Chapter 6. Solving Linear Inequalities

Ex. 6.4

Answer 1CU.

The objective is to describe the difference between a compound inequality containing 'and' and a compound inequality containing 'or'

A compound inequality containing 'and' is true if and only if both inequalities are true.

For example:- if $a \le 6$ and $a \ge -2$ .This is possible only if both inequalities are true.

A compound inequality containing 'or' is true if and only if at least 1 of the inequalities is true.
For example:- if $y > 12$ or $y < 9$ .This is true if at least 1 of the inequalities is true.

Answer 1PQ.

The objective is to solve inequality and to check the solution

$5 - 4b > -23$

$5 + 23 > 4b$ Add $23 + 4b$ on both sides of inequality

$28 > 4b$

$\frac{28}{4} > b$ Divide both sides of inequality with 4

$7 > b$

Conclusion:- $\boxed{7 > b}$

To check the solution

Consider $b = 5$ since $7 > b$

Substitute $b = 5$ in $5 - 4b > -23$ to check

We get $5 - 4(5) ? - 23$

$5 - 20 ? - 23$

$-15 > -23$

Since this inequality is true, $7 > b$ is true

Answer 2CU.

The objective is to write a compound inequality for the statement

7 is less than t, which is less than 12

Compound inequality is $7 < t$ and $t < 12$

This can also be written as $7 < t < 12$

Conclusion:- Compound inequality is $\boxed{7 < t < 12}$

Answer 2PQ.

The objective is to solve inequality and to check the solution

$$\frac{1}{2}n + 3 \geq -5$$

$\frac{1}{2}n \geq -5 - 3$ Add -3 on both sides of inequality

$$\frac{1}{2}n \geq -8$$

$n \geq -16$ Multiply both sides of inequality with 2

Conclusion:- $\boxed{n \geq -16}$

To check the solution

Consider $n = 0$ since $n \geq -16$

Substitute $n = 0$ in $\frac{1}{2}n + 3 \geq -5$ to check

We get $\frac{1}{2}(0) + 3 ? - 5$

$3 > -5$

Since this inequality is true, $n \geq -16$ is true

Answer 3CU.

The objective is to give an example of a compound inequality containing 'and' that has no solution.

A compound inequality containing 'and' is true if and only if both inequalities are true.

Example is $x > 4$ and $x \leq -2$ because there is no solution for which both inequalities are true since their intersection is null set.

Answer 3PQ.

The objective is to solve inequality and to check the solution

$3(t+6)<9$

$3t+18<9$ Use distributive property

$3t<9-18$ Add -18 on both sides of inequality

$3t<-9$

$t<\frac{-9}{3}$ Divide both sides of inequality with 3

$t<-3$

Conclusion:- $\boxed{t<-3}$

To check the solution

Consider $t=-5$ since $t<-3$

Substitute $t=-5$ in $3(t+6)<9$ to check

We get $3(-5+6)?9$

$3(1)?9$

$3<9$

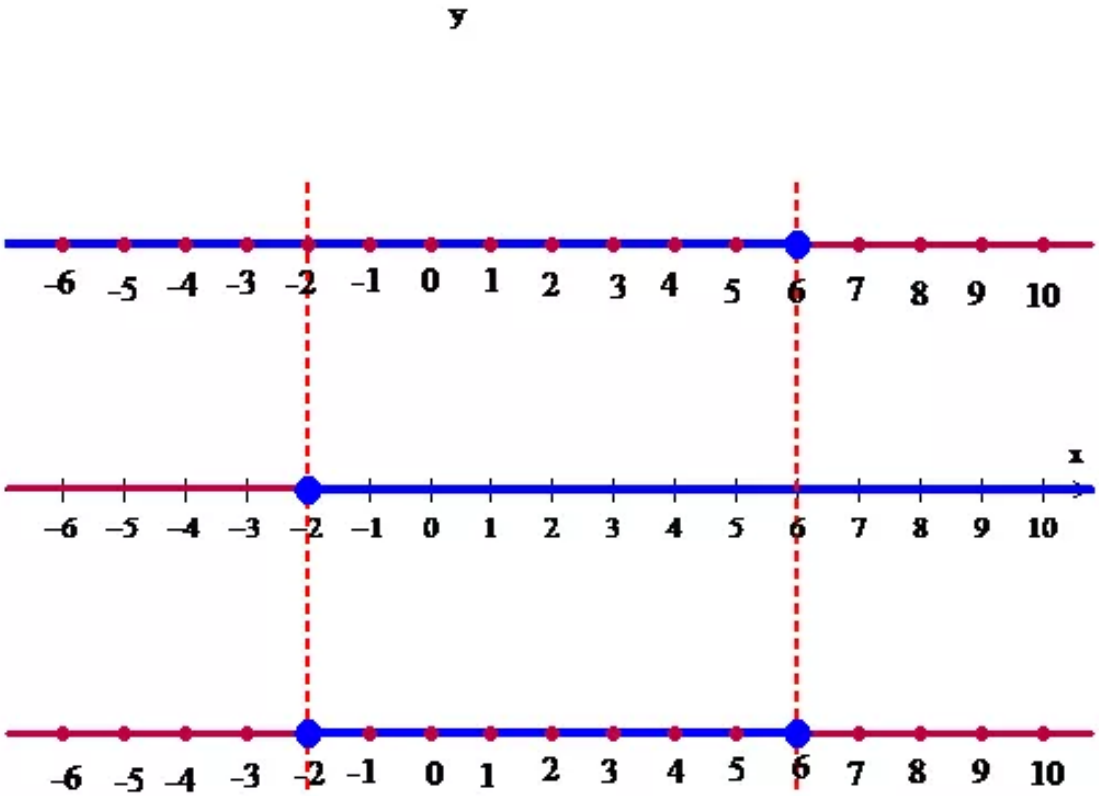
Since this inequality is true, $t<-3$ is true

Answer 4CU.

The objective is to graph the solution set of the compound inequality.

$a \le 6$ and $a \ge -2$

Graph of $a \le 6$ and $a \ge -2$



The topmost line is graph of $a \le 6$

The middle line is graph of $a \ge -2$

The bottom line is graph of their intersection.

The solution set is $= \{a / -2 \le a \le 6\}$

Answer 4PQ.

The objective is to solve inequality and to check the solution

$9x + 2 > 20$

$9x > 20 - 2$ Add -2 on both sides of inequality

$9x > 18$

$x > \frac{18}{9}$ Divide both sides of inequality with 9

Conclusion:- $\boxed{x > 2}$

To check the solution

Consider $x = 5$ since $x > 2$

Substitute $x = 5$ in $9x + 2 > 20$ to check

We get $9(5) + 2 ? 20$

$45 + 2 ? 20$

$47 > 20$

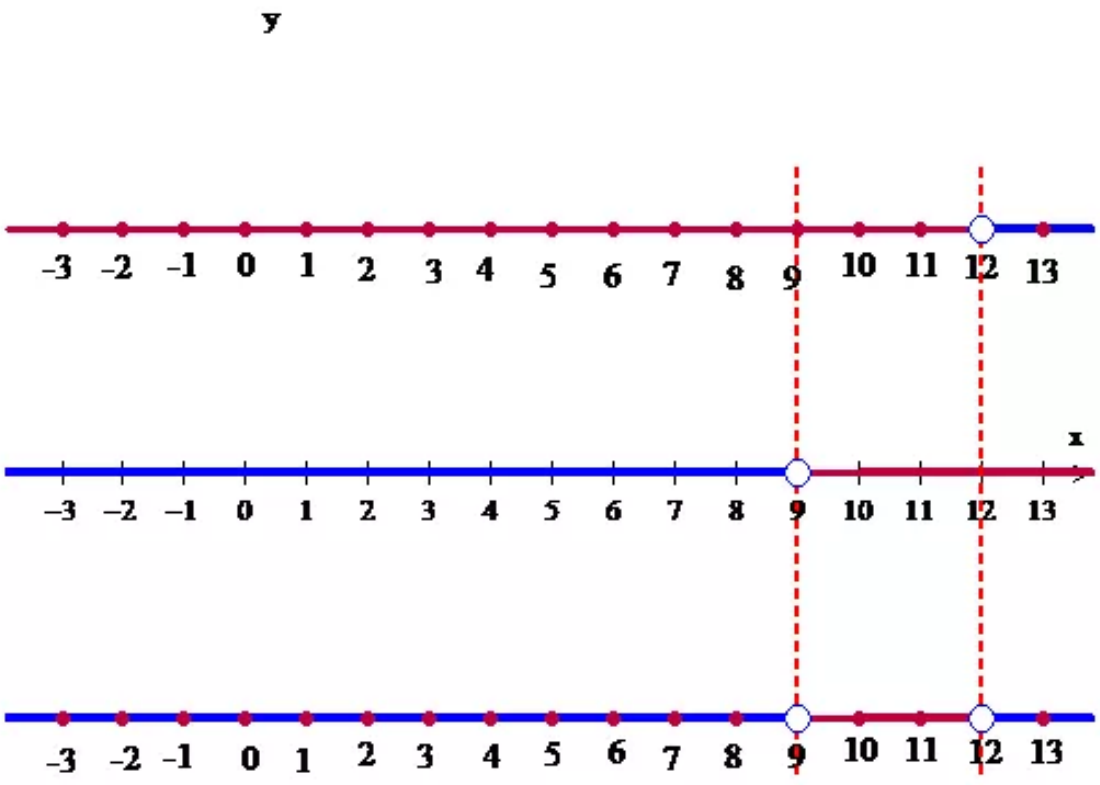
Since this inequality is true, $x > 2$ is true

Answer 5CU.

The objective is to graph the solution set of the compound inequality.

$y > 12$ or $y < 9$

Graph of $y > 12$ or $y < 9$



The topmost line is graph of $y > 12$

The middle line is graph of $y < 9$

The bottom line is graph of their union.

The solution set is $= \{y / y > 12 or y < 9\}$

Answer 5PQ.

The objective is to solve inequality and to check the solution

$2m+5 \le 4m-1$

$5+1 \le 4m-2m$ Add $-2m+1$ on both sides of inequality

$6 \le 2m$

$\frac{6}{2} \le m$ Divide both sides of inequality with 2

$3 \le m$

Conclusion:- $\boxed{3 \le m}$

To check the solution

Consider $m=5$ since $3 \le m$

Substitute $m=5$ in $2m+5 \le 4m-1$ to check

We get $2(5)+5?4(5)-1$

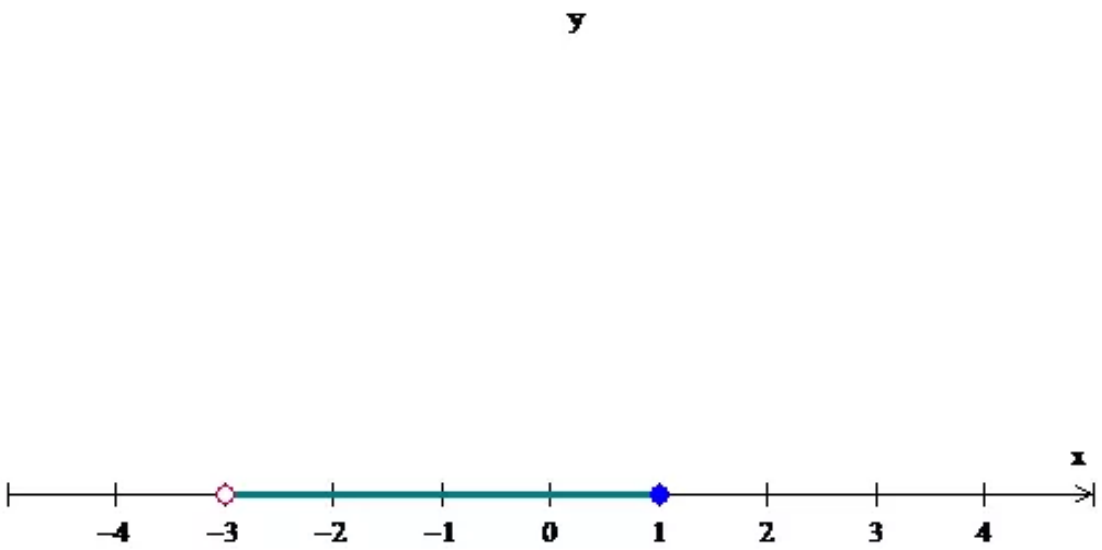
$10+5?20-1$

$15<19$

Since this inequality is true, $3 \le m$ is true

Answer 6CU.

The objective is to write a compound inequality for the graph



Consider the variable to be *x*

Since the line in the graph has values greater than -3 and less than or equal to 1,

the compound inequality is $x > -3$ and $x \le 1$

Conclusion:- The compound inequality is $\boxed{x > -3 \text{ and } x \le 1}$

Answer 6PQ.

The objective is to solve inequality and to check the solution

$$a < \frac{2a - 15}{3}$$

$3a < 2a - 15$ Multiply 3 on both sides of inequality

$3a - 2a < -15$ Add $-2a$ on both sides of inequality

$a < -15$

Conclusion:- $\boxed{a < -15}$

To check the solution

Consider $a = -18$ since $a < -15$

Substitute $a = -18$ in $a < \frac{2a-15}{3}$ to check

We get $-18 ? \frac{2(-18)-15}{3}$

$-18 ? \frac{-36-15}{3}$

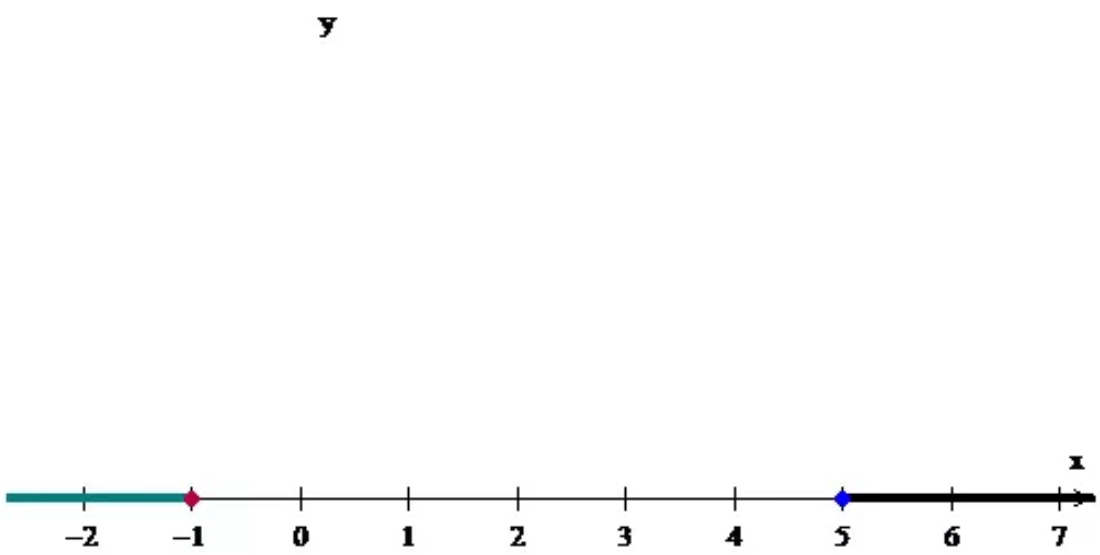
$-18 ? \frac{-51}{3}$

$-18 < -17$

Since this inequality is true, $a < -15$ is true

Answer 7CU.

The objective is to write a compound inequality for the graph



Consider the variable to be *x*

Since line in the graph has values greater than or equal to 5 or less than or equal to -1,

the compound inequality is $x \le 1 or x \ge 5$

Conclusion:- The compound inequality is $\boxed{x \le 1 or x \ge 5}$

Answer 7PQ.

The objective is to graph the solution set of the compound inequality after solving it .

$x-2<7$ and $x+2>5$

Consider $x-2<7$

$x<7+2$ Add 2 on both sides of inequality

$x<9$

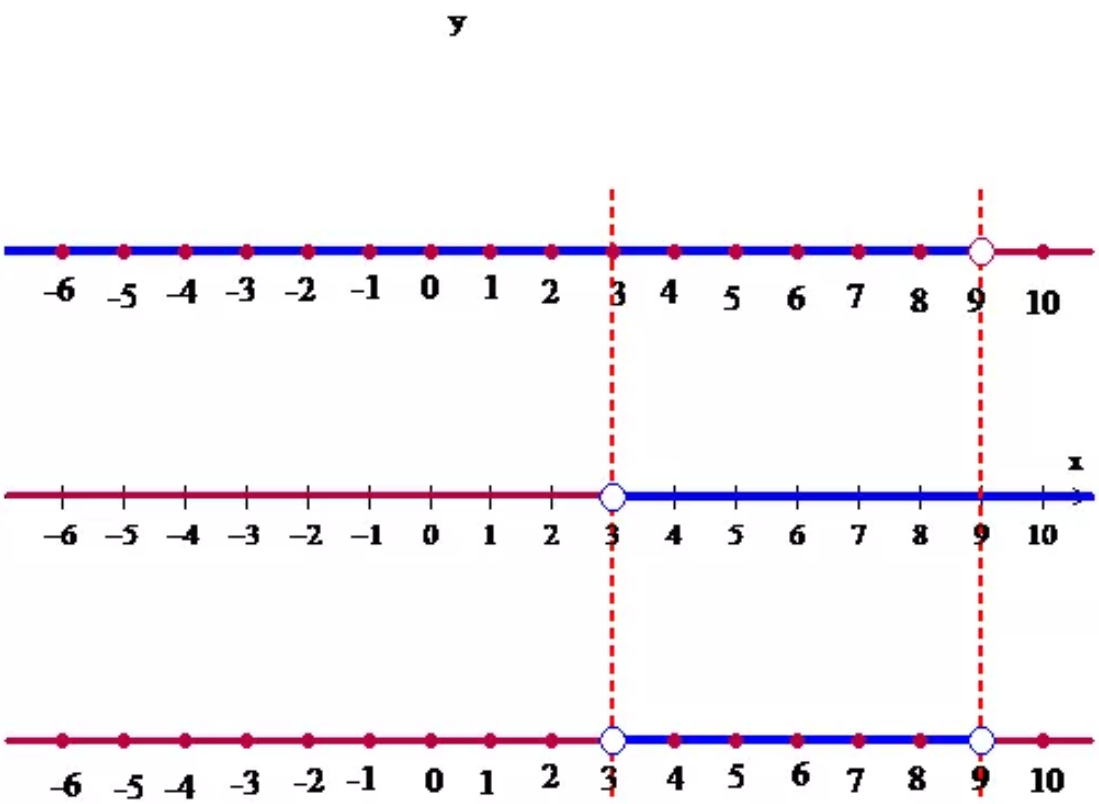
Consider $x+2>5$

$x>5-2$ Add -2 on both sides of inequality

$x>3$

Solution is $x<9$ and $x>3$

Graph of $x-2<7$ and $x+2>5$



The topmost line is graph of $x-2<7$

The middle line is graph of $x+2>5$

The bottom line is graph of their intersection.

The solution set is $=\{x/9>x>3\}$

Answer 8CU.

The objective is to graph the solution set of the compound inequality.

$6 < w+3$ and $w+3 < 11$

Consider $6 < w+3$

$6-3 < w$ Add -3 on both sides of inequality

$3 < w$

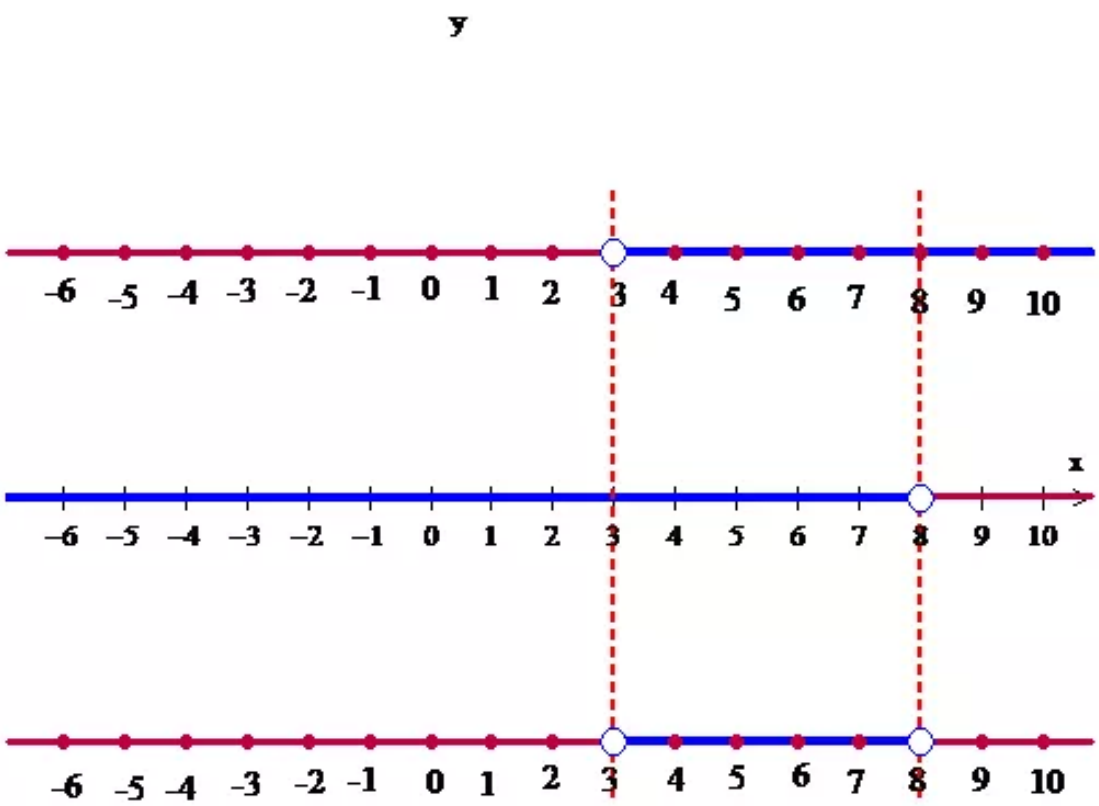
Consider $w+3 < 11$

$w < 11-3$ Add -3 on both sides of inequality

$w < 8$

Solution is $w < 8$ and $3 < w$

Graph of $6 < w+3$ or $w+3 < 11$



The topmost line is graph of $6 < w+3$

The middle line is graph of $w+3 < 11$

The bottom line is graph of their intersection.

The solution set is $= \{3 < w < 8\}$

Answer 8PQ.

The objective is to graph the solution set of the compound inequality after solving it..

$2b+5\le -1$ or $b-4\ge -4$

Consider $2b+5\le -1$

$2b\le -1-5$ Add -5 on both sides of inequality

$2b\le -6$

$b\le \frac{-6}{2}$ Divide both sides of inequality with2

$b\le -3$

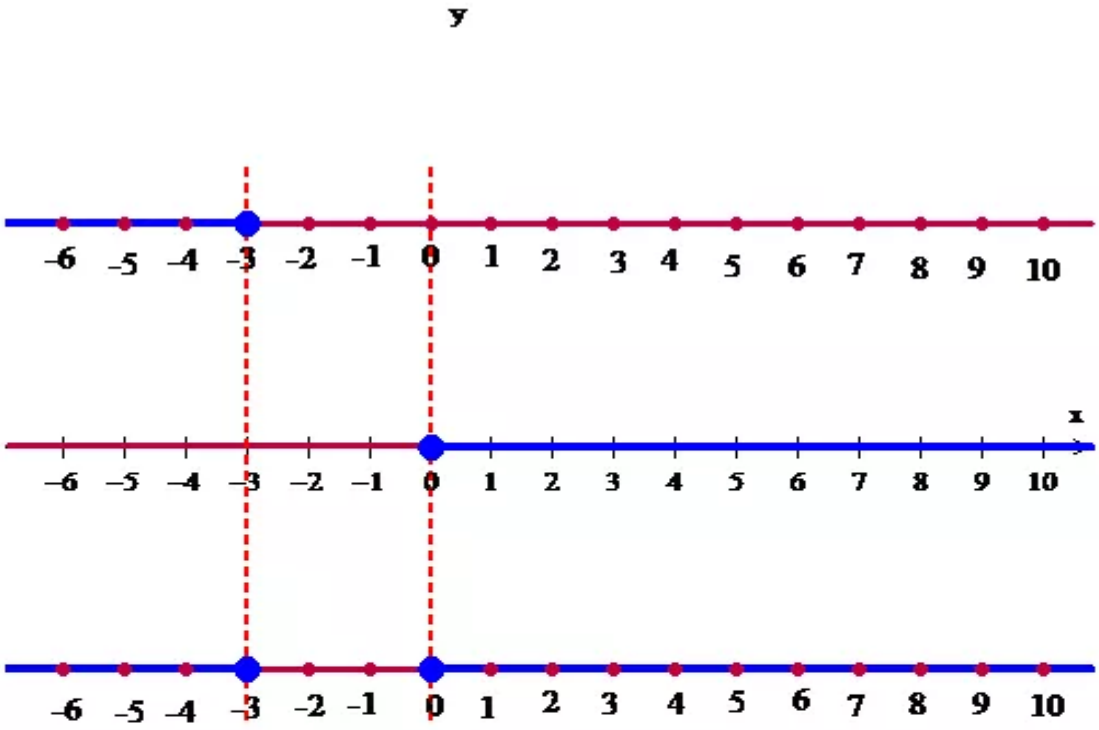
Consider $b-4\ge -4$

$b\ge -4+4$ Add both sides of inequality with 4

$b\ge 0$

Solution is $b\le -3$ or $b\ge 0$

Graph of $2b+5\le -1$ or $b-4\ge -4$



The topmost line is graph of $2b+5\le -1$

The middle line is graph of $b-4\ge -4$

The bottom line is graph of their union.

The solution set is $=\{b/b\le -3 or b\ge 0\}$

Answer 9CU.

The objective is to graph the solution set of the compound inequality after solving it..

$n-7\le -5$ or $n-7\ge 1$

Consider $n-7\le -5$

$n\le -5+7$ Add 7 on both sides of inequality

$n\le 2$

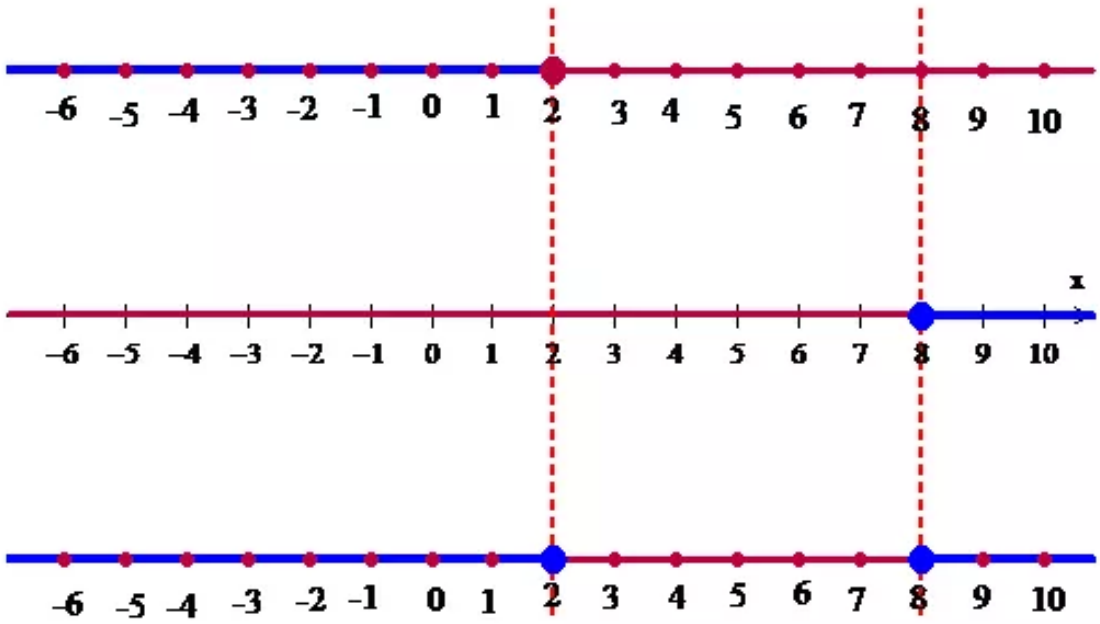
Consider $n-7\ge 1$

$n\ge 1+7$ Add 7 on both sides of inequality

$n\ge 8$

Solution is $n\le 2$ or $n\ge 8$

Graph of $n-7\le -5$ or $n-7\ge 1$



The topmost line is graph of $n-7\le -5$

The middle line is graph of $n-7\ge 1$

The bottom line is graph of their union.

The solution set is $=\{n/2\ge norn\ge 8\}$

Answer 9PQ.

The objective is to graph the solution set of the compound inequality.

$4m-5>7$ or $4m-5<-9$

Consider $4m-5>7$

$4m>7+5$ Add 5 on both sides of inequality

$4m>12$

$m>\frac{12}{4}$ Divide both sides of inequality with 4

$m>3$

Consider $4m-5<-9$

$4m<-9+5$ Add 5 on both sides of inequality

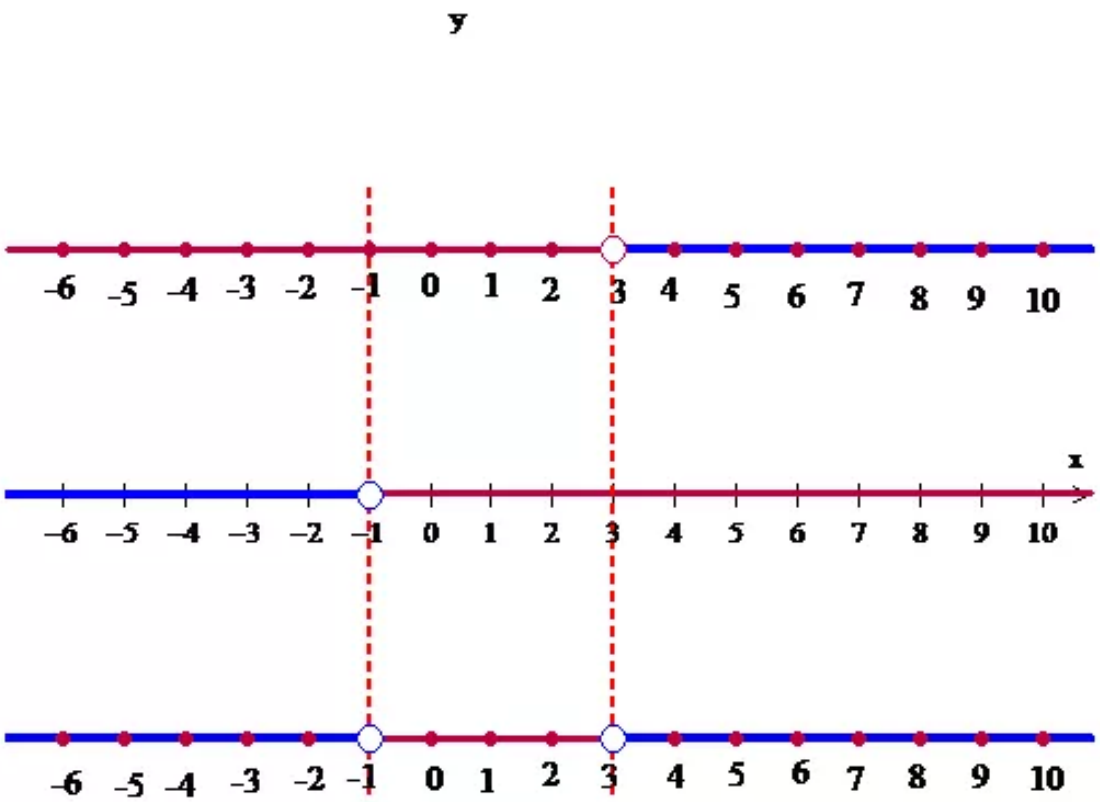
$4m<-4$

$m<\frac{-4}{4}$ Divide both sides of inequality with 4

$m<-1$

Solution is $m>3$ or $m<-1$

Graph of $4m-5>7$ or $4m-5<-9$



The topmost line is graph of $4m-5>7$

The middle line is graph of $4m-5<-9$

The bottom line is graph of their union.

The solution set is $=\{m/m>3 or m<-1\}$

Answer 10CU.

The objective is to graph the solution set of the compound inequality after solving it..

$3z+1<13$ or $z\le 1$

Consider $3z+1<13$

$3z<13-1$ Add -1 on both sides of inequality

$3z<12$

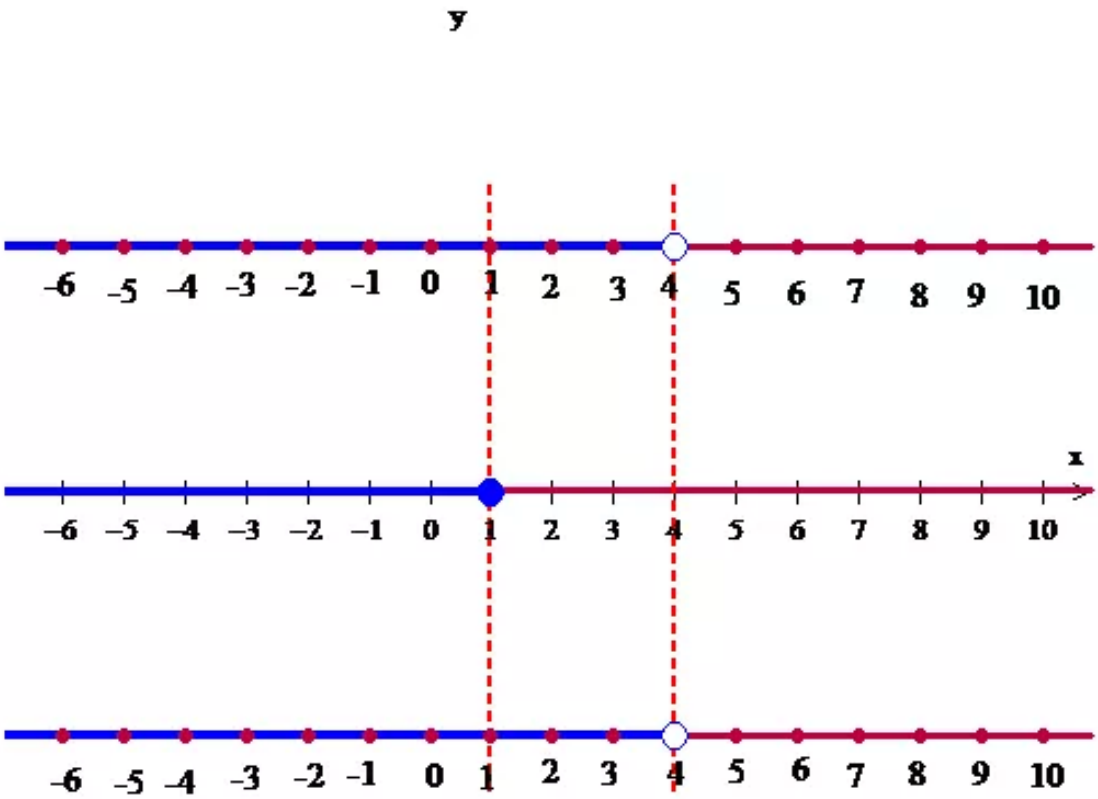
$z<\frac{12}{3}$ Divide both sides of inequality with 3

$z<4$

Consider $z\le 1$

Solution is $z<4$ or $z\le 1$

Graph of $3z+1<13$ or $z\le 1$



The topmost line is graph of $3z+1<13$

The middle line is graph of $z\le 1$

The bottom line is graph of their union.

The solution set is $=\{z/z<4\}$

Answer 10PQ.

The objective is to graph the solution set of the compound inequality after solving it .

$a-4<1$ and $a+2>1$

Consider $a-4<1$

$a<1+4$ Add 4 on both sides of inequality

$a<5$

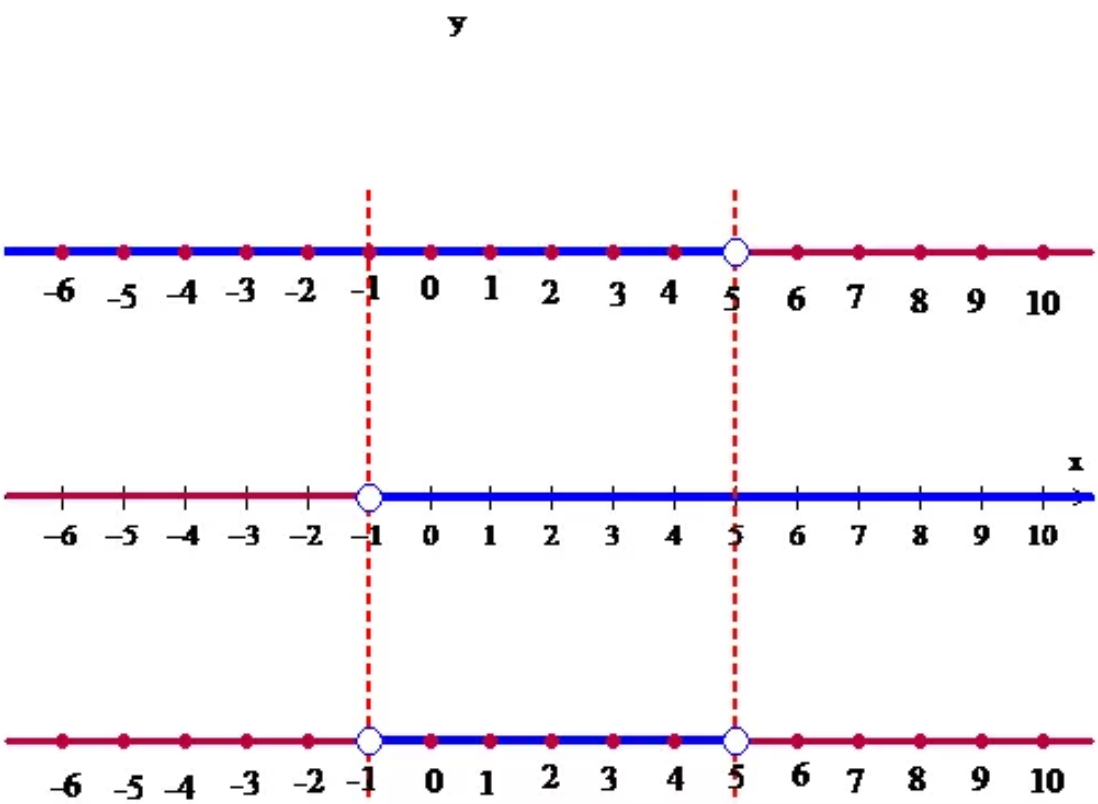
Consider $a+2>1$

$a>1-2$ Add -2 on both sides of inequality

$a>-1$

Solution is $a<5$ and $a>-1$

Graph of $a-4<1$ and $a+2>1$



The topmost line is graph of $a-4<1$

The middle line is graph of $a+2>1$

The bottom line is graph of their intersection.

The solution set is $=\{a/5>a>-1\}$

Answer 11CU.

The objective is to graph the solution set of the compound inequality.

$-8<x-4\leq -3$

Consider $-8<x-4$

$-8+4<x$ Add 4 to both sides of inequality

$-4<x$

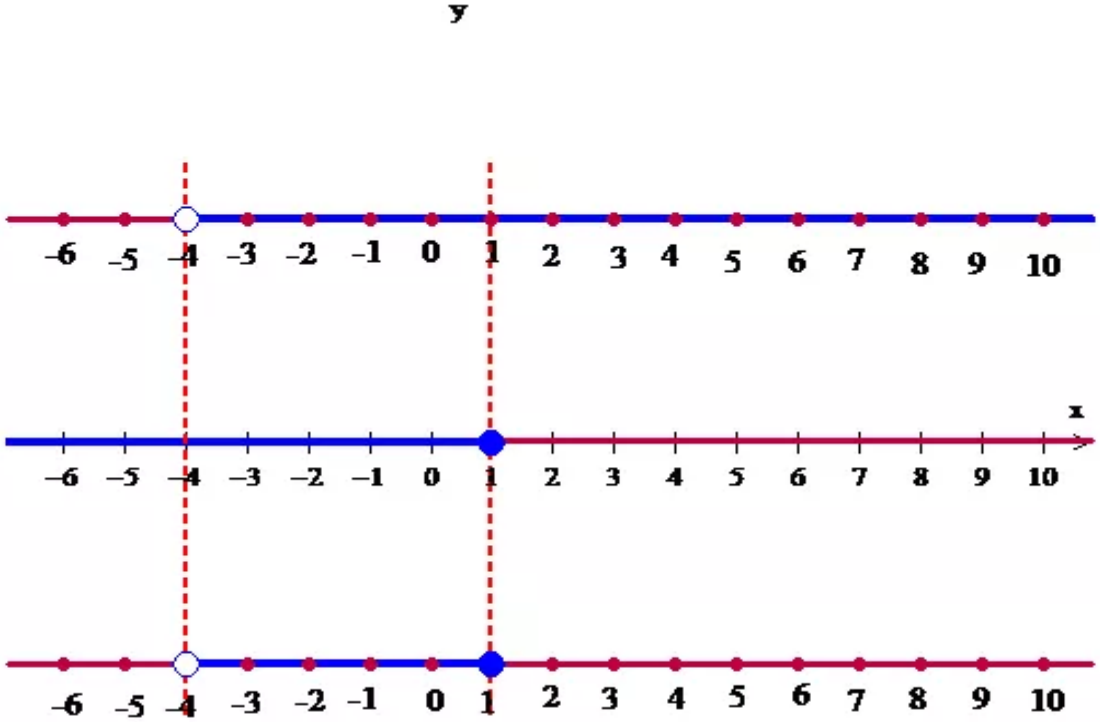
Consider $x-4\leq -3$

$x\leq -3+4$ Add 4 to both sides of inequality

$x\leq 1$

Solution is $-4<x$ and $x\leq 1$

Graph of $-8<x-4\leq -3$



The topmost line is graph of $-4 < x$

The middle line is graph of $x \le 1$

The bottom line is graph of their intersection.

The solution set is $= \{x / -4 < x \le 1\}$

Answer 12CU.

The objective is to define a variable, write a compound inequality for the statement and solve it.

Three times a number minus 7 is less than 17 and greater than 5

Compound inequality is $5 < 3x - 7$ and $3x - 7 < 17$,

This can also be written as $5 < 3x - 7 < 17$

Consider $5 < 3x - 7$

$5 + 7 < 3x$

$12 < 3x$

$\frac{12}{3} < x$

$4 < x$

AND

Consider $3x - 7 < 17$

$3x < 17 + 7$

$3x < 24$

$x < \frac{24}{3}$

$x < 8$

Conclusion:- Solution is $\boxed{4 < x < 8}$

Answer 13CU.

The objective is to find the range of increased lengths of the stretched spring if forces between 20 and 30 pounds, inclusive, are applied to the spring.

According to problem, *F* in pounds required to stretch a certain spring *x* inches beyond its natural length is given by $F = 4.5x$

The compound inequality for this situation is $20 \le 4.5x \le 30$

This can be written as $20 \le 4.5x$ and $4.5x \le 30$

Consider $20 \le 4.5x$

$\frac{20}{4.5} \le x$ divide 4.5 on both sides of inequality

$4.44 \le x$

AND

Consider $4.5x \le 30$

$x \le \frac{30}{4.5}$ Divide 4.5 on both sides of inequality

$x \le 6.67$

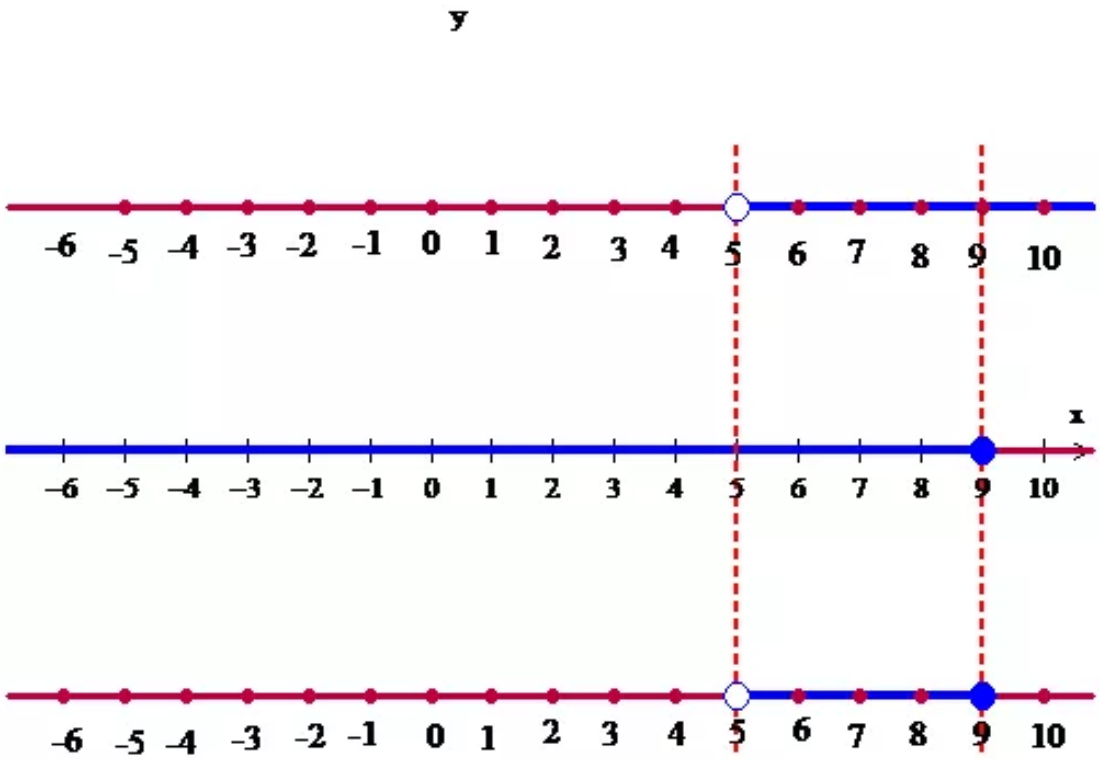
Solution is $\boxed{4.44 \le x \le 6.67}$

Answer 14PA.

The objective is to graph the solution set of the compound inequality.

$x > 5$ and $x \le 9$

Graph of $x > 5$ and $x \le 9$



The topmost line is graph of $x > 5$

The middle line is graph of $x \le 9$

The bottom line is graph of their intersection.

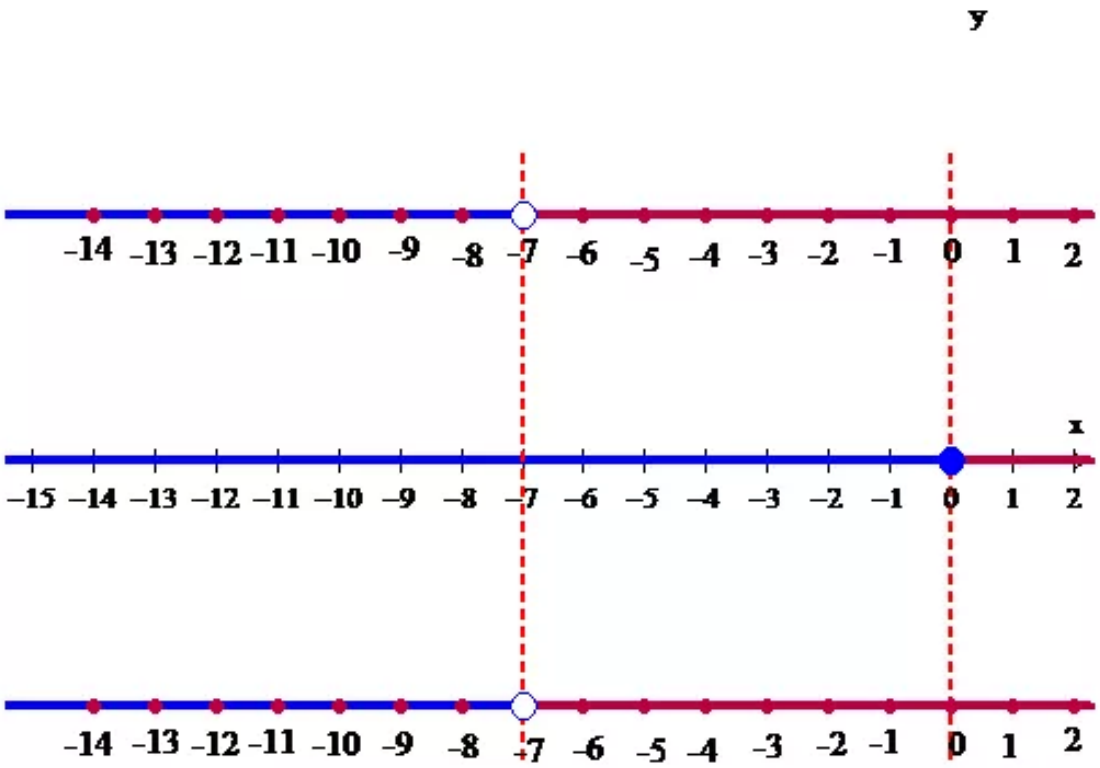
The solution set is $= \{x / 5 < x \le 9\}$

Answer 15PA.

The objective is to graph the solution set of the compound inequality.

$s < -7$ and $s \le 0$

Graph of $s < -7$ and $s \le 0$



The topmost line is graph of $s < -7$

The middle line is graph of $s \le 0$

The bottom line is graph of their intersection.

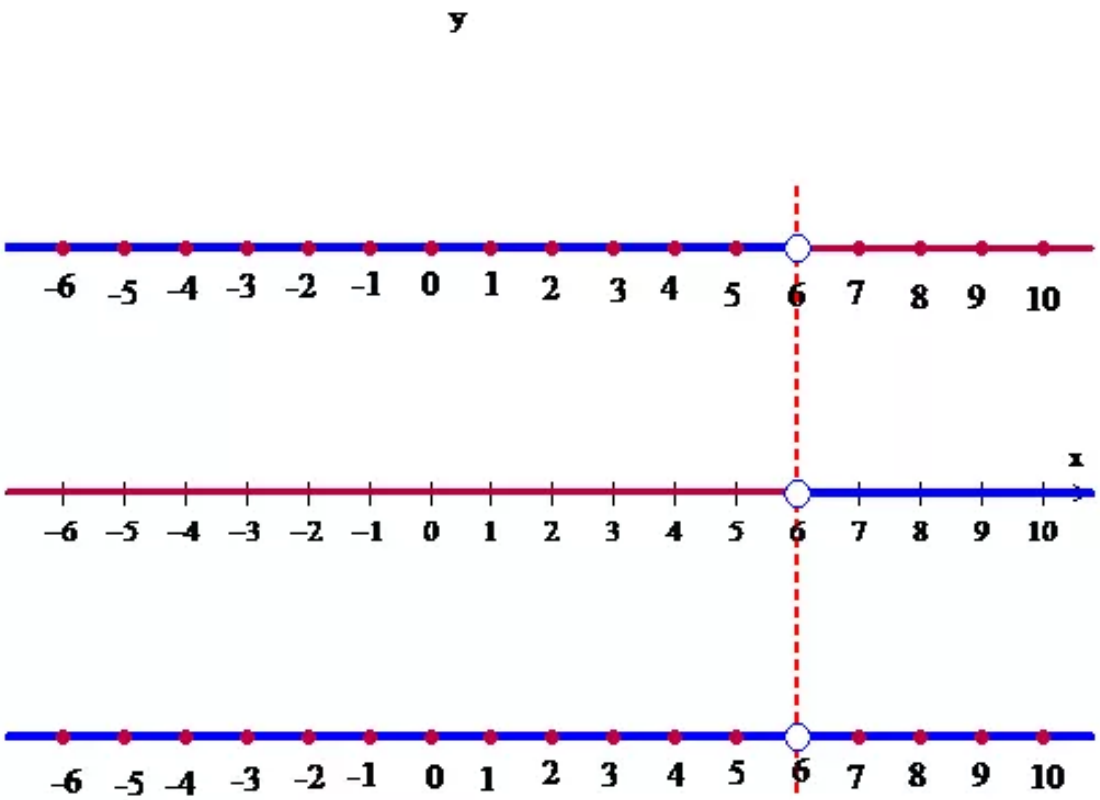
The solution set is $= \{s / s < -7\}$

Answer 16PA.

The objective is to graph the solution set of the compound inequality.

$r < 6$ or $r > 6$

Graph of $r < 6$ or $r > 6$



The topmost line is graph of $r < 6$

The middle line is graph of $r > 6$

The bottom line is graph of their union.

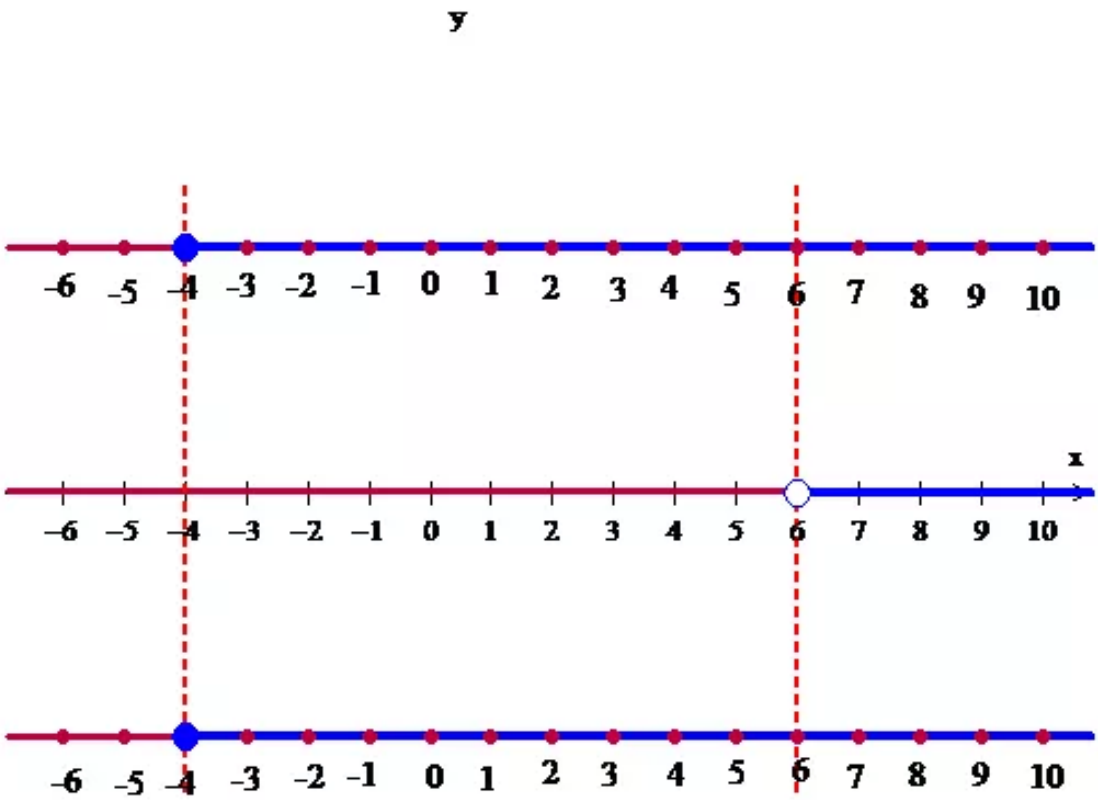
The solution set is $= \{r / 6 > r > 6\}$

Answer 17PA.

The objective is to graph the solution set of the compound inequality.

$m \geq -4$ or $m > 6$

Graph of $m \geq -4$ or $m > 6$



The topmost line is graph of $m \geq -4$

The middle line is graph of $m > 6$

The bottom line is graph of their union.

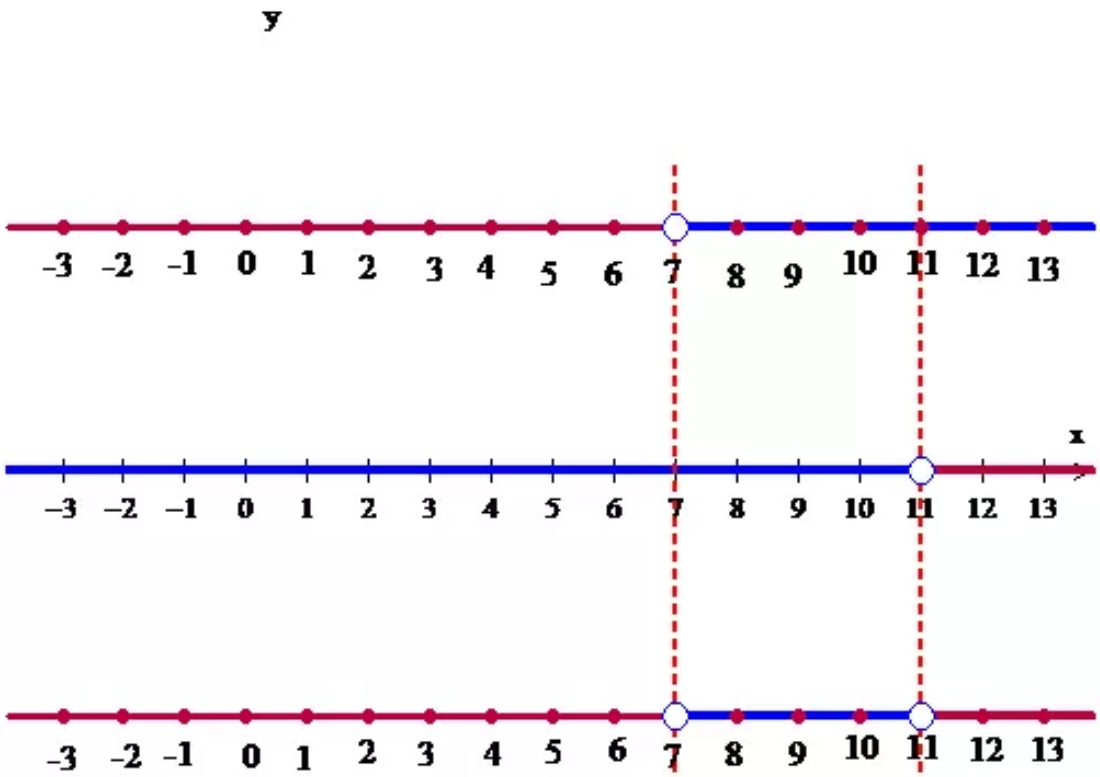
The solution set is $= \{m / m \geq -4\}$

Answer 18PA.

The objective is to graph the solution set of the compound inequality.

$7 < d < 11$

Graph of $7 < d$ and $d < 11$



The topmost line is graph of $7 < d$

The middle line is graph of $d < 11$

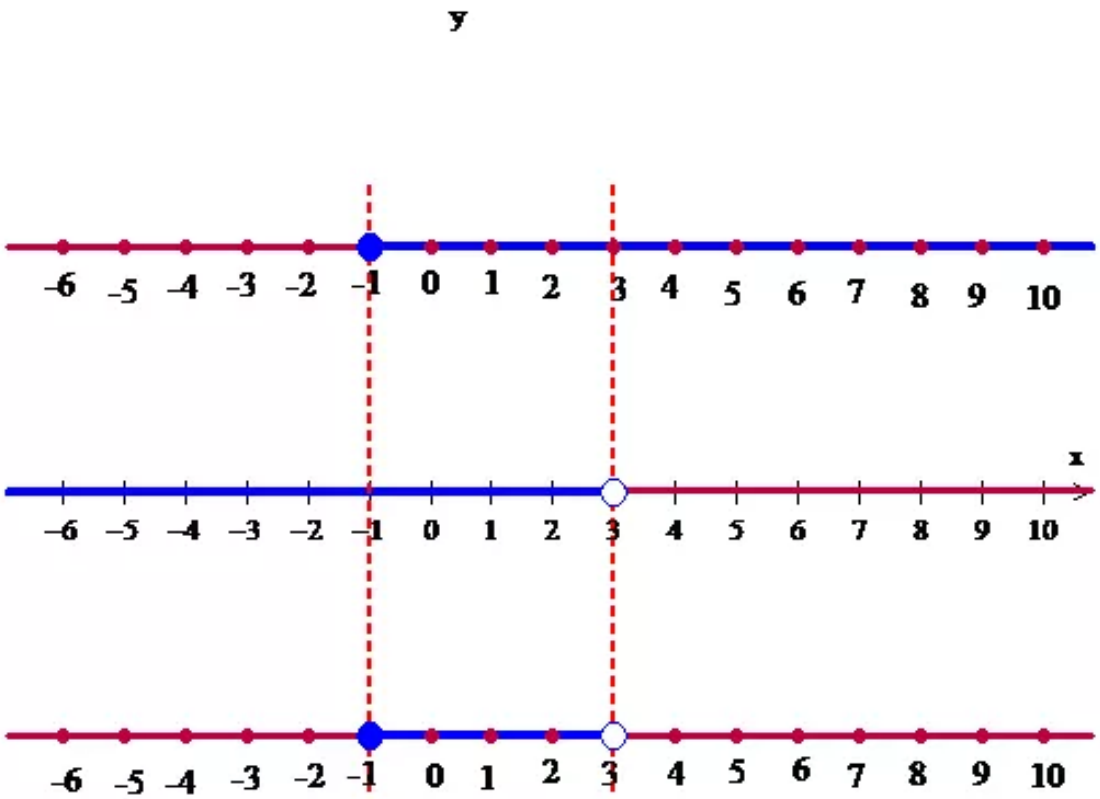
The bottom line is graph of their intersection.

Answer 19PA.

The objective is to graph the solution set of the compound inequality.

$-1 \le g < 3$

Graph of $-1 \le g < 3$



The topmost line is graph of $-1 \le g$

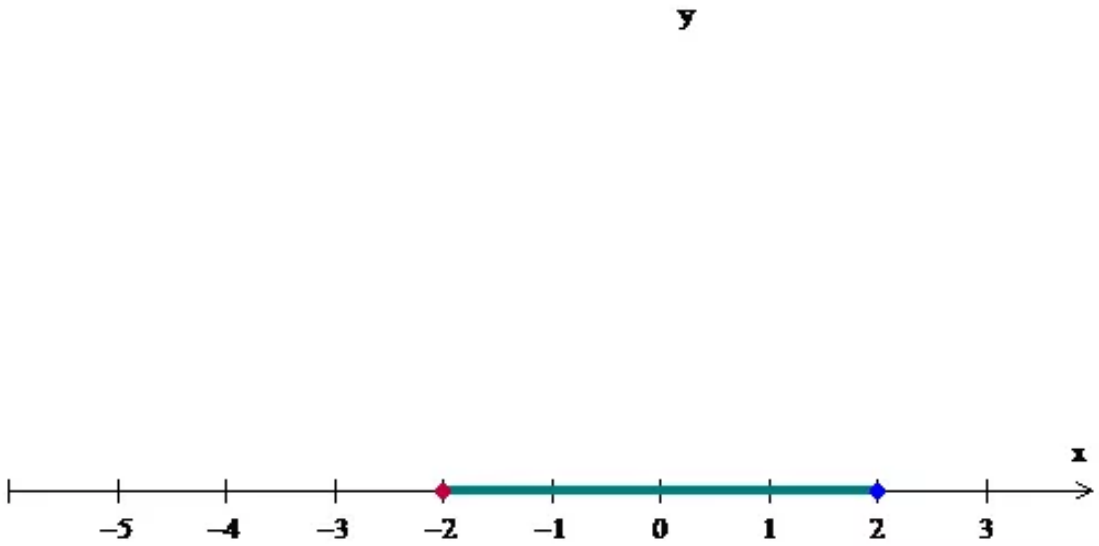
The middle line is graph of $g < 3$

The bottom line is graph of their intersection.

The solution set is $= \{g / -1 \le g < 3\}$

Answer 20PA.

The objective is to write a compound inequality for the graph



Consider the variable to be *x*

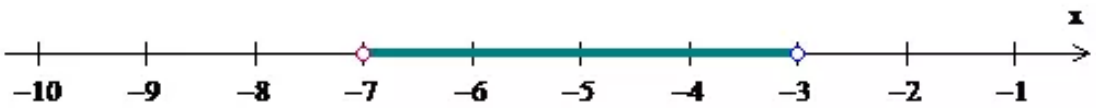
Since line in the graph has values greater than or equal to -2 and less than or equal to 2,

the compound inequality is $x \geq -2$ and $x \leq 2$

Conclusion:- The compound inequality is $\boxed{x \geq -2 \text{ and } x \leq 2}$

Answer 21PA.

The objective is to write a compound inequality for the graph



Consider the variable to be x

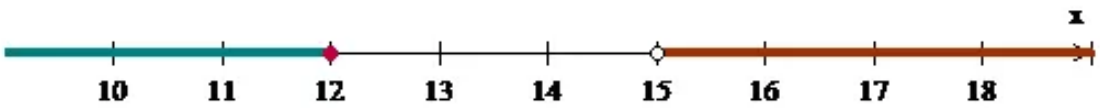
Since line in the graph has values greater than -7 and less than -3,

the compound inequality is $x > -7$ and $x < -3$

Conclusion:- The compound inequality is $\boxed{-7 < x < -3}$

Answer 22PA.

The objective is to write a compound inequality for the graph



Consider the variable to be x

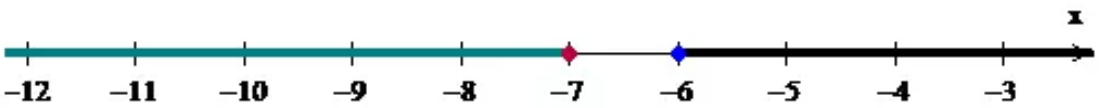
Since line in the graph has values greater than 15 and less than or equal to 12.

the compound inequality is $x \le 12$ or $x > 15$

Conclusion:- The compound inequality is $\boxed{x \le 12 or x > 15}$

Answer 23PA.

The objective is to write a compound inequality for the graph



Consider the variable to be *x*

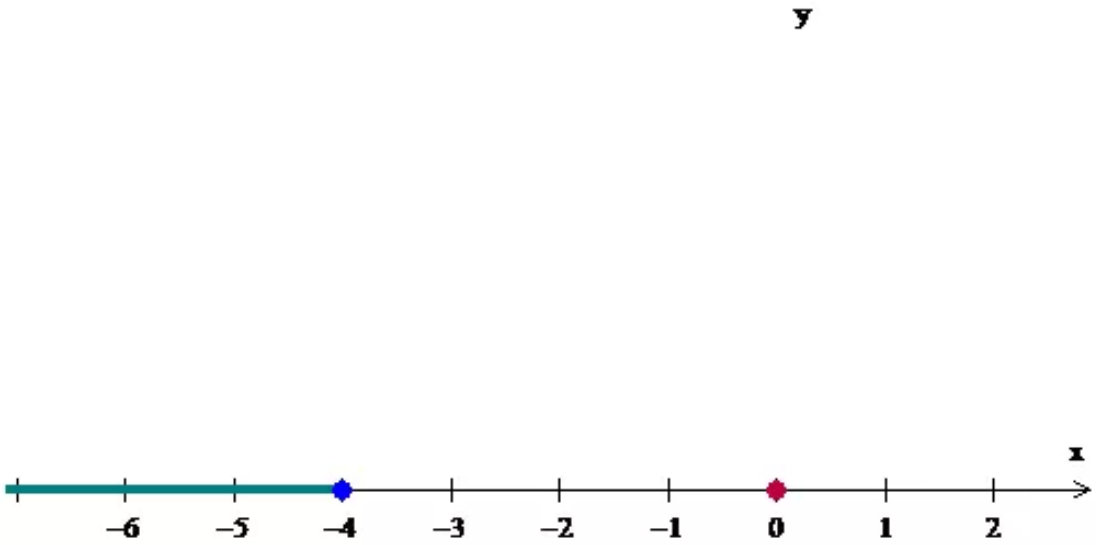
Since line in the graph has values greater than or equal to -6 and less than or equal to -7 .

the compound inequality is $y \le -7$ or $y \ge -6$

Conclusion:- The compound inequality is $\boxed{y \le -7 or y \ge -6}$

Answer 24PA.

The objective is to write a compound inequality for the graph



Consider the variable to be y

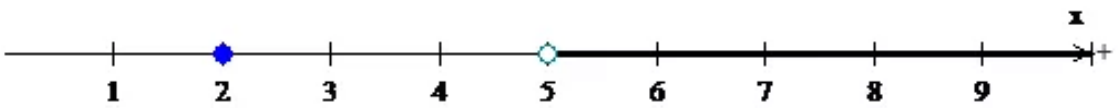
Since line in the graph has values equal to 0 and less than or equal to -4 .

the compound inequality is $y = 0$ or $y \le -4$

Conclusion:- The compound inequality is $\boxed{y = 0 or y \le -4}$

Answer 25PA.

The objective is to write a compound inequality for the graph



Consider the variable to be y

Since line in the graph has values equal to 2 and greater than 5 .

the compound inequality is $y = 2$ or $y > 5$

Conclusion:- The compound inequality is $\boxed{y = 2 or y > 5}$

Answer 26PA.

The objective is to write an inequality for the range of wind speeds of an F3 tornado.

As per data given in problem, F3 tornado has wind speeds rating from 158-206mph

The inequality for the range of wind speeds of an F3 tornado is $158 \le f \le 206$

Conclusion:- The inequality is $\boxed{158 \le f \le 206}$

Answer 27PA.

The objective is to write an inequality to represent temperatures where sharks will not thrive.

As per data given in problem, the optimum temperature for sharks range from 18C to 22C

The inequality to represent temperatures where sharks will not thrive is less than the lower value and higher the greater value ,that is $t \le 18$ or $t \ge 22$

Conclusion:- The inequality is $\boxed{t \le 18 or t \ge 22}$

Answer 28PA.

The objective is to graph the solution set of the compound inequality after solving it .

$k+2>12$ and $k+2\le 18$

Consider $k+2>12$

$k>12-2$ Add -2 on both sides of inequality

$k>10$

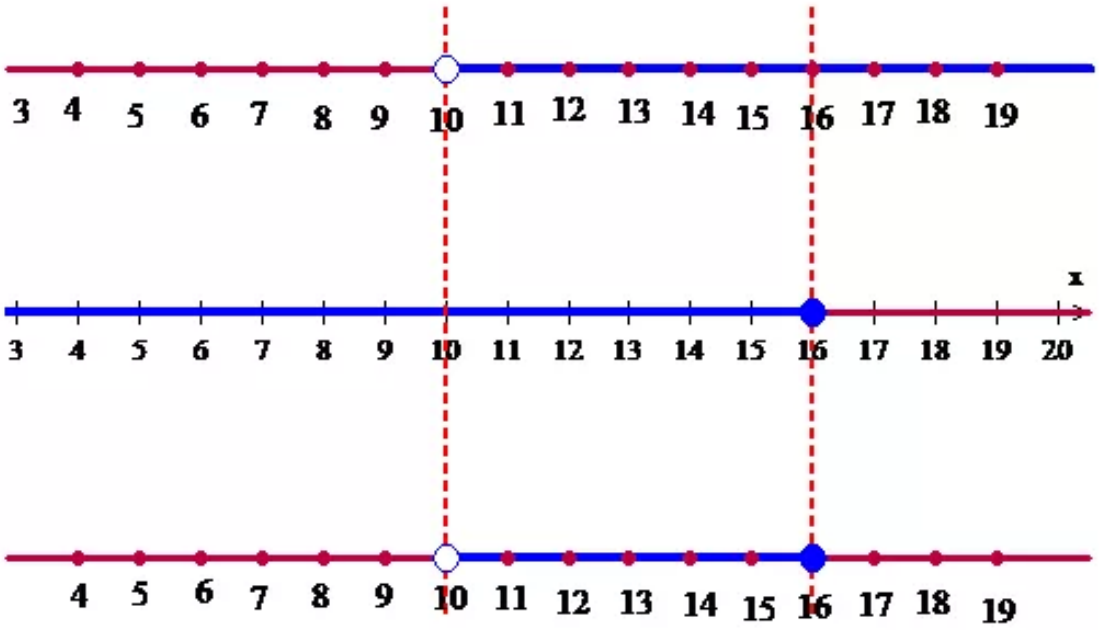
Consider $k+2\le 18$

$k\le 18-2$ Add -2 on both sides of inequality

$k\le 16$

Solution is $k>10$ and $k\le 16$

Graph of $k+2>12$ and $k+2\le 18$



The topmost line is graph of $k+2>12$

The middle line is graph of $k+2\le 18$

The bottom line is graph of their intersection.

The solution set is $=\{k/10<k\le 16\}$

Answer 29PA.

The objective is to graph the solution set of the compound inequality after solving it .

$f+8\le 3$ and $f+9\ge -4$

Consider $f+8\le 3$

$f\le 3-8$ Add -8 on both sides of inequality

$f\le -5$

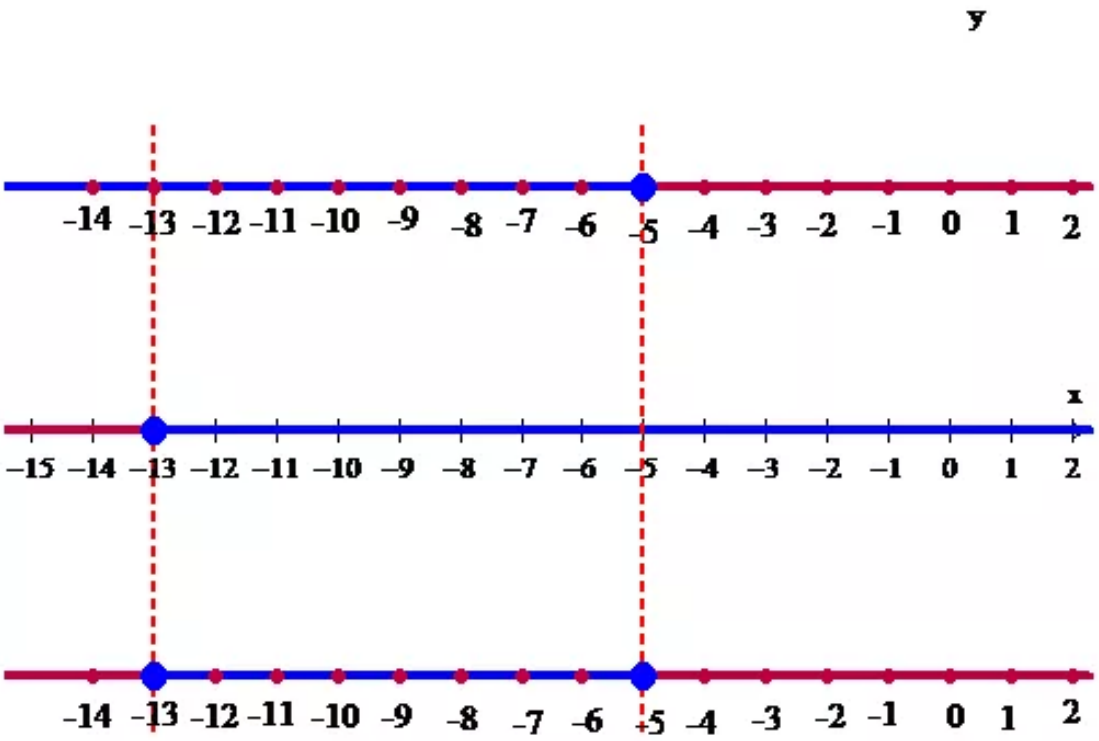
Consider $f+9\ge -4$

$f\ge -4-9$ Add -9 on both sides of inequality

$f\ge -13$

Solution is $f\le -5$ and $f\ge -13$

Graph of $f+8\le 3$ and $f+9\ge -4$



The topmost line is graph of $f+8\le 3$

The middle line is graph of $f+9\ge -4$

The bottom line is graph of their intersection.

The solution set is $=\{f/-5\ge f\ge -13\}$

Answer 30PA.

The objective is to graph the solution set of the compound inequality.

$d-4>3$ or $d-4\le 1$

Consider $d-4>3$

$d>3+4$ Add 4 on both sides of inequality

$d>7$

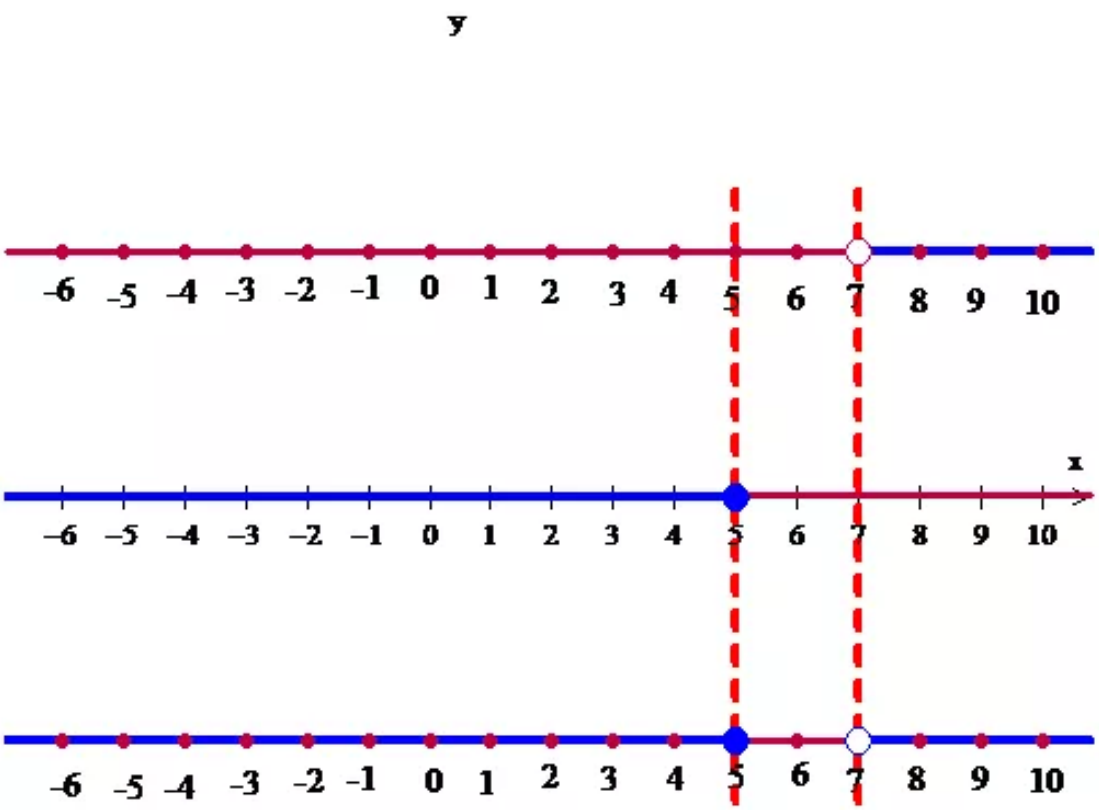
Consider $d-4\le 1$

$d\le 1+4$ Add 4 on both sides of inequality

$d\le 5$

Solution is $d>7$ or $d\le 5$

Graph of $d-4>3$ or $d-4\le 1$



The topmost line is graph of $d-4>3$

The middle line is graph of $d-4\le 1$

The bottom line is graph of their union.

The solution set is $=\{d/5\ge d>7\}$

Answer 31PA.

The objective is to graph the solution set of the compound inequality.

$h-10<-21$ or $h+3<2$

Consider $h-10<-21$

$h<-21+10$ Add 10 on both sides of inequality

$h<-11$

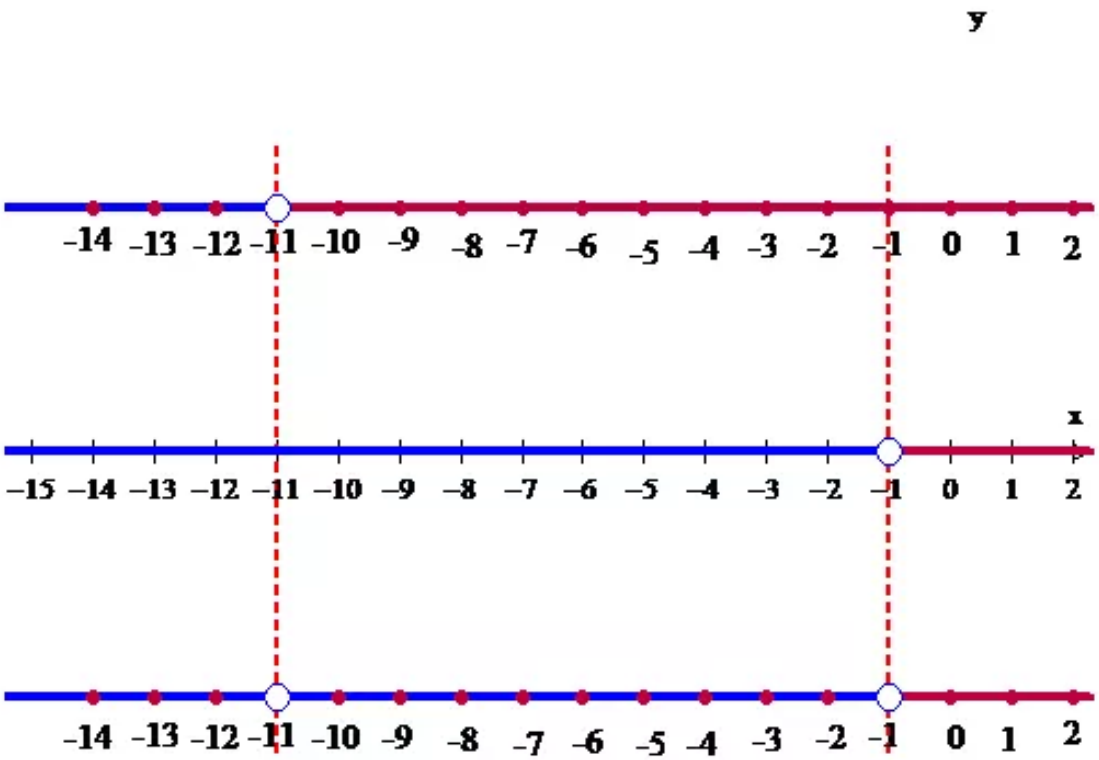
Consider $h+3<2$

$h<2-3$ Add -3 on both sides of inequality with

$h<-1$

Solution is $h<-11$ or $h<-1$

Graph of $h-10<-21$ or $h+3<2$



The topmost line is graph of $h-10<-21$

The middle line is graph of $h+3<2$

The bottom line is graph of their union.

The solution set is $=\{h/h<-1\}$

Answer 32PA.

The objective is to graph the solution set of the compound inequality after solving it .

$3 < 2x - 3 < 15$

Consider $3 < 2x - 3$

$3 + 3 < 2x$ Add 3 on both sides of inequality

$6 < 2x$

$\frac{6}{2} < x$ Divide both sides of the inequality with 2

$3 < x$

Consider $2x - 3 < 15$

$2x < 15 + 3$ Add 3 on both sides of inequality

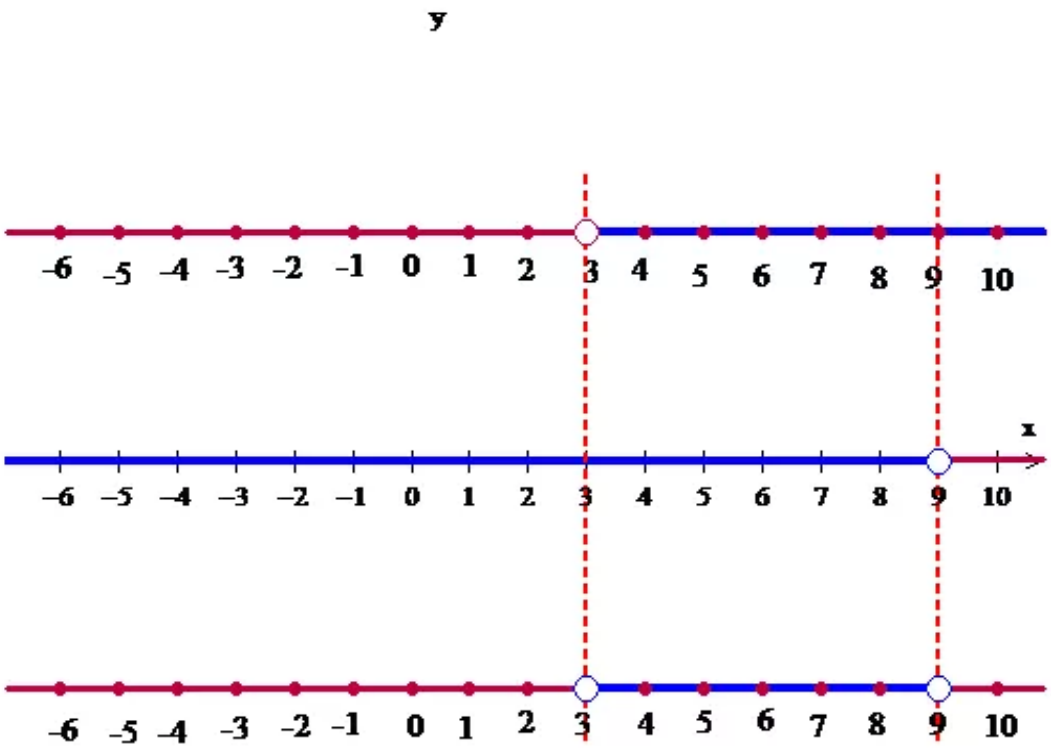
$2x < 18$

$x < \frac{18}{2}$ Divide both sides of the inequality with 2

$x < 9$

Solution is $3 < x$ and $x < 9$

Graph of $3 < 2x - 3$ or $2x - 3 < 15$



The topmost line is graph of $3 < 2x - 3$

The middle line is graph of $2x - 3 < 15$

The bottom line is graph of their intersection.

The solution set is $= \{x / 3 < x < 9\}$

Answer 33PA.

The objective is to graph the solution set of the compound inequality after solving it .

$4 < 2y - 2 < 10$

Consider $4 < 2y - 2$

$4 + 2 < 2y$ Add 2 on both sides of inequality

$6 < 2y$

$\frac{6}{2} < y$ Divide both sides of inequality with 2

$3 < y$

Consider $2y - 2 < 10$

$2y < 10 + 2$ Add 2 on both sides of inequality

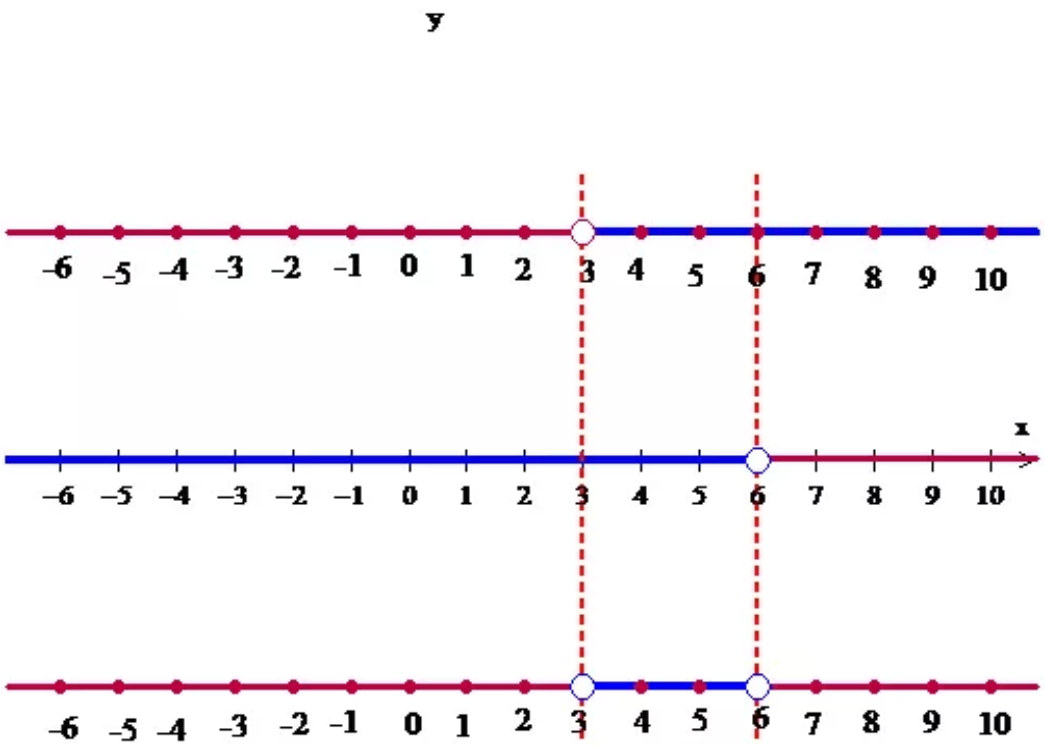
$2y < 12$

$y < \frac{12}{2}$ Divide both sides of inequality with 2

$y < 6$

Solution is $3 < y$ and $y < 6$

Graph of $4 < 2y - 2 < 10$



The topmost line is graph of $4 < 2y - 2$

The middle line is graph of $2y - 2 < 10$

The bottom line is graph of their intersection.

The solution set is $= \{y / 3 < y < 6\}$

Answer 34PA.

The objective is to graph the solution set of the compound inequality after solving it .

$3t-7\geq 5$ and $2t+6\leq 12$

Consider $3t-7\geq 5$

$3t\geq 5+7$ Add 7 on both sides of inequality

$3t\geq 12$

$t\geq \frac{12}{3}$ Divide both sides of the inequality with 3

$t\geq 4$

Consider $2t+6\leq 12$

$2t\leq 12-6$ Add -6 on both sides of inequality

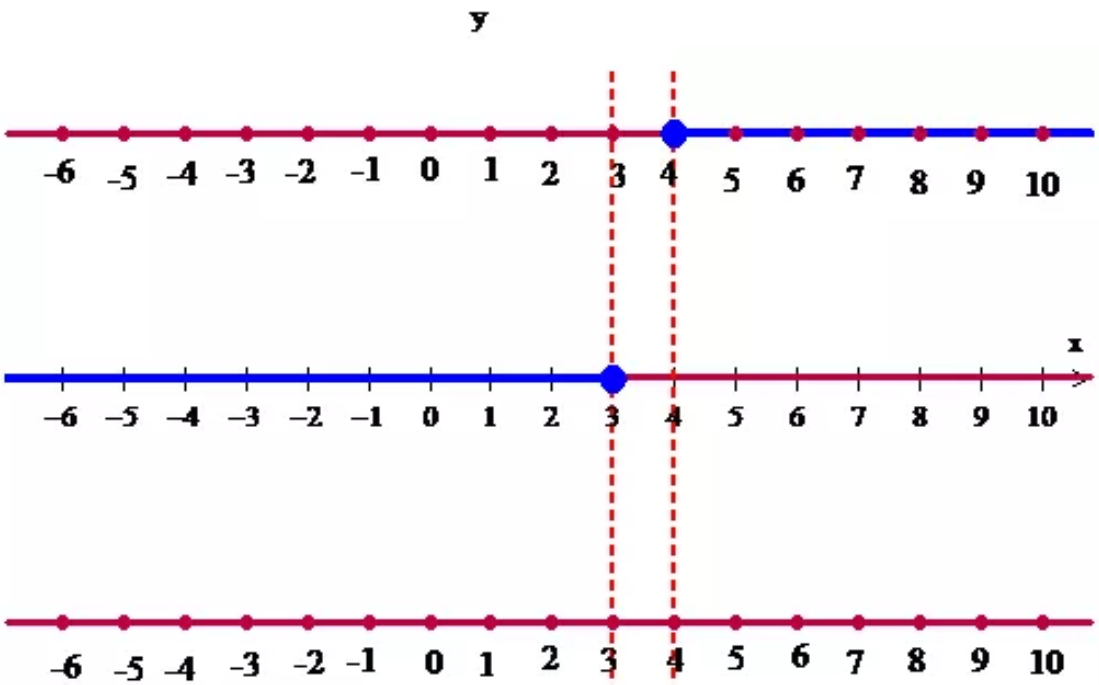
$2t\leq 6$

$t\leq \frac{6}{2}$ Divide both sides of the inequality with 2

$t\leq 3$

Solution is $t\geq 4$ and $t\leq 3$

Graph of $3t-7\geq 5$ and $2t+6\leq 12$



The topmost line is graph of $3t-7\geq 5$

The middle line is graph of $2t+6\leq 12$

The bottom line is graph of their intersection which is null set.

The solution set is = $\emptyset$

Answer 35PA.

The objective is to graph the solution set of the compound inequality after solving it .

$8 > 5 - 3q$ and $5 - 3q > -13$

Consider $8 > 5 - 3q$

$3q > 5 - 8$ Add $-8 + 3q$ on both sides of inequality

$3q > -3$

$q > \frac{-3}{3}$ Divide both sides of inequality with 3

$q > -1$

Consider $5 - 3q > -13$

$5 + 13 > 3q$ Add $3q + 13$ on both sides of inequality

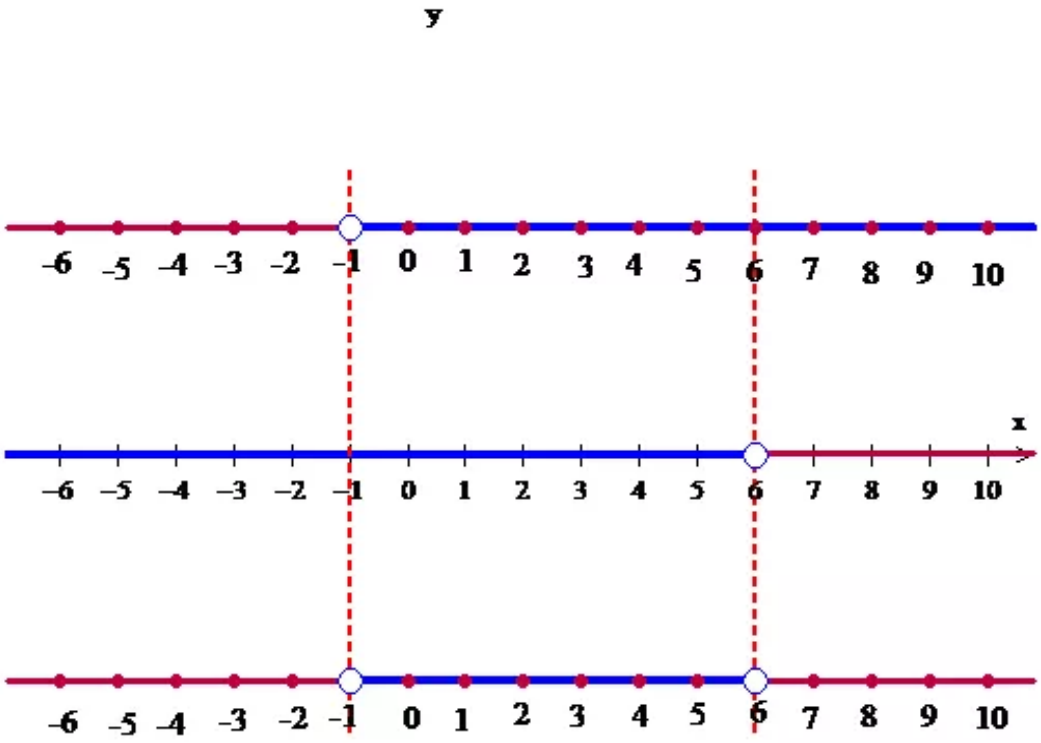
$18 > 3q$

$\frac{18}{3} > q$ Divide both sides of inequality with 3

$6 > q$

Solution is $q > -1$ and $6 > q$

Graph of $8 > 5 - 3q$ and $5 - 3q > -13$



The topmost line is graph of $8 > 5 - 3q$

The middle line is graph of $5 - 3q > -13$

The bottom line is graph of their intersection.

The solution set is $= \{q / 6 > q > -1\}$

Answer 36PA.

The objective is to graph the solution set of the compound inequality.

$-1+x\le 3$ or $-x\le -4$

Consider $-1+x\le 3$

$x\le 3+1$ Add 1 on both sides of inequality

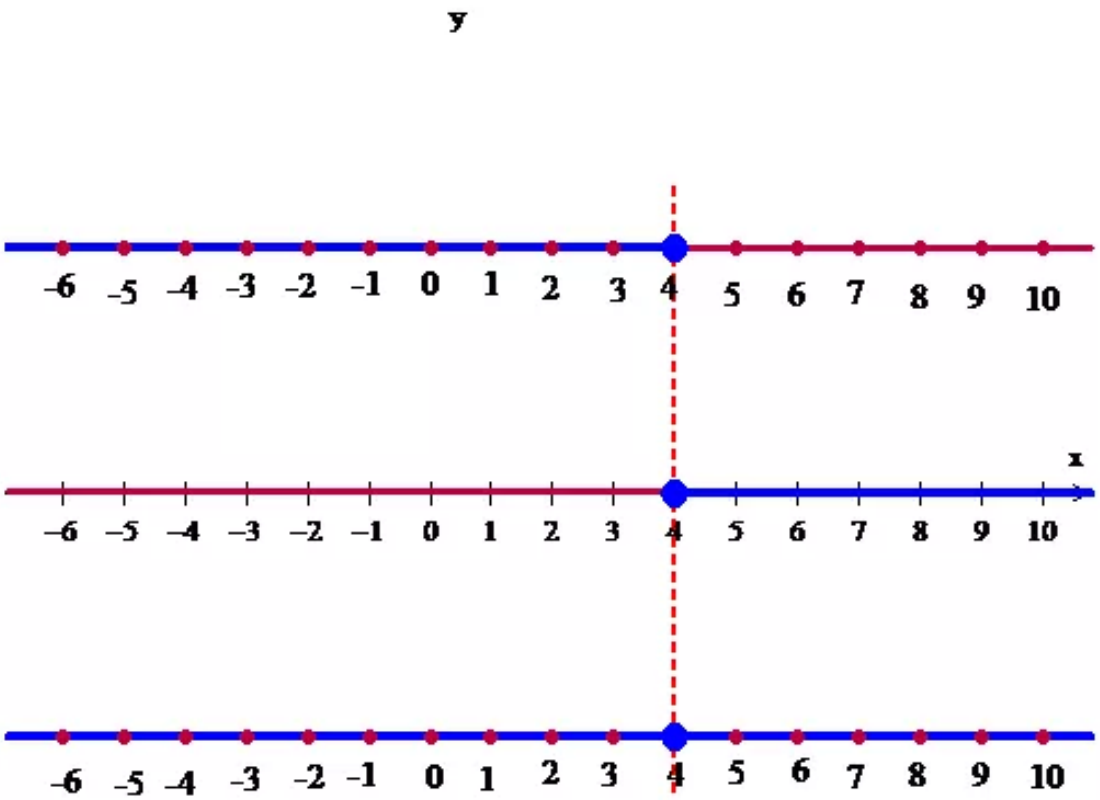
$x\le 4$

Consider $-x\le -4$

$x\ge 4$ Divide both sides of inequality with -1

Solution is $x\le 4$ or $x\ge 4$

Graph of $-1+x\le 3$ or $-x\le -4$



The topmost line is graph of $-1+x\le 3$

The middle line is graph of $-x\le -4$

The bottom line is graph of their union.

The solution set is $=\{x/4\le x\le 4\}$

Answer 37PA.

The objective is to graph the solution set of the compound inequality.

$3n+11\le 13$ or $-3n\ge -12$

Consider $3n+11\le 13$

$3n\le 13-11$ Add -11 on both sides of inequality

$3n\le 2$

$n\le \frac{2}{3}$ Divide both sides of inequality with 3

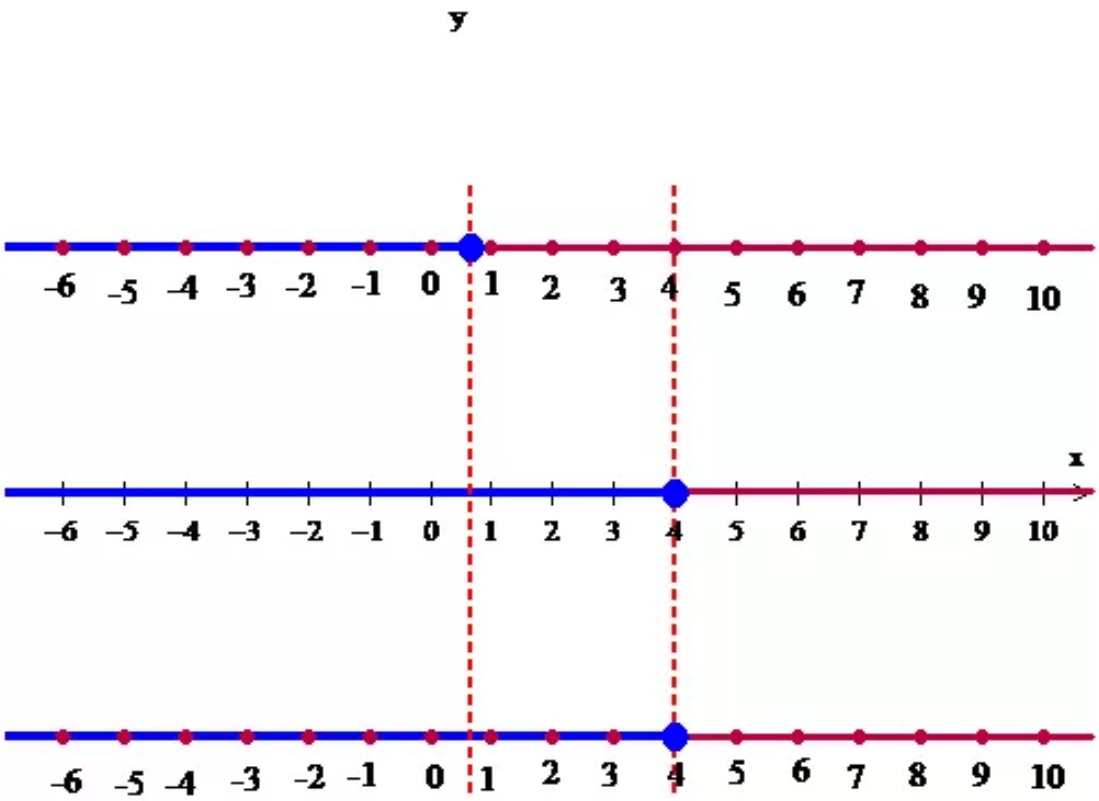
Consider $-3n\ge -12$

$n\le \frac{-12}{-3}$ Divide both sides of inequality with -3

$n\le 4$

Solution is $n\le \frac{2}{3}$ or $n\le 4$

Graph of $3n+11\le 13$ or $-3n\ge -12$



The topmost line is graph of $3n+11\le 13$

The middle line is graph of $-3n\ge -12$

The bottom line is graph of their union.

The solution set is $=\{n/n\le 4\}$

Answer 38PA.

The objective is to graph the solution set of the compound inequality after solving it .

$2p-2\le 4p-8\le 3p-3$

Consider $2p-2\le 4p-8$

$8-2\le 4p-2p$ Add $-2p+8$ on both sides of inequality

$6\le 2p$

$\frac{6}{2}\le p$ Divide both sides of the inequality with 2

$3\le p$

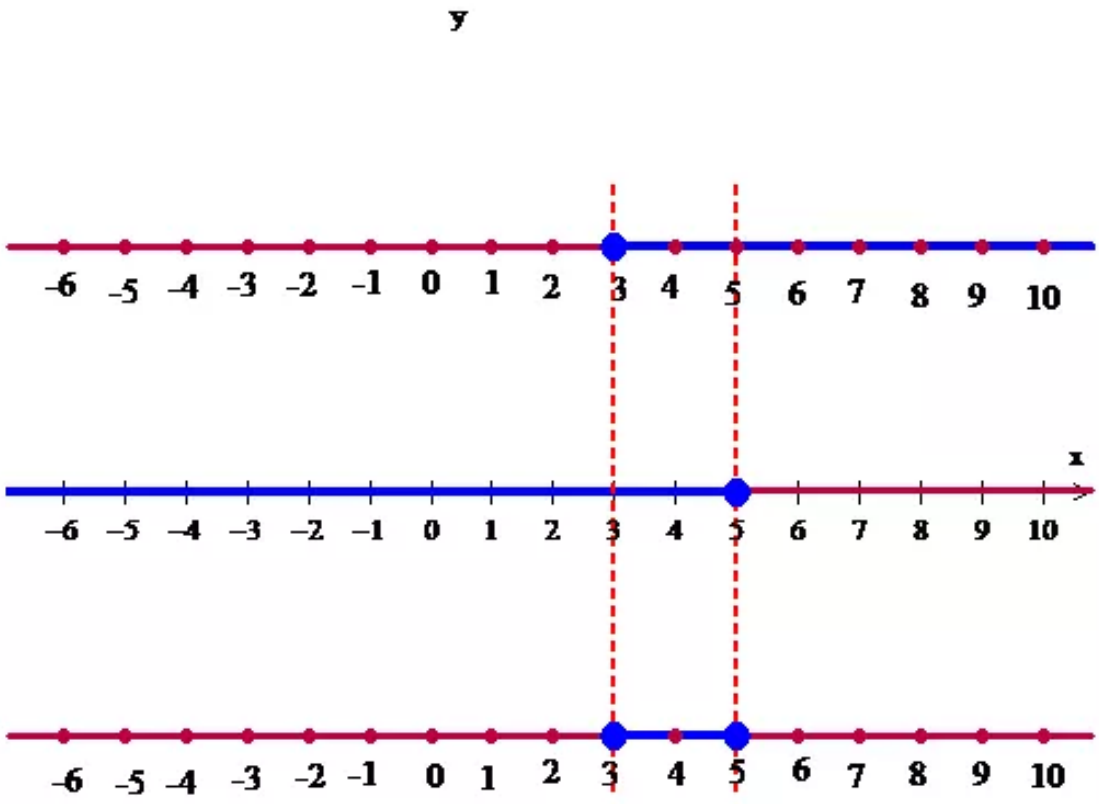
Consider $4p-8\le 3p-3$

$4p-3p\le 8-3$ Add $8-3p$ on both sides of inequality

$p\le 5$

Solution is $3\le p$ and $p\le 5$

Graph of $2p-2\le 4p-8\le 3p-3$



The topmost line is graph of $2p-2\le 4p-8$

The middle line is graph of $4p-8\le 3p-3$

The bottom line is graph of their intersection.

The solution set is $=\{p/3\le p\le 5\}$

Answer 39PA.

The objective is to graph the solution set of the compound inequality.

$3g+12 \le 6+g \le 3g-18$

Consider $3g+12 \le 6+g$

$3g-g \le 6-12$ Add $-12-g$ on both sides of inequality

$2g \le -6$

$g \le \frac{-6}{2}$ Divide with 2 on both sides of inequality

$g \le -3$

Consider $6+g \le 3g-18$

$6+18 \le 3g-g$ Add $-g+18$ on both sides of inequality

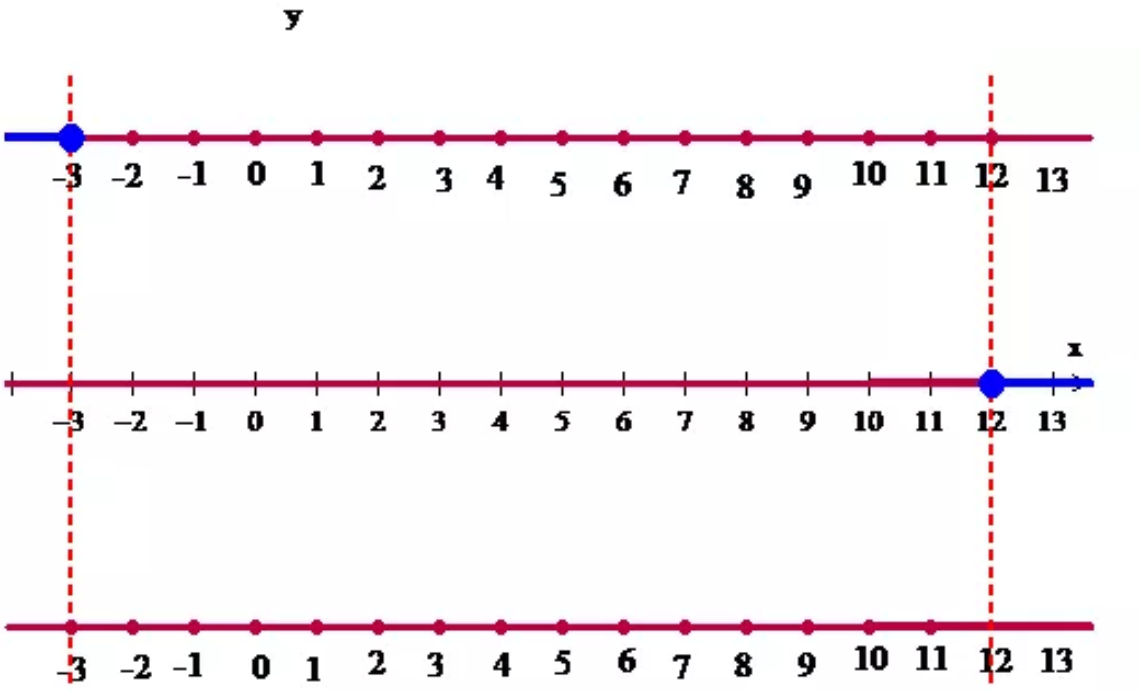
$24 \le 2g$

$\frac{24}{2} \le g$ Divide with 2 on both sides of inequality

$12 \le g$

Solution is $g \le -3$ and $12 \le g$

Graph of $3g+12 \le 6+g$ and $6+g \le 3g-18$



The topmost line is graph of $3g+12 \le 6+g$

The middle line is graph of $6+g \le 3g-18$

The bottom line is graph of their intersection.

The solution set is = null set

Answer 40PA.

The objective is to graph the solution set of the compound inequality.

$4c < 2c - 10$ or $-3c < -12$

Consider $4c < 2c - 10$

$4c - 2c < -10$ Add -2c on both sides of inequality

$2c < -10$

$c < \frac{-10}{2}$ Divide 2 on both sides of inequality

$c < -5$

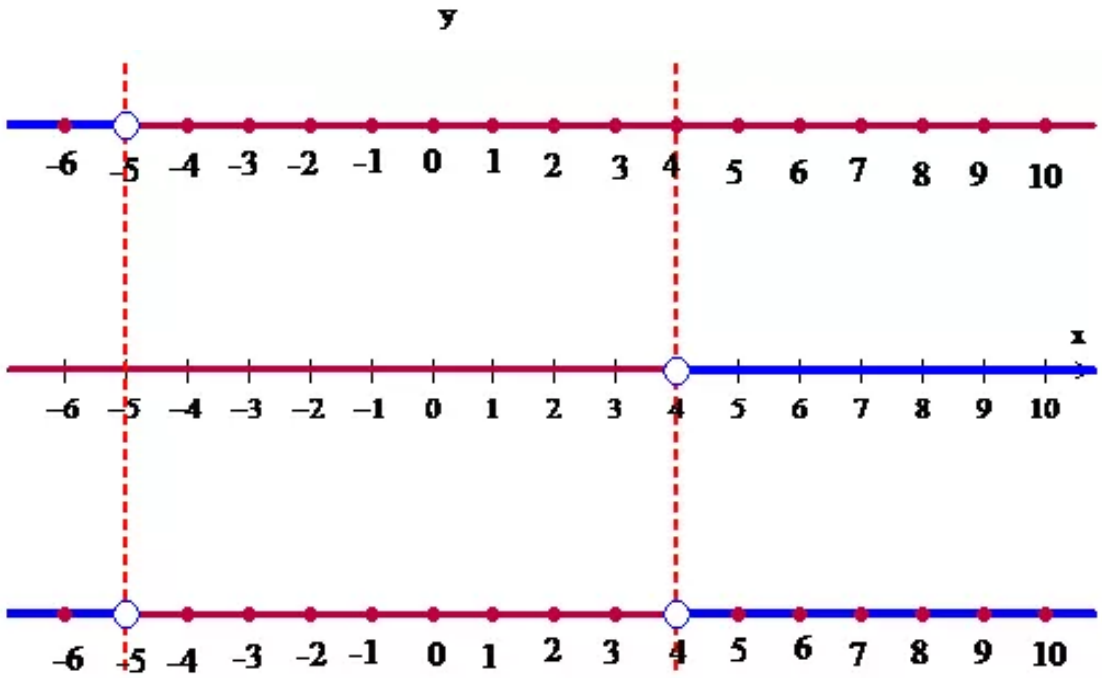
Consider $-3c < -12$

$c > \frac{-12}{-3}$ Divide both sides of inequality with -3

$c > 4$

Solution is $c < -5$ or $c > 4$

Graph of $4c < 2c - 10$ or $-3c < -12$



The topmost line is graph of $4c < 2c - 10$

The middle line is graph of $-3c < -12$

The bottom line is graph of their union.

The solution set is $= \{c / 4 < corc < -5\}$

Answer 41PA.

The objective is to graph the solution set of the compound inequality.

$0.5b > -6$ or $3b + 16 < -8 + b$

Consider $0.5b > -6$

$b > \frac{-6}{0.5}$ Divide 0.5 on both sides of inequality

$b > -12$

Consider $3b + 16 < -8 + b$

$3b - b < -8 - 16$ Add $-16 - b$ to both sides of inequality

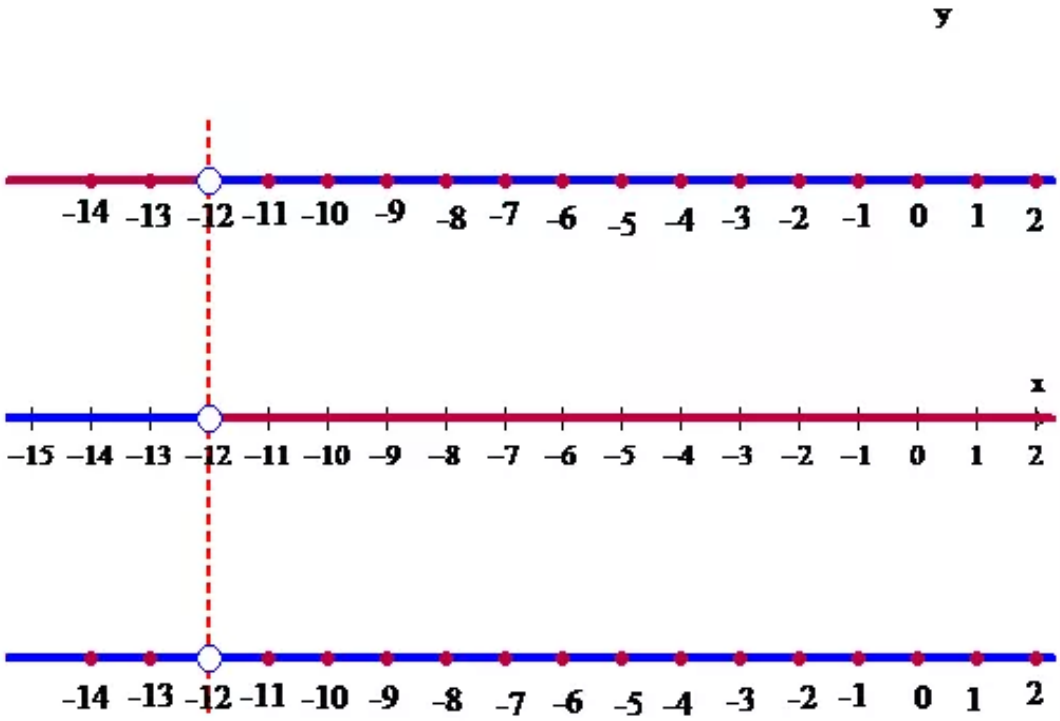
$2b < -24$

$b < \frac{-24}{2}$ Divide both sides of inequality with 2

$b < -12$

Solution is $b > -12$ or $b < -12$

Graph of $0.5b > -6$ or $3b + 16 < -8 + b$



The topmost line is graph of $0.5b > -6$

The middle line is graph of $3b + 16 < -8 + b$

The bottom line is graph of their union.

The solution set is $= \{b / -12 < b < -12\}$

Answer 42PA.

The objective is to define a variable, write an inequality and solve it.

Eight less than a number is no more than 14 and no less than 5

Let the variable be *x*

Compound inequality is $5 \le x - 8$ and $x - 8 \le 14$

This can also be written as $5 \le x - 8 \le 14$

Consider $5 \le x - 8$

$5 + 8 \le x$ Add 8 to both sides of inequality

$13 \le x$

Consider $x - 8 \le 14$

$x \le 14 + 8$ Add 8 to both sides of inequality

$x \le 22$

Conclusion:- Solution is $\boxed{13 \le x \le 22}$

Answer 43PA.

The objective is to define a variable, write an inequality and solve it.

The sum of 3 times a number and 4 is between -8 and 10

Let the variable be *a*

Compound inequality is $-8 < 3a + 4$ and $3a + 4 < 10$.

This can also be written as $-8 < 3a + 4 < 10$

Consider $-8 < 3a + 4$

$-8 - 4 < 3a$ Add -4 to both sides of inequality

$-12 < 3a$

$\frac{-12}{3} < a$ Divide both sides of inequality with 3

$-4 < a$

Consider $3a + 4 < 10$

$3a < 10 - 4$ Add -4 to both sides of inequality

$3a < 6$

$a < \frac{6}{3}$ Divide both sides of inequality with 3

$a < 2$

Conclusion:- Solution is $\boxed{-4 < a < 2}$

Answer 44PA.

The objective is to define a variable, write an inequality and solve it.

The product of -5 and a number is greater than 35 or less than 10

Let the variable be *x*

Compound inequality is $10 > -5x$ and $-5x > 35$.

This can also be written as $10 > -5x > 35$

Consider $10 > -5x$

$\frac{10}{-5} < x$ Divide both sides of inequality with -5

$-2 < x$

Consider $-5x > 35$

$x < \frac{35}{-5}$ Divide both sides of inequality with -5

$x < -7$

Conclusion:- Compound inequality is $\boxed{-2 < x or x < -7}$

Answer 45PA.

The objective is to define a variable, write an inequality and solve it.

One half a number is greater than 0 and less than or equal to 1.

Let the variable be *z*

Compound inequality is $0 < \frac{1}{2}z$ and $\frac{1}{2}z \le 1$.

This can also be written as $0 < \frac{1}{2}z \le 1$

Consider $0 < \frac{1}{2}z$

$0 < z$ Multiply both sides of inequality with 2

Consider $\frac{1}{2}z \le 1$

$z \le 2 \cdot 1$ Multiply both sides of inequality with 2

$z \le 2$

Conclusion:- Solution is $\boxed{0 < z \le 2}$

Answer 46PA.

The objective is to find the amount of time spent in REM sleep if an adult sleeps 7 to 8 hours.

According to problem, about 20% of time we sleep is spent in rapid eye movement.

The amount of time spent in REM sleep if an adult sleeps 7 hours is $20\%of\,7 = \frac{20}{100}\cdot 7$

$= 1.4$ hours.

As 0.4 hours is $0.4\cdot 60 = 24.0$ minutes

The amount of time spent in REM sleep if an adult sleeps 7 hours is = 1 hour 24 minutes

The amount of time spent in REM sleep if an adult sleeps 8 hours is $20\%of\,8 = \frac{20}{100}\cdot 8$

$= 1.6$ hours.

As 0.6 hours is $0.6\cdot 60 = 36.0$ minutes

The amount of time spent in REM sleep if an adult sleeps 8 hours is = 1 hour 36 minutes

The amount of time spent in REM sleep if an adult sleeps 7 to 8 hours is 1 hour 24 minutes to 1 hour 36minutes.

Answer 47PA.

The objective is to find the amount Luisana expects to spend after the mail-in rebate.

As per problem, the range in price of printer is from $175 to $260 and their mail-in rebate is $30

The lower range of printer's price after the mail-in rebate is $175 - 30 = 145$

The higher range of printer's price after the mail-in rebate is $260 - 30 = 230$

The amount Luisana expects to spend after the mail-in rebate is $145 to $230 inclusive

Answer 48PA.

The objective is to find the number of chocolates which are more to be sold to earn a prize in Category D($121-$180)

As per problem, So far Rashid has sold $70

The minimum number of chocolates to be sold after selling $70 for prize in Category D is

$121 - 70 = 51$

The maximum number of chocolates to be sold after selling $70 for prize in Category D is

$180 - 70 = 110$

So Rashid has to sell $51 to $110 more chocolates to earn prize in Category D.

Answer 49PA.

The objective is to write a compound inequality that represents the values of *x* which make the following expressions false

1) $x < 5$ or $x > 8$

2) $x \le 6$ and $x \ge 1$

A compound inequality that represents the values of *x* which make the expressions $x < 5$ or $x > 8$ false are $x \ge 5$ or $x \le 8$

A compound inequality that represents the values of *x* which make the expressions $x \le 6$ or $x \ge 1$ false are $x > 6$ or $x < 1$

Answer 50PA.

The objective is to write a compound inequality for hearing range of humans and one for the hearing range of dogs.

As per the problem, humans can hear in range 20 to 20,000 hertz and dogs can hear in the range 15 to 50,000 hertz

A compound inequality for hearing range of humans is $20 \le h \le 20,000$ and one for hearing range of dogs is $15 \le d \le 50,000$.

Answer 51PA.

The objective is to write a compound inequality for hearing range of humans and one for the hearing range of dogs. And also their union and intersection.

As per the problem, humans can hear in range 20 to 20,000 hertz and dogs can hear in the range 15 to 50,000 hertz

A compound inequality for hearing range of humans is $20 \le h \le 20,000$ and one for hearing range of dogs is $15 \le d \le 50,000$.

The union of these 2 sets is $15 \le u \le 50,000$ and their intersection is $20 \le i \le 20,000$.

Answer 52PA.

The objective is to write a compound inequality for hearing range of sounds that dogs can hear but humans cannot

As per the problem, humans can hear in range 20 to 20,000 hertz and dogs can hear in the range 15 to 50,000 hertz

A compound inequality for hearing range of humans is $20 \le h \le 20,000$ and one for hearing range of dogs is $15 \le d \le 50,000$.

A compound inequality for hearing range of sounds that dogs can hear but humans cannot is $20,000 \le x \le 50,000$ and $15 \le x \le 20$

Answer 55PA.

The objective is to find the number of cups one pound of tomatoes make.

According to problem, ten pounds of fresh tomatoes make between 10 and 15 cups of cooked tomatoes.

The compound inequality for above situation is $10 < 10x < 15$

Consider $10 < 10x < 15$

Divide the inequalities with 10

We get $\frac{10}{10} < \frac{10}{10}x < \frac{15}{10}$

Simplify

$$1 < x < \frac{3}{2}$$

Write in mixed fractions

$$1 < x < 1\frac{1}{2}$$

So the number of cups one pound of tomatoes makes is between 1 and $1\frac{1}{2}$ cups.

Therefore $\boxed{\text{option is } (a)}$

Answer 56PA.

The objective is to solve $-7 < x + 2 < 4$

This can be written as $-7 < x + 2$ and $x + 2 < 4$

Consider $-7 < x + 2$

$-7 - 2 < x$ Add -2 on both sides of inequality

$-9 < x$

AND

Consider $x + 2 < 4$

$x < 4 - 2$ Add -2 on both sides of inequality

$x < 2$

Solution is $-9 < x$ and $x < 2$

That is $-9 < x < 2$

The correct $\boxed{\text{option is } (b)}$

Answer 59MYS.

The objective is to solve inequality and to check the solution

$18d \geq 90$

$d \geq \frac{90}{18}$ Divide both sides of inequality with 18

$d \geq 5$

Conclusion:- $\boxed{d \geq 5}$

To check the solution

Consider $d = 6$ since $d \geq 5$

Substitute $d = 6$ in $18d \geq 90$ to check

We get $18 \cdot 6 ? 90$

$108 > 90$

Since this inequality is true, $d \geq 5$ is true

Answer 60MYS.

The objective is to solve inequality and to check the solution

$-7v < 91$

$v > \frac{91}{-7}$ Divide both sides of inequality with -7

$v > -13$

Conclusion:- $\boxed{v > -13}$

To check the solution

Consider $v = 0$ since $v > -13$

Substitute $v = 0$ in $-7v < 91$ to check

We get $-7(0) ? 91$

$0 < 91$

Since this inequality is true, $v > -13$ is true

Answer 61MYS.

The objective is to solve inequality and to check the solution

$\frac{t}{13} < 13$

$t < 13 \cdot 13$ Multiply both sides of inequality with 13

$t < 169$

Conclusion:- $\boxed{t < 169}$

To check the solution

Consider $t = 65$ since $t < 169$

Substitute $t = 65$ in $\frac{t}{13} < 13$ to check

We get $\frac{65}{13} ? 13$

$5 < 13$

Since this inequality is true, $t < 169$ is true

Answer 62MYS.

The objective is to solve inequality and to check the solution

$$-\frac{3}{8}b > 9$$

$b < 9\left(-\frac{8}{3}\right)$ Multiply both sides of inequality with -8/3

$$b < 3(-8)$$

$$b < -24$$

Conclusion:- $\boxed{b < -24}$

To check the solution

Consider $b = -32$ since $b < -24$

Substitute $b = -32$ in $-\frac{3}{8}b > 9$ to check

We get $-\frac{3}{8}(-32)?9$

$$12 > 9$$

Since this inequality is true, $b < -24$ is true

Answer 63MYS.

The objective is to solve and find *x* when $y = 6$ .To assume that *y* varies directly as *x*

According to the problem, $y = -8$ when $x = -3$

Hence $\frac{x}{y} = \frac{-3}{-8}$

In this problem $y = 6$.

Substitute $y = 6$ in the above equation

$$\frac{x}{6} = \frac{-3}{-8}$$

Multiply with 6 on both sides of equation

$$x = \frac{-3}{-8} \cdot 6$$

$$x = \frac{9}{4}$$

$$x = 2.25$$

Conclusion:- The value is $\boxed{x = 2.25}$

Answer 64MYS.

The objective is to solve and find *y* when $x = 20$ .To assume that *y* varies directly as *x*

According to the problem, $y = 2.5$ when $x = 0.5$

Hence $\frac{x}{y} = \frac{0.5}{2.5}$

In this problem $x = 20$.

Substitute $x = 20$ in the above equation

$$\frac{20}{y} = \frac{0.5}{2.5}$$

Multiply with $y2.5$ on both sides of equation

$$y = \frac{20 \cdot 2.5}{0.5}$$

$$y = 20 \cdot 5$$

$$y = 100$$

Conclusion:-The value is $\boxed{y = 100}$

Answer 65MYS.

The objective is to express the relation in the mapping as a set of ordered pairs. Also to state the domain, range and inverse.

Ordered pairs are = $\{(6,0),(-3,5),(2,-2),(-3,3)\}$

Domain is $= \{-3,2,6\}$

Range is $= \{-2,0,3,5\}$

Inverse is $= \{(0,6),(5,-3),(-2,2),(3,-3)\}$

Answer 66MYS.

The objective is to express the relation in the mapping as a set of ordered pairs. Also to state the domain, range and inverse.

Ordered pairs are = $\{(5,2),(-3,1),(2,2),(1,7)\}$

Domain is $= \{-3,1,2,5\}$

Range is $= \{1,2,7\}$

Inverse is $= \{(2,5),(2,2),(1,-3),(7,1)\}$

Answer 67MYS.

The objective is to express the relation in the mapping as a set of ordered pairs. Also to state the domain, range and inverse.

Ordered pairs are = $\{(3,4),(3,2),(2,9),(5,4),(5,8),(-7,2)\}$

Domain is $=\{-7,2,3,5\}$

Range is $=\{2,4,8,9\}$

Inverse is $=\{(4,3),(2,3),(9,2),(4,5),(8,5),(2,-7)\}$

Answer 68MYS.

The objective is to find the odds of each outcome if a die is rolled

The number is greater than 2

The numbers on dice are 1,2,3,4,5,6.

The numbers greater than 2 are 3,4,5,6

Therefore there are 4 such numbers and 2 numbers which are not greater than 2

Hence the odds of outcome if a die is rolled is 4:2

Answer 69MYS.

The objective is to find the odds of each outcome if a die is rolled

The number is not a 3

The numbers on dice are 1,2,3,4,5,6.

The numbers which are not a 3 are 1,2,4,5,6

Therefore there are 5 such numbers and 1 number which is a 3

Hence the odds of outcome if a die is rolled is 5:1

Answer 70MYS.

The objective is to find the product

$$-\frac{5}{6}\left(-\frac{2}{5}\right)$$

$$=\frac{-\cancel{5}\cdot\left(-\cancel{2}\right)}{\cancel{2}\cdot 3\cdot\cancel{5}}$$ Write the numbers as product of factors and divide out common

common terms and product of 2 negative numbers is positive

$$=\frac{1}{3}$$

Conclusion:- $\boxed{-\frac{5}{6}\left(-\frac{2}{5}\right)=\frac{1}{3}}$

Answer 71MYS.

The objective is to find the product

$-100(4.7)$

$-100(4.7) = -470.0$ Product of 1 negative and 1 positive number is negative

Conclusion:- $\boxed{-100(4.7) = -470.0}$

Answer 72MYS.

The objective is to find the product

$$-\frac{7}{12}\left(\frac{6}{7}\right)\left(-\frac{3}{4}\right)$$

$$= \frac{\cancel{(-7)}\cancel{(6)}(-3)}{\cancel{6}\cdot 2\cdot \cancel{7}\cdot 4}$$ Write the numbers as product of factors and divide out common

common terms and product of 2 negative numbers is positive

$$= \frac{3}{8}$$

Conclusion:- $\boxed{-\frac{7}{12}\left(\frac{6}{7}\right)\left(-\frac{3}{4}\right) = \frac{3}{8}}$

Answer 73MYS.

The objective is to find the value

$|-7|$

$|-7| = 7$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|-7| = 7}$

Answer 74MYS.

The objective is to find the value

$|10|$

$|10| = 10$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|10| = 10}$

Answer 75MYS.

The objective is to find the value

$|-1|$

$|-1| = 1$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|-1| = 1}$

Answer 76MYS.

The objective is to find the value

$|-3.5|$

$|-3.5|=3.5$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|-3.5|=3.5}$

Answer 77MYS.

The objective is to find the value

$|12-6|$

$=|6|$

$=6$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|12-6|=6}$

Answer 78MYS.

The objective is to find the value

$|5-9|$

$=|-4|$

$=4$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|5-9|=4}$

Answer 79MYS.

The objective is to find the value

$|20-21|$

$=|-1|$

$=1$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|20-21|=1}$

Answer 80MYS.

The objective is to find the value

$|3-18|$

$=|-15|$

$=15$ Absolute value of any number is its positive value

Conclusion:- $\boxed{|3-18|=15}$