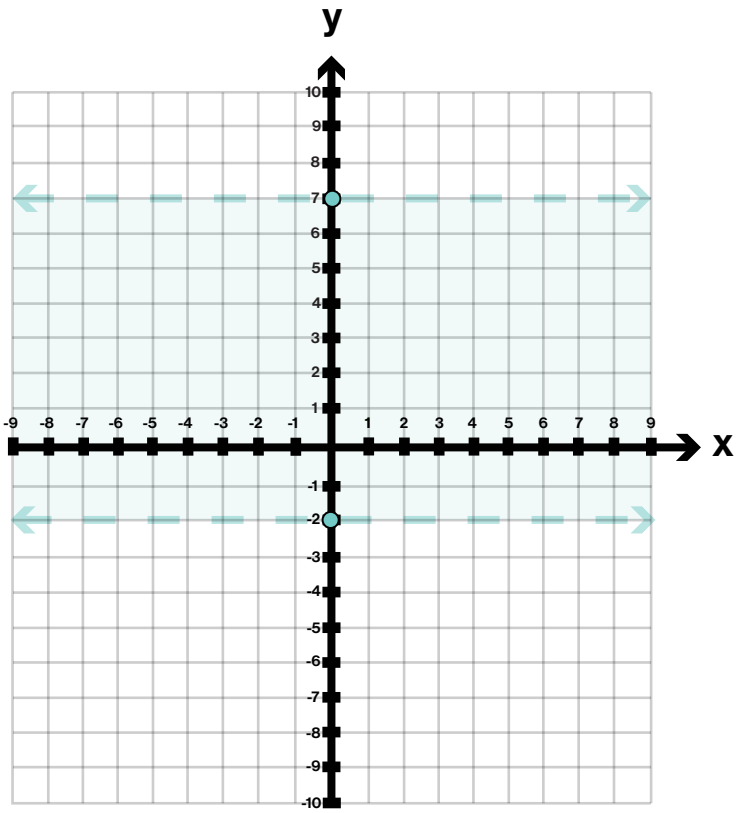
II.



$6 > 2x + 3y$

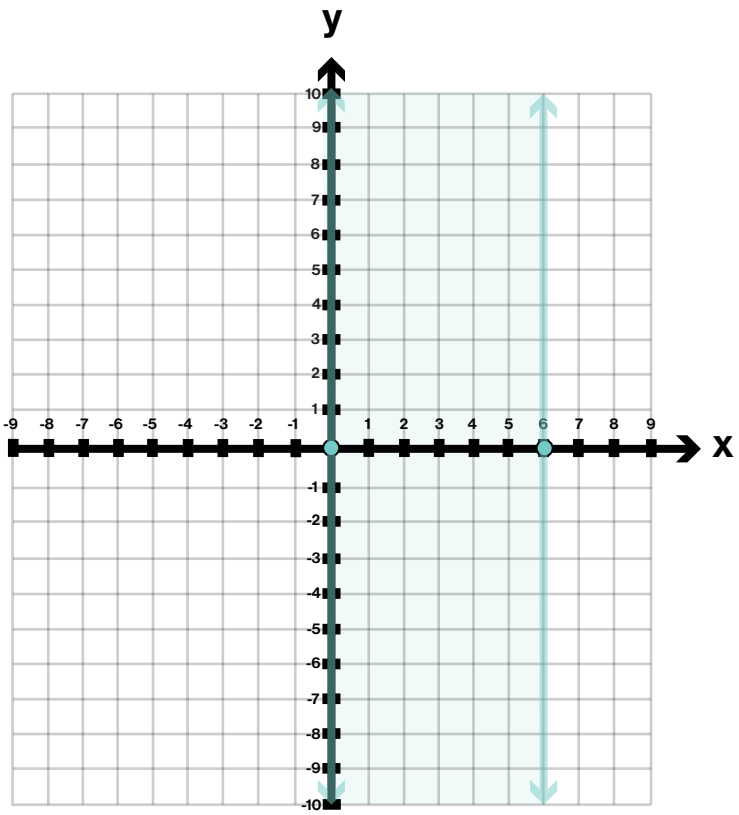
Inequalities Practice

III.



$-2 < y < 7$

IV.



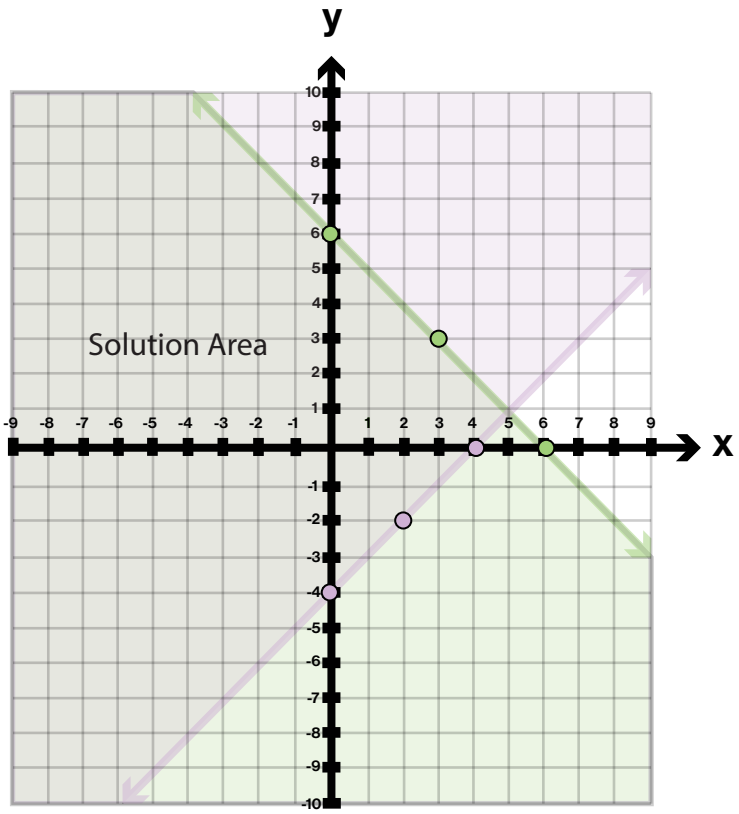
$0 \leq x \leq 6$

Inequalities Practice

Question 11

Graph and find the solution area

I.



$x + y \leq 6$

$x - y \leq 4$