Chapter 6. Solving Linear Inequalities

Ex. 6.5

Answer 1CU.

The objective is to compare and contrast the solution of $|x-2|>6$ and $|x-2|<6$

$|x-2|>6$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|x-2|>6$, then $x-2>6$ or $x-2<-6$

Consider $x-2>6$

$x>6+2$ Add 2 to both sides of inequality

$x>8$

OR

Consider $x-2<-6$

$x<-6+2$ Add 2 to both sides of inequality

$x<-4$

Solution :- $x>8$ or $x<-4$

Consider $|x-2|<6$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x-2|<6$, then $x-2<6$ and $x-2>-6$

Consider $x-2<6$

$x<6+2$ Add 2 to both sides of inequality

$x<8$

AND

Consider $x-2>-6$

$x>-6+2$ Add 2 to both sides of inequality

$x>-4$

Conclusion:- $x<8$ and $x>-4$

Inequality $|x-2|>6$ has solution $x>8$ or $x<-4$

While inequality $|x-2|<6$ has solution $x<8$ and $x>-4$

Answer 2CU.

The objective is to write an absolute value inequality and then to graph the solution set

Let the absolute value inequality be $|t+8|<2$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|t+8|<2$, then $t+8<2$ or $t+8>-2$

Consider $t+8<2$

$t<2-8$ Add -8 to both sides of inequality

$t<-6$

AND

Consider $t+8>-2$

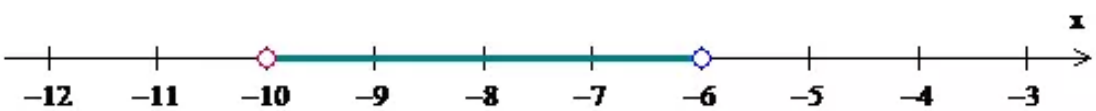
$t>-2-8$ Add -8 to both sides of inequality

$t>-10$

Conclusion:- $\boxed{t<-6}$ and $\boxed{t>-10}$

To graph the solution of $|t+8|<2$

Graph of $t<-6$ and $t>-10$



Answer 3CU.

The objective is to find the error while Leslie and Holly are solving $|x+3|=2$.

Leslie is correct because she solves as follows

$$x+3=2$$

$$x+3-3=2-3$$

$$x=-1$$

OR

$$x+3=-2$$

$$x+3-3=-2-3$$

$$x=-5$$

If $|x|=n$, then $x=-n$ or $x=n$

Leslie followed this rule while Holly did not follow the above rule but solved $|x+3|=2$

by 2 equations $x+3=2$ (which is right) or $x-3=2$ (which is wrong)

Conclusion :- $\boxed{\text{Leslie}}$ is correct

Answer 4CU.

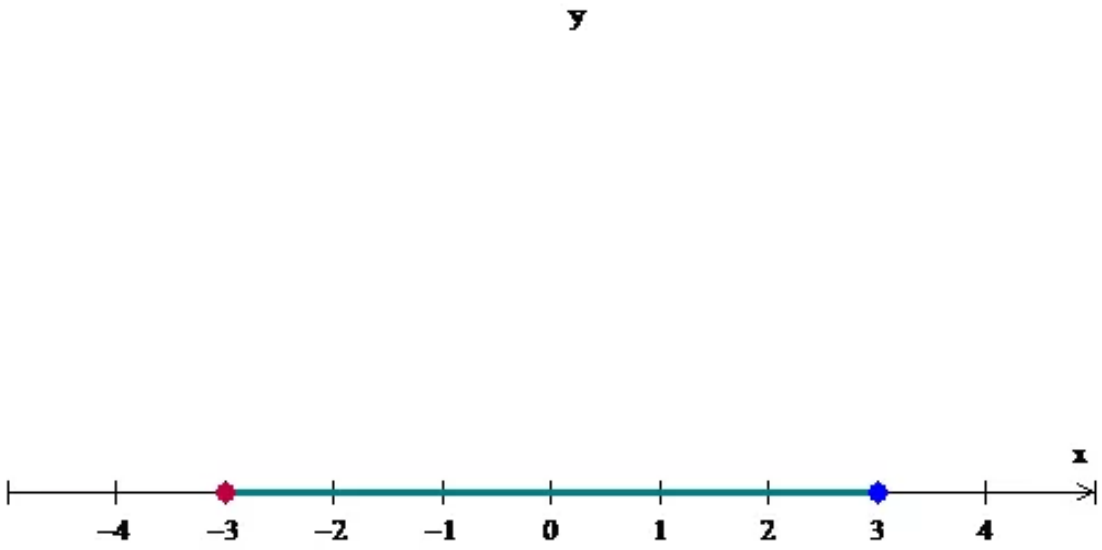
The objective is to graph the solution of $|k|\leq 3$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|k|\leq 3$, then $k\leq 3$ and $k\geq -3$

Since the value of *k* should be less than 3 and greater than -3, $\boxed{\text{option (a)}}$ is right

(a) The graph is given below



Answer 5CU.

The objective is to find the graph that represents the solution of $|x-4|>2$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|x-4|>2$, then $x-4>2$ or $x-4<-2$

Consider $x-4>2$

$x>2+4$ Add 4 to both sides of inequality

$x>6$

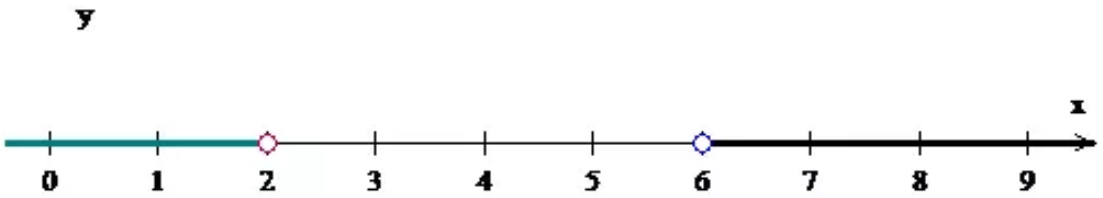
OR

Consider $x-4<-2$

$x<-2+4$ Add 4 to both sides of inequality

$x<2$

This solution is represented in option (c)



Conclusion:- $\boxed{x>6}$ or $\boxed{x<2}$ The option is (c)

Answer 6CU.

The objective is to express the statement using an inequality involving absolute value

Statement:- A jar contains 832 gumballs. Amanda's guess was within 46 pieces

The inequality is $|y-832|\leq 46$

Answer 7CU.

The objective is to solve each open sentence and then to graph the solution set

$|r+3|=10$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|r+3|=10$, then $r+3=-10$ or $r+3=10$

Consider $r+3=-10$

$r=-10-3$ Add -3 to both sides of equation

$r=-13$

OR

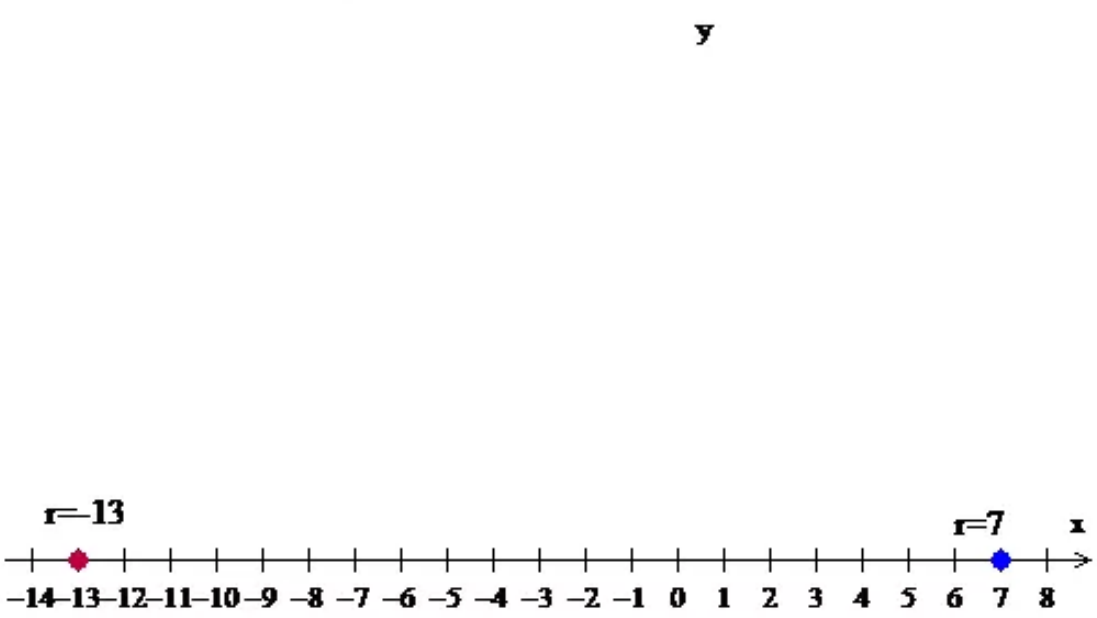
Consider $r+3=10$

$r=10-3$ Add -3 to both sides of equation

$r=7$

Conclusion:- $\boxed{r=-13}$ or $\boxed{r=7}$

To graph the solution of $|r+3|=10$



Answer 8CU.

The objective is to solve each open sentence and then to graph the solution set

$|c-2|<6$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|c-2|<6$, then $c-2<6$ and $c-2>-6$

Consider $c-2<6$

$c<6+2$ Add 2 to both sides of inequality

$c<8$

AND

Consider $c-2>-6$

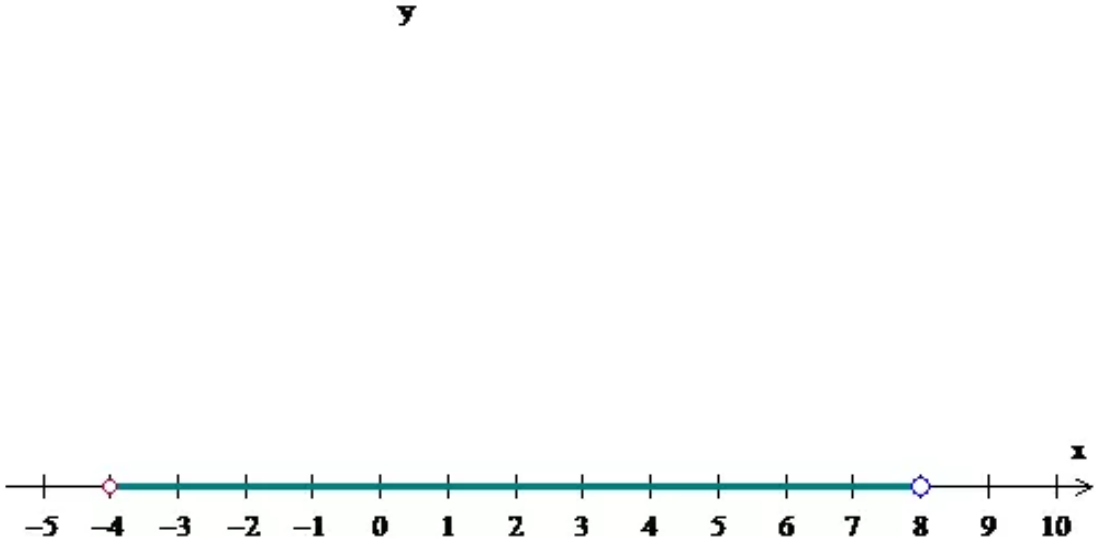
$c>-6+2$ Add 2 to both sides of inequality

$c>-4$

Conclusion:- $\boxed{c<8}$ and $\boxed{c>-4}$

To graph the solution of $|c-2|<6$

Graph of $c<8$ and $c>-4$



Answer 9CU.

The objective is to solve each open sentence and then to graph the solution set

$|10-w|>15$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|10-w|>15$, then $10-w>15$ or $10-w<-15$

Consider $10-w>15$

$10-15>w$ Add $w-15$ to both sides of inequality

$-5>w$

OR

Consider $10-w<-15$

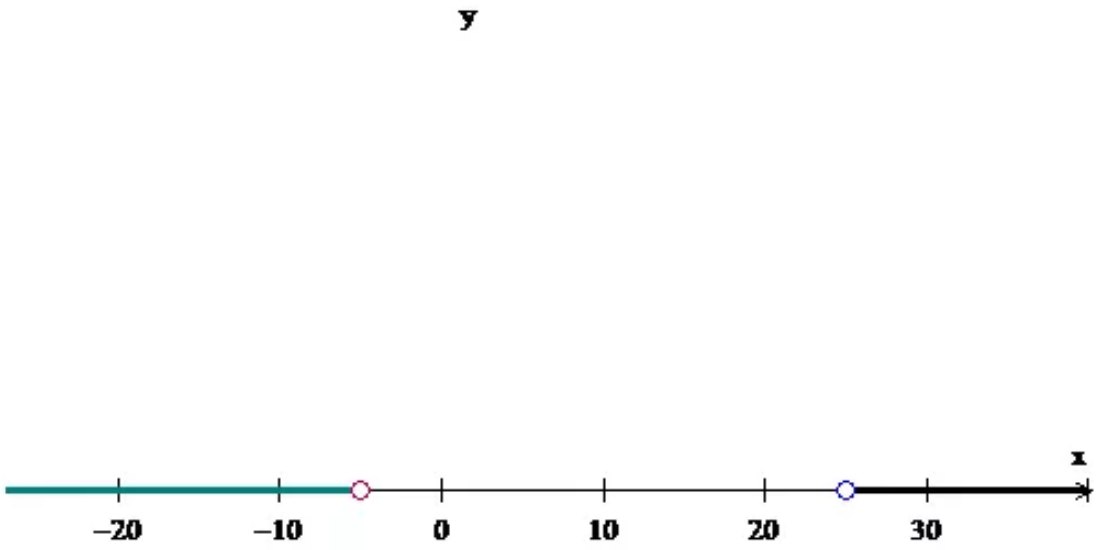
$10+15<w$ Add $w+15$ to both sides of inequality

$25<w$

Conclusion:- $\boxed{-5>w}$ or $\boxed{25<w}$

To graph the solution of $|10-w|>15$

Graph of $-5>w$ or $25<w$



Answer 10CU.

The objective is to solve each open sentence and then to graph the solution set

$|2g+5|\geq 7$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|2g+5|\geq 7$, then $2g+5\geq 7$ or $2g+5\leq -7$

Consider $2g+5\geq 7$

$2g\geq 7-5$ Add -5 to both sides of inequality

$2g\geq 2$

$g\geq \frac{2}{2}$ Divide both sides of inequality with 2

$g\geq 1$

OR

Consider $2g+5\leq -7$

$2g\leq -7-5$ Add -5 to both sides of inequality

$2g\leq -12$

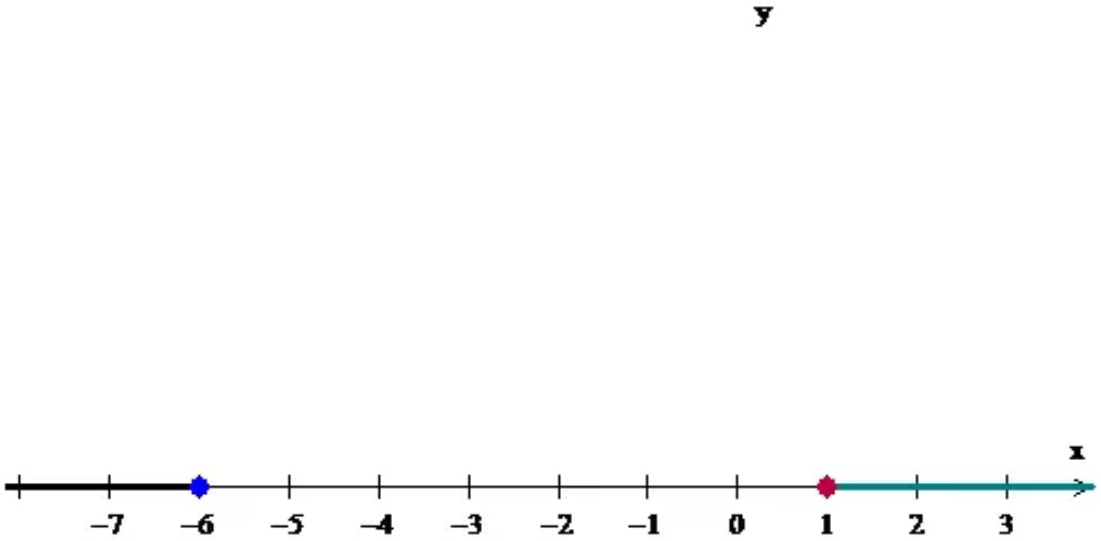
$g\leq \frac{-12}{2}$ Divide both sides of inequality with 2

$g\leq -6$

Conclusion:- $\boxed{g\leq -6}$ or $\boxed{g\geq 1}$

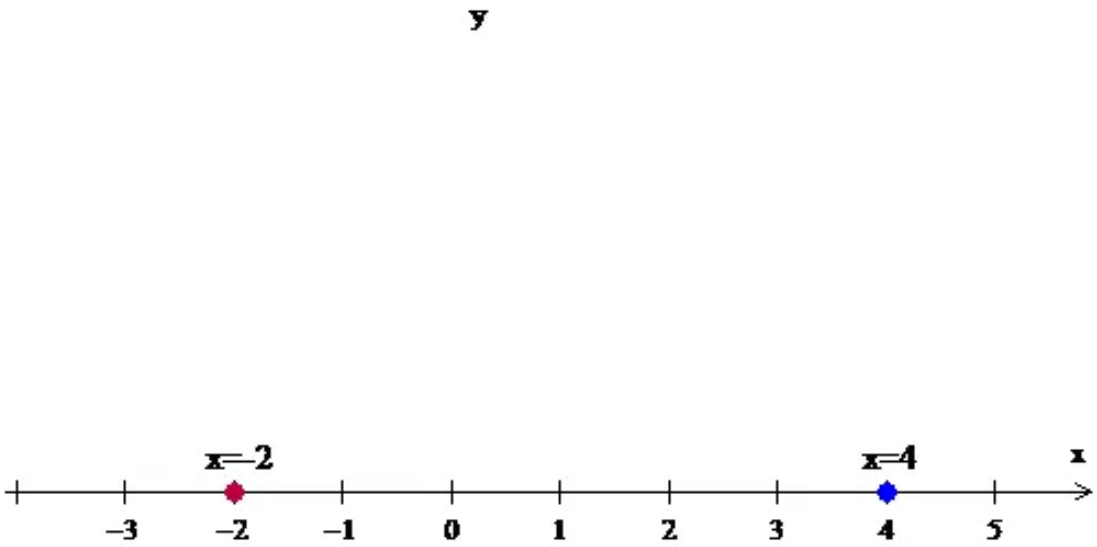
To graph the solution of $|2g+5|\geq 7$

Graph of $g\geq 1$ or $g\leq -6$



Answer 11CU.

The objective is to write an open sentence involving absolute value for the graph



Since $x=-2$ or $x=4$

Find the point that is the same distance from -2 as distance from 4. The midpoint between -2 and 4 is 1

The distance from 1 to -2 is 3 units

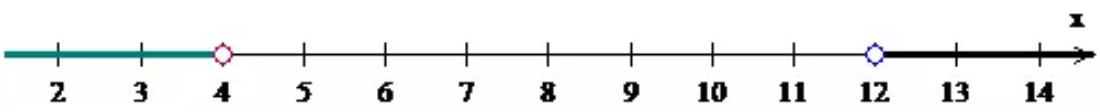
The distance from 1 to 4 is 3 units

Therefore $|x-1|=3$

Conclusion:- open sentence is $\boxed{|x-1|=3}$

Answer 12CU.

The objective is to write an open sentence involving absolute value for the graph



Since $x < 4$ or $x > 12$

Find the point that is the same distance from 4 as distance from 12. The midpoint between 12 and 4 is 8

The distance from 8 to 12 is 4 units

The distance from 8 to 4 is 4 units

We know that, if $|x| > n$, then $x > n$ or $x < -n$

The above graph is of this form

Therefore $|x - 8| > 4$

Conclusion:- open sentence is $\boxed{|x - 8| > 4}$

Answer 13CU.

The objective is to find the acceptable measurements for the diameter of the bolts.

According to the problem, bolts which must have a diameter within 0.001 cm of 1.5cm.

The inequality is $|x - 1.5| \le 0.001$.

If $|x| < n$, then $x < n$ and $x > -n$

If $|x - 1.5| \le 0.001$, then $x - 1.5 \le 0.001$ and $x - 1.5 \ge -0.001$

Consider $x - 1.5 \le 0.001$

$x \le 1.5 + 0.001$ Add 1.5 on both sides of inequality

$x \le 1.501$

AND

Consider $x - 1.5 \ge -0.001$

$x \ge 1.5 - 0.001$ Add 1.5 on both sides of inequality

$x \ge 1.499$

Solution set $= \{x / 1.499 \le x \le 1.501\}$

Conclusion :- The acceptable measurements for the diameter of the bolts are between 1.499 and 1.501 that is $1.499 \le x \le 1.501$

Answer 14PA.

(14) $|x+5| \le 3$

We know that if $|x| < n$, then $x < n$ and $x > -n$

Similarly if $|x+5| \le 3$, then $x+5 \le 3$ and $x+5 \ge -3$

Consider $x+5 \le 3$

$x \le 3-5$ Add -5 on both sides of inequality

$x \le -2$

AND

Consider $x+5 \ge -3$

$x \ge -3-5$ Add -5 on both sides of inequality

$x \ge -8$

Since $x \le -2$ and $x \ge -8$, the option is (c).

Answer 15PA.

(15) $|x-4| > 4,$

We know that if $|x| > n$, then $x > n$ or $x < -n$

Similarly if $|x-4| > 4,$ then $x-4 > 4$ or $x-4 < -4$

Consider $x-4 > 4$

$x > 4+4$ Add 4 on both sides of inequality

$x > 8$

Consider $x-4 < -4$

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

$x < 0$

Since $x > 8$ or $x < 0$, the option is (f)

Answer 16PA.

(16) $|2x-8|=6$

We know that if $|x|=n$, then $x=n$ or $x=-n$

Similarly if $|2x-8|=6$, then $2x-8=6$ or $2x-8=-6$

Consider $2x-8=6$

$2x=6+8$ Add 8 on both sides of inequality

$x=\frac{14}{2}$ Divide both sides of inequality with 2

$x=7$

Consider $2x-8=-6$

$2x=-6+8$ Add 8 on both sides of inequality

$x=\frac{2}{2}$ Divide both sides of inequality with 2

$x=1$

Since $x=7$ or $x=1$, the option is (a)

Answer 17PA.

(17) $|x+3|\geq -1$

We know that if $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|x+3|\geq -1$ then $x+3\geq -1$ or $x+3\leq 1$

Consider $x+3\geq -1$

$x\geq -1-3$ Add -3 on both sides of inequality

$x\geq -4$

Consider $x+3\leq 1$

$x\leq 1-3$ Add -3 on both sides of inequality

$x\leq -2$

Since $x\geq -4$ or $x\leq -2$, the option is (b)

Answer 18PA.

(18) $|x|<2$

We know that if $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x|<2$, then $x<2$ and $x>-2$

Since $x<2$ and $x>-2$, the option is (e).

Answer 19PA.

(19) $|8-x|=2$

We know that if $|x|=n$, then $x=n$ or $x=-n$

Similarly if $|8-x|=2$, then $8-x=2$ or $8-x=-2$

Consider $8-x=2$

$8-2=x$ Add $x-2$ on both sides of inequality

$x=6$

Consider $8-x=-2$

$8+2=x$ Add $x+2$ on both sides of inequality

$10=x$

Since $x=6$ or $x=10$, the option is (d)

The correct matches are (14)—(c), (15)—(f), (16)—(a), (17)—(b), (18)—(e), (19)—(d)

Answer 20PA.

The objective is to express the statement using an inequality involving absolute value

Statement:- The pH of a buffered eye solution must be within 0.002 of a pH of 7.3

The inequality is $|y-7.3|\leq 0.002$ because the difference between the actual number and 7.3 is within 0.002.

Answer 21PA.

The objective is to express the statement using an inequality involving absolute value

Statement:- The temperature inside a refrigerator should be within 1.5 degrees of 38F

The inequality is $|t-38|\leq 1.5$ because the difference between the actual number and 38 is within 1.5degrees.

Answer 22PA.

The objective is to express the statement using an inequality involving absolute value

Statement:- Ramona's bowling score was within 6 points of her average score of 98

The inequality is $|x-98|\leq 6$ because the difference between the actual number and 98 is within 6 points.

Answer 23PA.

The objective is to express the statement using an inequality involving absolute value

Statement:-The cruise control of a car set at 55 miles per hour should keep the speed within 3 miles per hour of 55

The inequality is $|s-55|\leq 3$ because the difference between the actual number and

55 is within 3miles.

Answer 24PA.

The objective is to solve each open sentence and then to graph the solution set

$|x-5|=8$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|x-5|=8$, then $x-5=-8$ or $x-5=8$

Consider $x-5=-8$

$x=-8+5$ Add 5 to both sides of equation

$x=-3$

OR

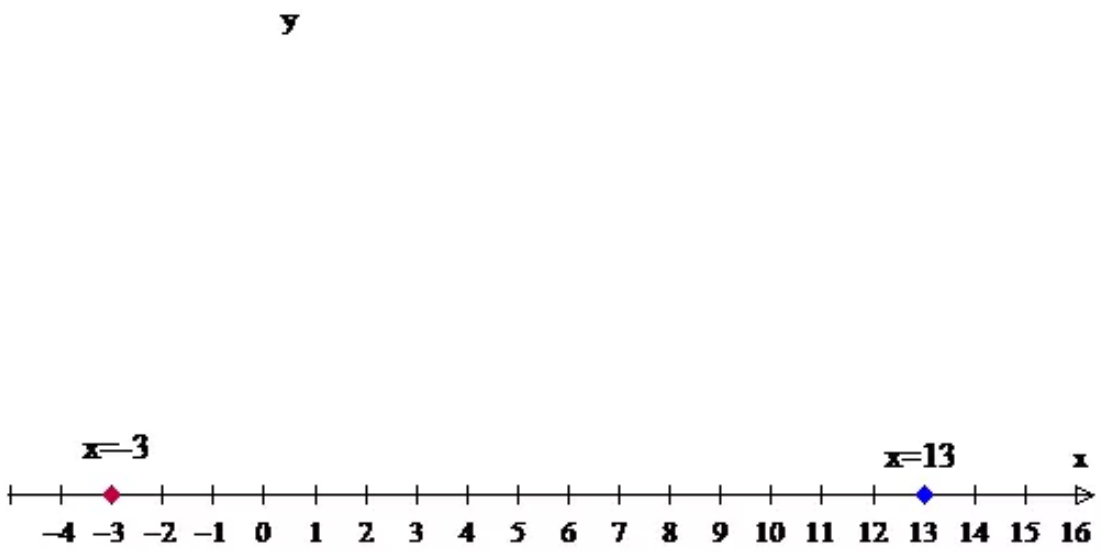
Consider $x-5=8$

$x=8+5$ Add 5 to both sides of equation

$x=13$

Conclusion:- $\boxed{x=-3}$ or $\boxed{x=13}$

To graph the solution of $|x-5|=8$



Answer 25PA.

The objective is to solve each open sentence and then to graph the solution set

$|b+9|=2$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|b+9|=2$, then $b+9=-2$ or $b+9=2$

Consider $b+9=-2$

$b=-2-9$ Add -9 to both sides of equation

$b=-11$

OR

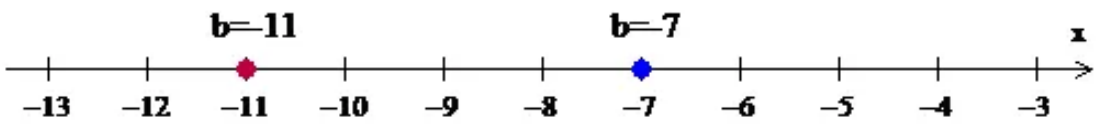
Consider $b+9=2$

$b=2-9$ Add -9 to both sides of equation

$b=-7$

Conclusion:- $\boxed{b=-11}$ or $\boxed{b=-7}$

To graph the solution of $|b+9|=2$



Answer 26PA.

The objective is to solve each open sentence and then to graph the solution set

$|2p-3|=17$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|2p-3|=17$, then $2p-3=-17$ or $2p-3=17$

Consider $2p-3=-17$

$2p=-17+3$ Add 3 to both sides of equation

$2p=-14$

$p=\frac{-14}{2}$ Divide both sides of equation with 2

$p=-7$

OR

Consider $2p-3=17$

$2p=17+3$ Add 3 to both sides of equation

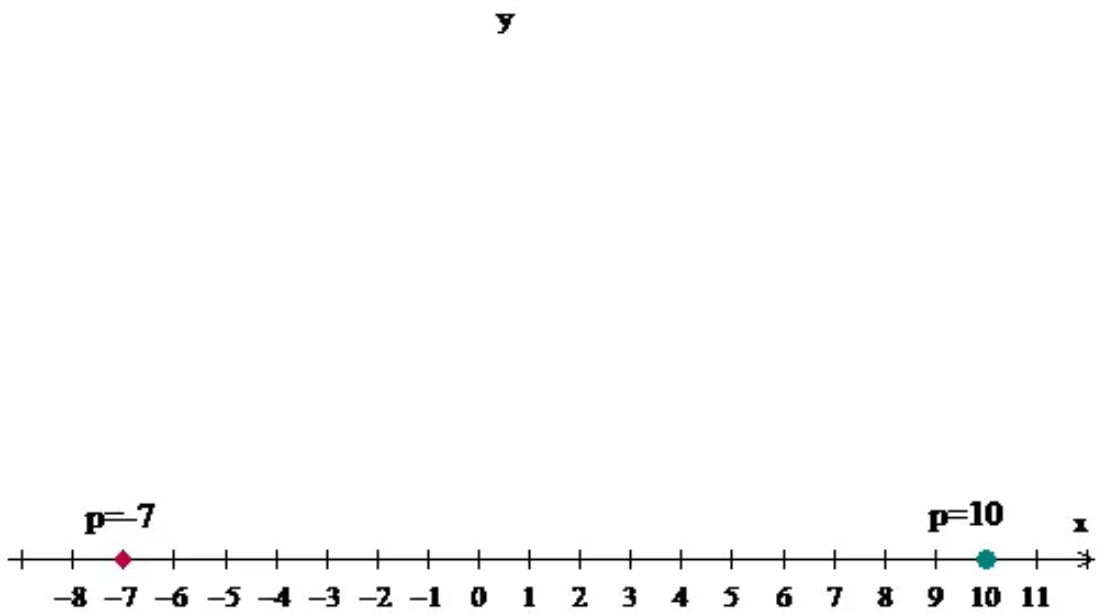
$2p=20$

$p=\frac{20}{2}$ Divide both sides of equation with 2

$p=10$

Conclusion:- $\boxed{p=-7}$ or $\boxed{p=10}$

To graph the solution of $|2p-3|=17$



Answer 27PA.

The objective is to solve each open sentence and then to graph the solution set

$|5c-8|=12$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|5c-8|=12$, then $5c-8=-12$ or $5c-8=12$

Consider $5c-8=-12$

$5c=-12+8$ Add 8 to both sides of equation

$c=\frac{-4}{5}$ Divide both sides of equation with 5

OR

Consider $5c-8=12$

$5c=12+8$ Add 8 to both sides of equation

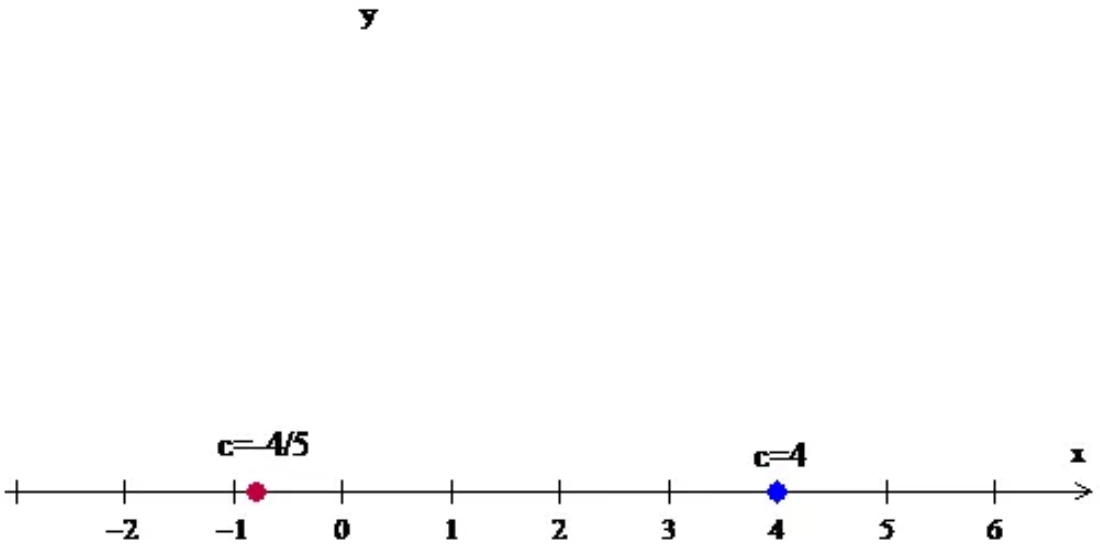
$5c=20$

$c=\frac{20}{5}$ Divide both sides of equation with 5

$c=4$

Conclusion:- $\boxed{c=\frac{-4}{5}}$ or $\boxed{c=4}$

To graph the solution of $|5c-8|=12$



Answer 28PA.

The objective is to solve each open sentence and then to graph the solution set

$|z-2| \leq 5$

If $|x| < n$, then $x < n$ and $x > -n$

Similarly if $|z-2| \leq 5$, then $z-2 \leq 5$ and $z-2 \geq -5$

Consider $z-2 \leq 5$

$z \leq 5+2$ Add 2 to both sides of inequality

$z \leq 7$

AND

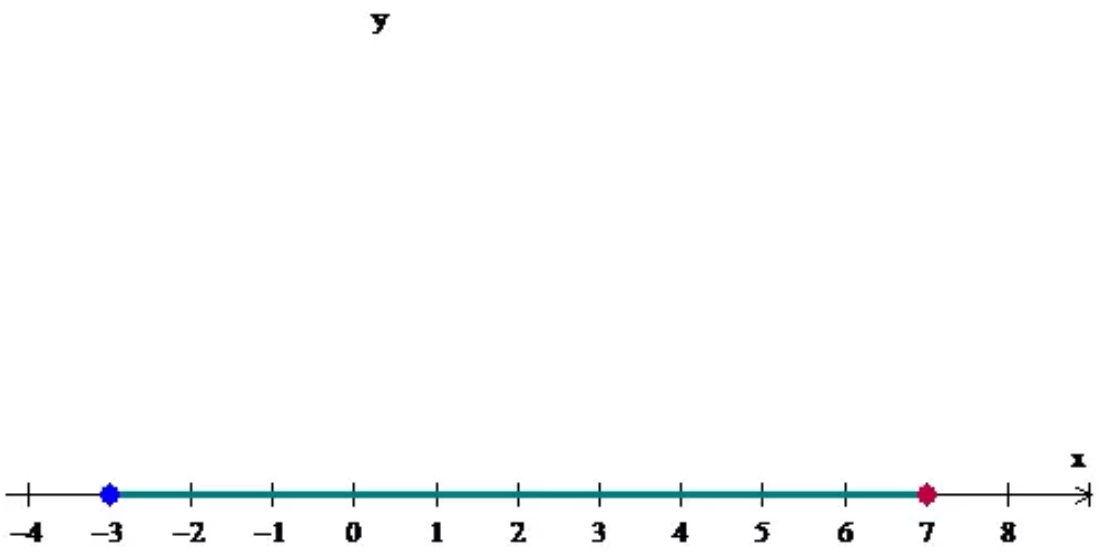
Consider $z-2 \geq -5$

$z \geq -5+2$ Add 2 to both sides of inequality

$z \geq -3$

Conclusion:- $\boxed{z \leq 7}$ or $\boxed{z \geq -3}$

To graph the solution of $|z-2| \leq 5$



Answer 29PA.

The objective is to solve each open sentence and then to graph the solution set

$|t+8|<2$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|t+8|<2$, then $t+8<2$ and $t+8>-2$

Consider $t+8<2$

$t<2-8$ Add -8 to both sides of inequality

$t<-6$

AND

Consider $t+8>-2$

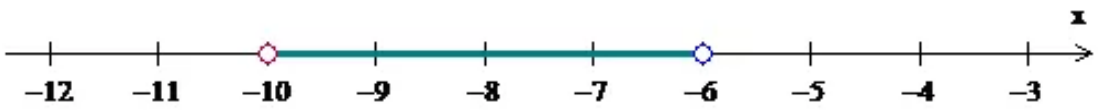
$t>-2-8$ Add -8 to both sides of inequality

$t>-10$

Conclusion:- $\boxed{t<-6}$ and $\boxed{t>-10}$

To graph the solution of $|t+8|<2$

Graph of $t<-6$ and $t>-10$



Answer 30PA.

The objective is to solve each open sentence and then to graph the solution set

$|v+3|>1$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|v+3|>1$, then $v+3>1$ or $v+3<-1$

Consider $v+3>1$

$v>1-3$ Add -3 to both sides of inequality

$v>-2$

OR

Consider $v+3<-1$

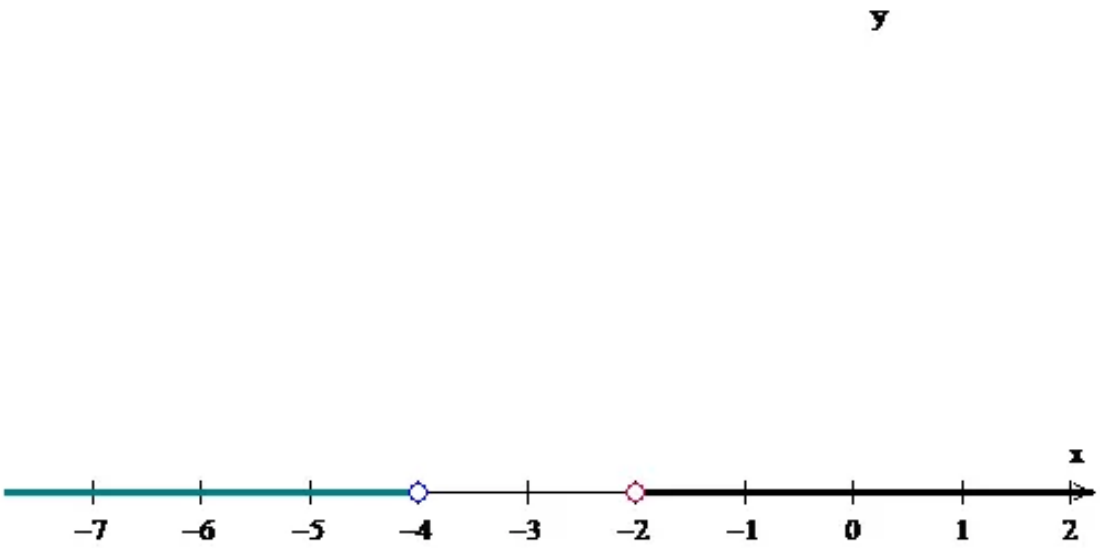
$v<-1-3$ Add -3 to both sides of inequality

$v<-4$

Conclusion:- $v>-2$ or $v<-4$

To graph the solution of $|v+3|>1$

Graph of $v>-2$ or $v<-4$



Answer 31PA.

The objective is to solve each open sentence and then to graph the solution set

$|w-6|\geq 3$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|w-6|\geq 3$, then $w-6\geq 3$ or $w-6<-3$

Consider $w-6\geq 3$

$w\geq 3+6$ Add 6 to both sides of inequality

$w\geq 9$

OR

Consider $w-6\leq -3$

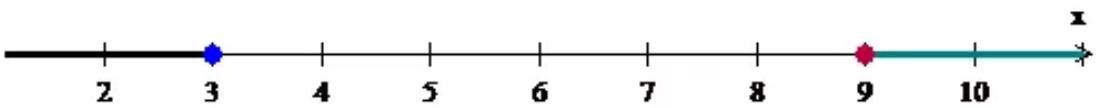
$w\leq -3+6$ Add 6 to both sides of inequality

$w\leq 3$

Conclusion:- $w\geq 9$ or $w\leq 3$

To graph the solution of $|w-6|\geq 3$

Graph of $w\geq 9$ or $w\leq 3$



Answer 32PA.

The objective is to solve each open sentence and then to graph the solution set

$|3s+2|>-7$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|3s+2|>-7$, then $3s+2>-7$ or $3s+2<7$

Consider $3s+2>-7$

$3s>-7-2$ Add -2 to both sides of inequality

$3s>-9$

$s>\frac{-9}{3}$ Divide both sides of inequality with 3

$s>-3$

OR

Consider $3s+2<7$

$3s<7-2$ Add -3 to both sides of inequality

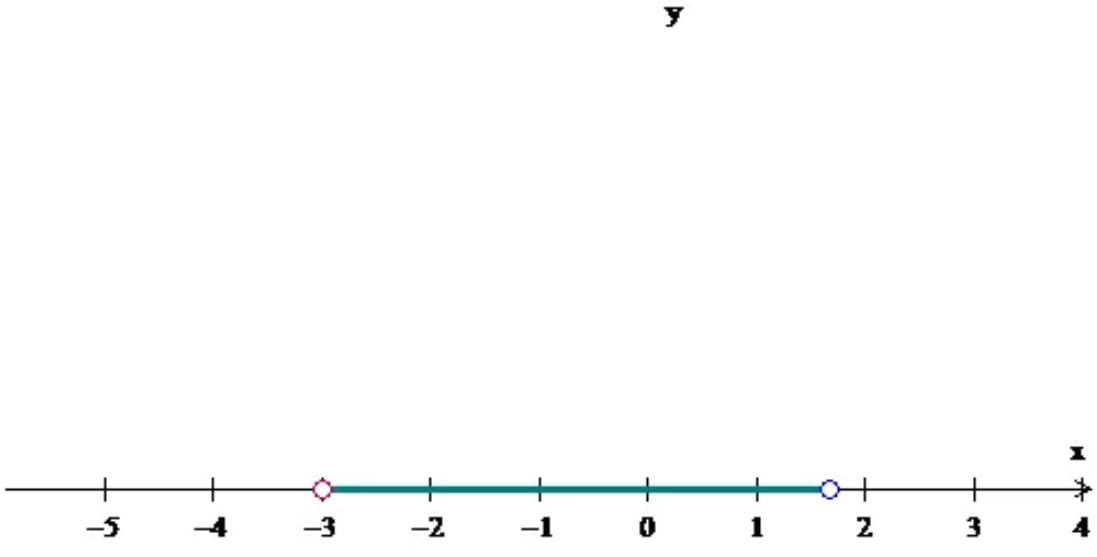
$3s<5$

$s<\frac{5}{3}$ Divide both sides of inequality with 3

Conclusion:- $s>-3$ or $s<\frac{5}{3}$

To graph the solution of $|3s+2|>-7$

Graph of $s>-3$ or $s<\frac{5}{3}$



Answer 33PA.

The objective is to solve each open sentence and then to graph the solution set

$|3k+4|\geq 8$

If $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|3k+4|\geq 8$, then $3k+4\geq 8$ or $3k+4\leq -8$

Consider $3k+4\geq 8$

$3k\geq 8-4$ Add -4 to both sides of inequality

$3k\geq 4$

$k\geq \frac{4}{3}$ Divide both sides of inequality with 3

OR

Consider $3k+4\leq -8$

$3k\leq -8-4$ Add 6 to both sides of inequality

$3k\leq -12$

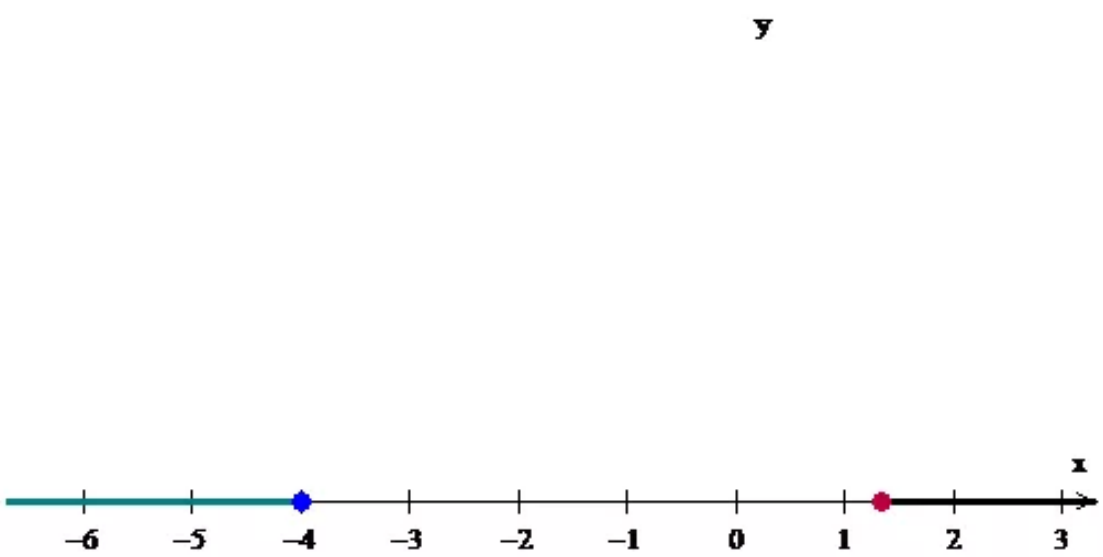
$k\leq \frac{-12}{3}$ Divide both sides of inequality with 3

$k\leq -4$

Conclusion:- $k\leq -4$ or $k\geq \frac{4}{3}$

To graph the solution of $|3k+4|\geq 8$

Graph of $k\leq -4$ or $k\geq \frac{4}{3}$



Answer 34PA.

The objective is to solve each open sentence and then to graph the solution set

$|2n+1|<9$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|2n+1|<9$, then $2n+1<9$ and $2n+1>-9$

Consider $2n+1<9$

$2n<9-1$ Add -1 to both sides of inequality

$2n<8$

$n<\frac{8}{2}$ Divide both sides of equation with 2

$n<4$

AND

Consider $2n+1>-9$

$2n>-9-1$ Add -1 to both sides of inequality

$2n>-10$

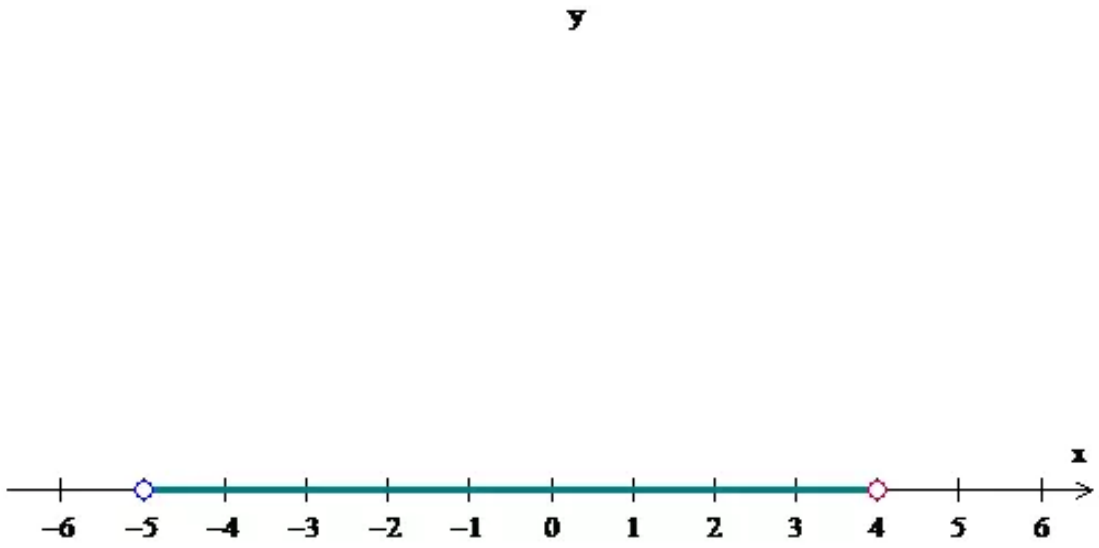
$n>\frac{-10}{2}$ Divide both sides of equation with 2

$n>-5$

Conclusion:- $\boxed{n<4}$ and $\boxed{n>-5}$

To graph the solution of $|2n+1|<9$

Graph of $n<4$ and $n>-5$



Answer 35PA.

The objective is to solve each open sentence and then to graph the solution set

$|6r+8|<-4$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|6r+8|<-4$, then $6r+8<-4$ and $6r+8>-(-4)$

Consider $6r+8<-4$

$6r<-4-8$ Add -8 to both sides of inequality

$6r<-12$

$r<\frac{-12}{6}$ Divide both sides of inequality with 6

$r<-2$

AND

Consider $6r+8>-(-4)$

$6r+8>4$

$6r>4-8$ Add -8 to both sides of inequality

$6r>-4$

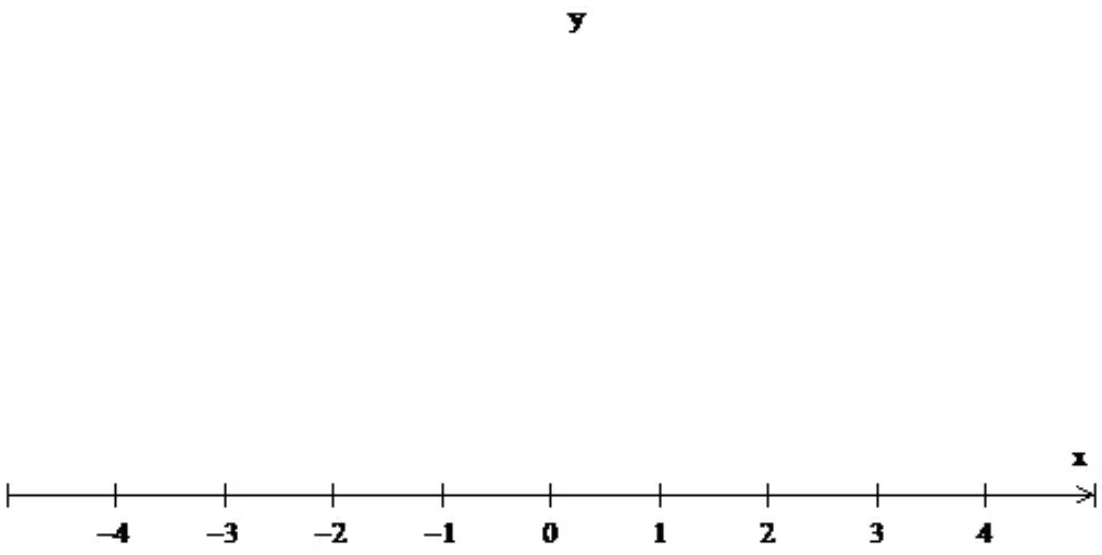
$r>\frac{-4}{6}$ Divide both sides of inequality with 6

$r>\frac{-2}{3}$

Conclusion:- $\boxed{r>\frac{-2}{3}}$ and $\boxed{r<-2}$ which is $\boxed{\text{null set}}$

To graph the solution of $|6r+8|<-4$

Graph of $r<-2$ and $r>\frac{-2}{3}$ which is a null set



Answer 36PA.

The objective is to solve each open sentence and then to graph the solution set

$|6-(3d-5)|\leq 14$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|6-(3d-5)|\leq 14$, then $6-(3d-5)\leq 14$ and $6-(3d-5)\geq -14$

Consider $6-(3d-5)\leq 14$

$6-3d+5\leq 14$

$11-3d\leq 14$

$11-14\leq 3d$ Add $3d-14$ to both sides of inequality

$-3\leq 3d$

$\frac{-3}{3}\leq d$ Divide both sides of inequality with 3

$-1\leq d$

AND

Consider $6-(3d-5)\geq -14$

$6-3d+5\geq -14$

$11-3d\geq -14$

$11+14\geq 3d$ Add $3d+14$ to both sides of inequality

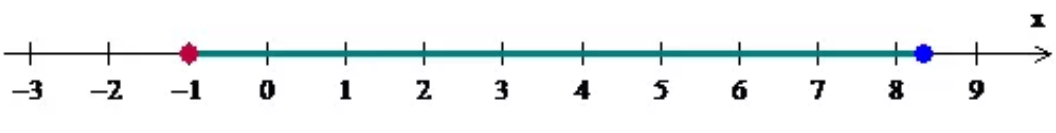
$25\geq 3d$

$\frac{25}{3}\geq d$ Divide both sides of inequality with 3

Conclusion:- $\boxed{-1\leq d}$ and $\boxed{\frac{25}{3}\geq d}$

To graph the solution of $|6-(3d-5)|\leq 14$

Graph of $-1\leq d$ and $\frac{25}{3}\geq d$



Answer 37PA.

The objective is to solve each open sentence and then to graph the solution set

$|8\text{-}(w-1)|\leq 9$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|8\text{-}(w-1)|\leq 9$, then $8-(w-1)\leq 9$ and $8-(w-1)\geq -9$

Consider $8-(w-1)\leq 9$

$8-w+1\leq 9$

$9-w\leq 9$

$9-9\leq w$ Add $w-9$ to both sides of inequality

$0\leq w$

AND

Consider $8-(w-1)\geq -9$

$8-w+1\geq -9$

$9-w\geq -9$

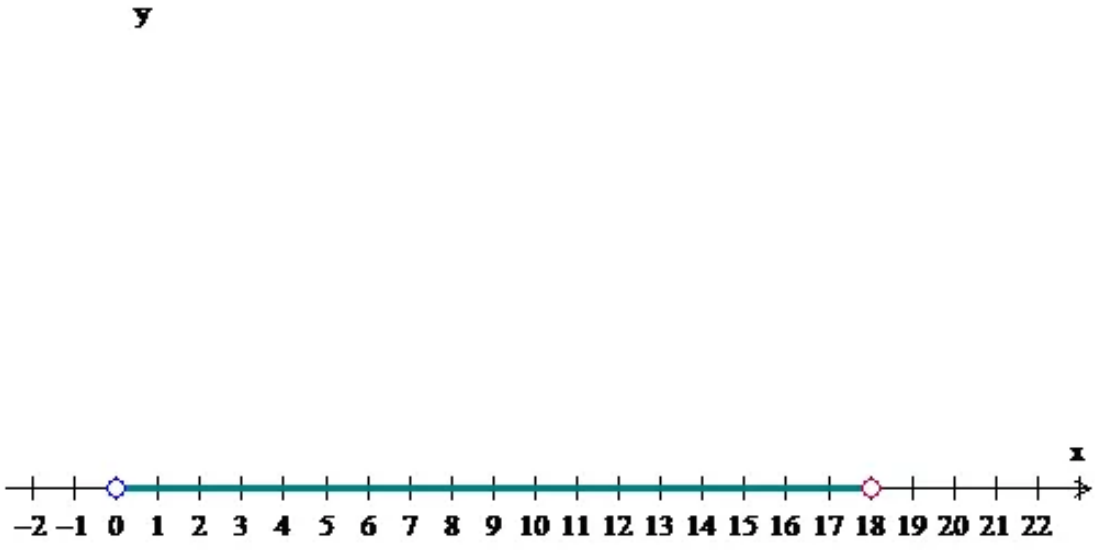
$9+9\geq w$ Add $w+9$ to both sides of equation

$18\geq w$

Conclusion:- $\boxed{18\geq w}$ and $\boxed{0\leq w}$

To graph the solution of $|6-(3d-5)|\leq 14$

Graph of $18\geq w$ and $0\leq w$



Answer 38PA.

The objective is to solve each open sentence and then to graph the solution set

$$\left|\frac{5h+2}{6}\right|=7$$

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $\left|\frac{5h+2}{6}\right|=7$, then $\frac{5h+2}{6}=-7$ or $\frac{5h+2}{6}=7$

Consider $\frac{5h+2}{6}=-7$

$5h+2=-42$ Multiply both sides of equation with 6

$5h=-42-2$ Add -2 to both sides of equation

$5h=-44$

$h=\frac{-44}{5}$ Divide both sides of equation with 5

OR

Consider $\frac{5h+2}{6}=7$

$5h+2=42$ Multiply both sides of equation with 6

$5h=42-2$ Add -2 to both sides of equation

$5h=40$

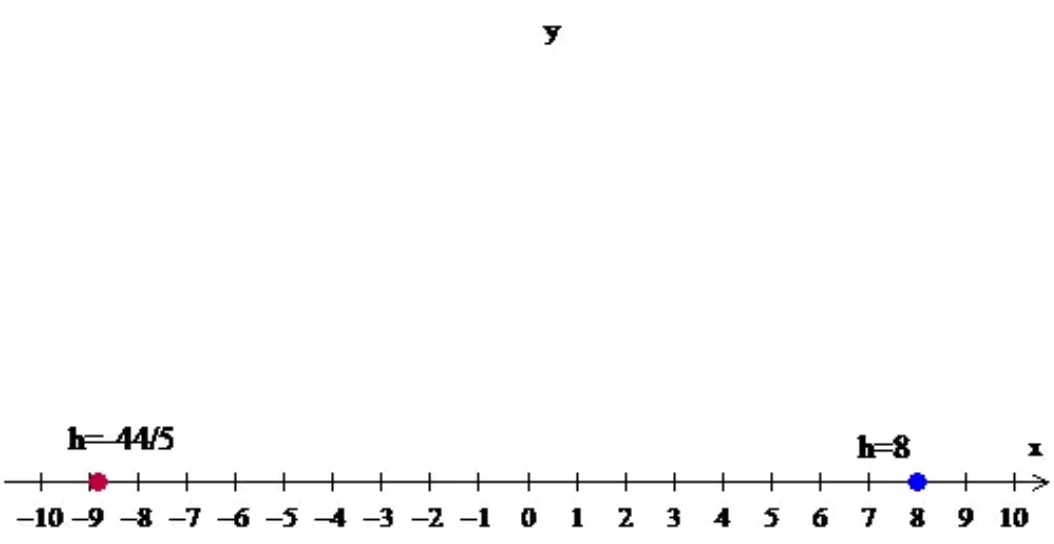
$h=\frac{40}{5}$ Divide both sides of equation with 5

$h=8$

Conclusion:- $\boxed{h=\frac{-44}{5}}$ or $\boxed{h=8}$

To graph the solution of $\left|\frac{5h+2}{6}\right|=7$

Graph of $h=\frac{-44}{5}$ or $h=8$



Answer 39PA.

The objective is to solve each open sentence and then to graph the solution set

$$\left|\frac{2-3x}{5}\right| \geq 2$$

If $|x| > n$, then $x > n$ or $x < -n$

Similarly if $\left|\frac{2-3x}{5}\right| \geq 2$, then $\frac{2-3x}{5} \geq 2$ or $\frac{2-3x}{5} \leq -2$

Consider $\frac{2-3x}{5} \geq 2$

$2-3x \geq 10$

$2-10 \geq 3x$ Add $3x-10$ to both sides of inequality

$-8 \geq 3x$

$\frac{-8}{3} \geq x$ Divide both sides of inequality with 3

OR

Consider $\frac{2-3x}{5} \leq -2$

$2-3x \leq -10$

$2+10 \leq 3x$ Add $3x+10$ to both sides of inequality

$12 \leq 3x$

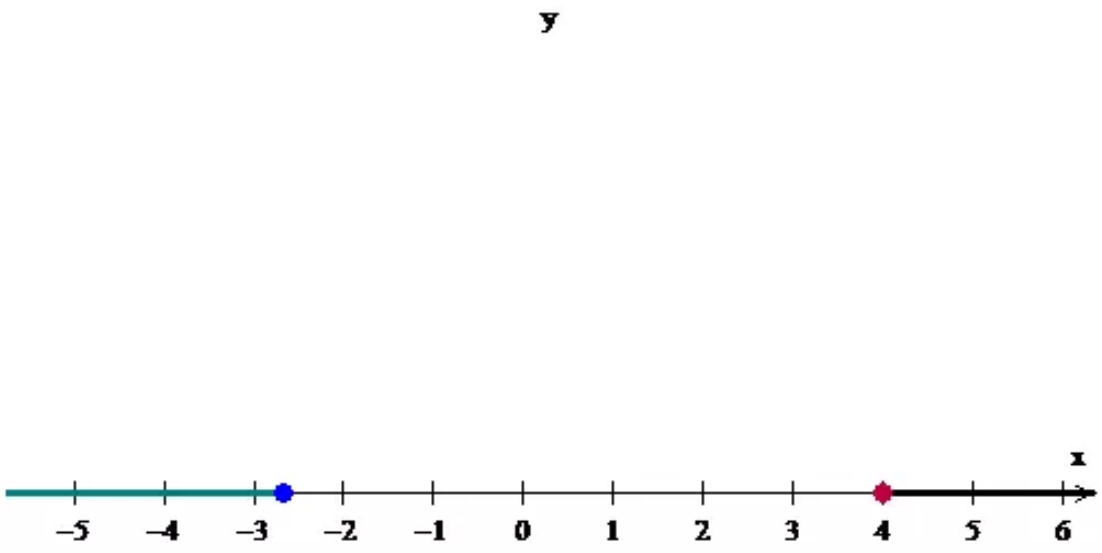
$\frac{12}{3} \leq x$ Divide both sides of inequality with 3

$4 \leq x$

Conclusion:- $4 \leq x$ or $\frac{-8}{3} \geq x$

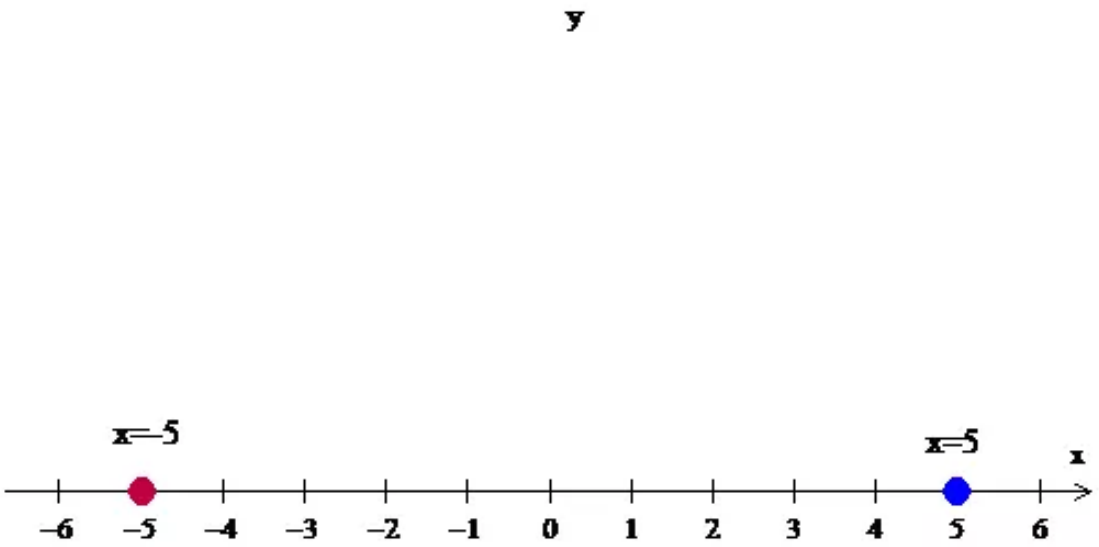
To graph the solution of $\left|\frac{2-3x}{5}\right| \geq 2$

Graph of $4 \leq x$ or $\frac{-8}{3} \geq x$



Answer 40PA.

The objective is to write an open sentence involving absolute value for the graph



Since $x = 5$ or $x = -5$

If $|x| = n$, then $x = -n$ or $x = n$.Inverse of this is also true

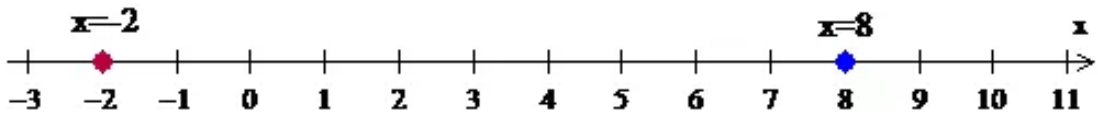
This can be written as $|x| = 5$

Conclusion:- open sentence is $\boxed{|x| = 5}$

Answer 41PA.

The objective is to write an open sentence involving absolute value for the graph

y



Since $x = -2$ or $x = 8$

Find the point that is the same distance from -2 as distance from 8. The midpoint between -2 and 8 is 3

The distance from 3 to -2 is 5 units

The distance from 3 to 8 is 5 units

Therefore $|x-3|=5$

Conclusion:- open sentence is $\boxed{|x-3|=5}$

Answer 42PA.

The objective is to write an open sentence involving absolute value for the graph

y

Since $-3 \le x \le 3$

Find the point that is the same distance from -3 as distance from 3. The midpoint between -3 and 3 is 0

The distance from 0 to -3 is 3 units

The distance from 0 to 3 is 3 units

We know that , If $|x| < n$, then $x < n$ and $x > -n$

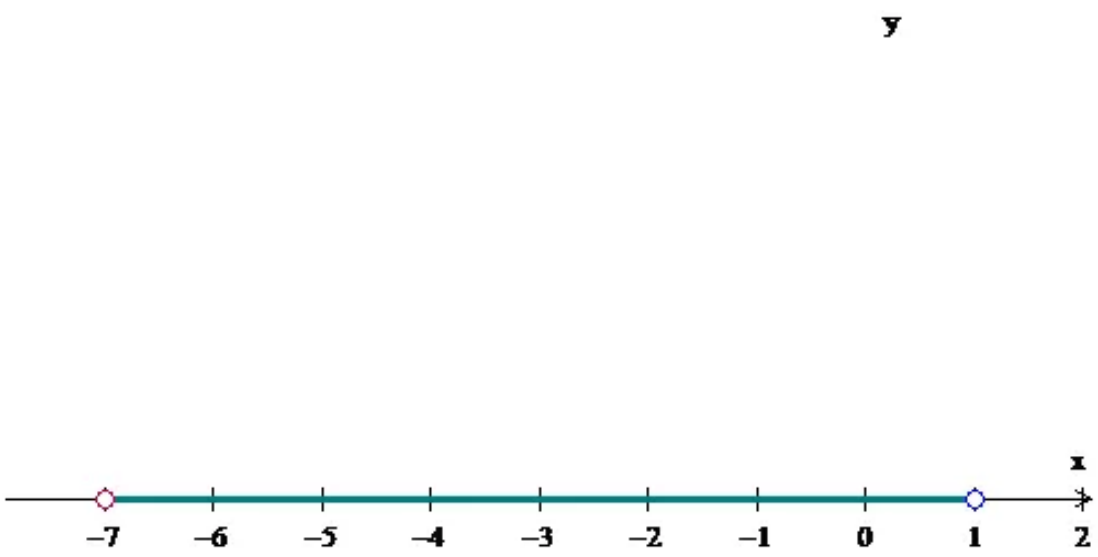
The above graph is of this form

Therefore $|x| < 3$

Conclusion:- open sentence is $\boxed{|x| < 3}$

Answer 43PA.

The objective is to write an open sentence involving absolute value for the graph



Since $-7 < x < 1$

Find the point that is the same distance from -7 as distance from 1. The midpoint between -7 and 1 is -3

The distance from -3 to -7 is 4 units

The distance from -3 to 1 is 4 units

We know that , If $|x| < n$, then $x < n$ and $x > -n$

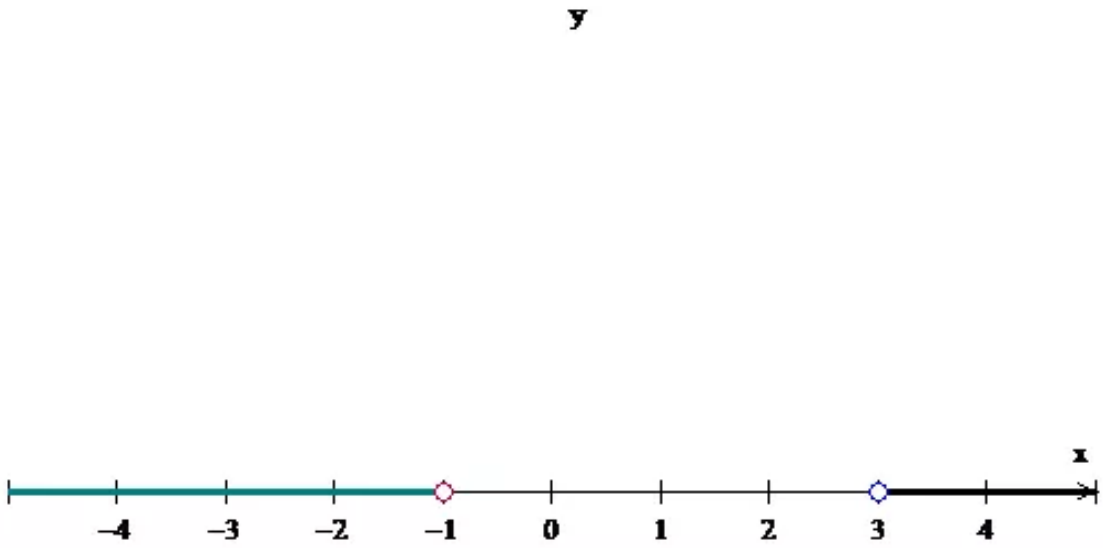
The above graph is of this form

Therefore $|x + 3| < 4$

Conclusion:- open sentence is $\boxed{|x + 3| < 4}$

Answer 44PA.

The objective is to write an open sentence involving absolute value for the graph



Since $x < -1$ or $x > 3$

Find the point that is the same distance from -1 as distance from 3. The midpoint between -1 and 3 is 1

The distance from 1 to 3 is 2 units

The distance from 1 to -1 is 2 units

We know that , if $|x| > n$, then $x > n$ or $x < -n$

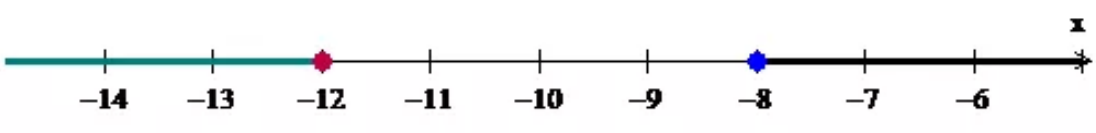
The above graph is of this form

Therefore $|x-1| > 2$

Conclusion:- open sentence is $\boxed{|x-1| > 2}$

Answer 45PA.

The objective is to write an open sentence involving absolute value for the graph



Since $x \le -12$ or $x \ge -8$

Find the point that is the same distance from -12 as distance from -8. The midpoint between -12 and -8 is -10

The distance from -10 to -8 is 2 units

The distance from -10 to -12 is 2 units

We know that , if $|x| > n$, then $x > n$ or $x < -n$

The above graph is of this form

Therefore $|x+10| \ge 2$

Conclusion:- open sentence is $\boxed{|x+10| \ge 2}$

Answer 46PA.

The objective is to write an absolute value inequality for the length of a full-term pregnancy.

Statement:- The average length of a human pregnancy is 280 days. However, a healthy, full-term pregnancy can be 14 days longer or shorter

The absolute value inequality for the length of a full-term pregnancy is $|x-280| \le 14$ because the difference between the actual number and 280 is within 14 days.

Answer 47PA.

The objective is to solve the inequality for the length of a full-term pregnancy.

Statement:- The average length of a human pregnancy is 280 days. However, a healthy, full-term pregnancy can be 14 days longer or shorter

The absolute value inequality for the length of a full-term pregnancy is $|x-280| \le 14$

Inequality is $|x-280| \le 14$

If $|x| < n$, then $x < n$ and $x > -n$

Similarly if $|x-280| \le 14$, then $x-280 \le 14$ and $x-280 \ge -14$

Consider $x-280 \le 14$

$x \le 14+280$ Add 280 to both sides of inequality

$x \le 294$

AND

Consider $x-280 \ge -14$

$x \ge -14+280$ Add 280 to both sides of inequality

$x \ge 266$

Conclusion:- $\boxed{x \ge 266}$ and $\boxed{x \le 294}$ That is , a healthy, full-term pregnancy can be between 266 and 294 days.

Answer 48PA.

The objective is to write the range of pressures for safe fire extinguisher

According to problem, the pressure of a typical fire extinguisher should be within 25 pounds per square inch of 195 psi.

The absolute value inequality for the typical fire extinguisher is $|p-195|\leq 25$

Inequality is $|p-195|\leq 25$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|p-195|\leq 25$, then $p-195\leq 25$ or $p-195\geq -25$

Consider $p-195\leq 25$

$p\leq 25+195$ Add 195 to both sides of inequality

$p\leq 220$

AND

Consider $p-195\geq -25$

$p\geq -25+195$ Add 195 to both sides of inequality

$p\geq 170$

Conclusion:- $\boxed{p\leq 220}$ and $\boxed{p\geq 170}$ That is the range of pressures for safe fire extinguisher is between 170 and 220

Answer 49PA.

The objective is to write the range of temperatures in the house

According to problem, the thermostat which is with 3-degree differential is set at 68oF.

Since this is having 3-degree differential, the temperature will be kept within 30F

The absolute value inequality for the thermostat is $|x-68|\leq 3$

Inequality is $|x-68|\leq 3$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x-68|\leq 3$, then $x-68\leq 3$ or $x-68\geq -3$

Consider $x-68\leq 3$

$x\leq 3+68$ Add 68 to both sides of inequality

$x\leq 71$

AND

Consider $x-68\geq -3$

$x\geq -3+68$ Add 68 to both sides of inequality

$x\geq 65$

Conclusion:- $\boxed{65\leq x\leq 71}$ That is the range of temperature is between 650F to 710F

Answer 50PA.

The objective is to find the range of the percent of people who say protection of the environment should have priority over developing energy supplies.

According to problem, the Americans who say protecting the environment should be given priority is 52% .The margin of error is $\pm 3\%$ points.

The absolute value inequality for Americans who say protecting the environment should be given priority $|x-52|\leq 3$

Inequality is $|x-52|\leq 3$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x-52|\leq 3$, then $x-52\leq 3$ and $x-52\geq -3$

Consider $x-52\leq 3$

$x\leq 3+52$ Add 52 to both sides of inequality

$x\leq 55$

AND

Consider $x-52\geq -3$

$x\geq -3+52$ Add 52 to both sides of inequality

$x\geq 49$

Conclusion:-Solution set $=\{x/49\leq x\leq 55\}$ That is the range of the percent of people who say protection of the environment should have priority over developing energy supplies is between 49 and 55

Answer 51PA.

The objective is to write the range of acceptable pressures

According to problem, the tires should be kept within 2 psi of the manufactures recommended tire pressure. The recommended inflation pressure for tire is 30 psi.

The absolute value inequality for the tire pressure is $|x-30|\leq 2$

Inequality is $|x-30|\leq 2$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x-30|\leq 2$, then $x-30\leq 2$ or $x-30\geq -2$

Consider $x-30\leq 2$

$x\leq 2+30$ Add 30 to both sides of equation

$x\leq 32$

AND

Consider $x-30\geq -2$

$x\geq -2+30$ Add 30 to both sides of equation

$x\geq 28$

Conclusion:- $\boxed{x\leq 32}$ and $\boxed{x\geq 28}$ That is the range of pressures is given by solution set

$\boxed{\{p/28\leq x\leq 32\}}$

Answer 52PA.

The objective is to state whether each open sentence is always, sometimes or never true.

(a) $|x+3|<-5$

We know that if $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x+3|<-5$, then $x+3<-5$ and $x+3>5$

Consider $x+3<-5$

$x<-5-3$ Add -3 on both sides of inequality

$x<-8$

AND

Consider $x+3>5$

$x>5-3$ Add -3 on both sides of inequality

$x>2$

Since $x<-8$ and $x>2$, the solution is null set.

So this open sentence is $\boxed{\text{never true}}$

(b) $|x-6|>-1$

We know that if $|x|>n$, then $x>n$ or $x<-n$

Similarly if $|x-6|>-1$, then $x-6>-1$ or $x-6<1$

Consider $x-6>-1$

$x>-1+6$ Add 6 on both sides of inequality

$x>5$

Consider $x-6<1$

$x<1+6$ Add 6 on both sides of inequality

$x<7$

Since $x>5$ or $x<7$, this open sentence is $\boxed{\text{sometimes true}}$

(c) $|x+2|=0$

We know that if $|x|=n$, then $x=n$ or $x=-n$

Similarly if $|x+2|=0$, then $x+2=0$

Since $x+2=0$ Add -2 on both sides of equation

$x=-2$

This open sentence is $\boxed{\text{always true}}$

Answer 53PA.

The objective is to find the amount of sodium chloride Li=Cheng can add and obtain the correct results

Cheng must add 3.0 milliliters of sodium Chloride to a solution & the sodium chloride must be within 0.5 milliliters of required amount.

The amount of sodium chloride Li=Cheng can add and obtain the correct results is 3 ± 0.5

That is

$3+0.5=3.5$

$3-0.5=2.5$

Solution set is $=\{a/2.5\le a\le 3.5\}$

Conclusion :- The amount of sodium chloride Li=Cheng can add and obtain the correct results is between 2.5 and 3.5 that is solution set is $\boxed{\{a/2.5\le a\le 3.5\}}$

Answer 54PA.

The objective is to find the range of guesses in which Luis can win the vehicle.

According to problem, the actual price of car is $18000.Luis must guess within $1500 of actual price of the car.

The absolute value inequality for guessing the car's price and winning the vehicle is

$|x-18,000|\leq 1500$

Inequality is $|x-18,000|\leq 1500$

If $|x|<n$, then $x<n$ and $x>-n$

Similarly if $|x-18,000|\leq 1500$, then $x-18000\leq 1500$ or $x-18000\geq -1500$

Consider $x-18000\leq 1500$

$x\leq 18000+1500$ Add 18000 to both sides of inequality

$x\leq 19500$

AND

Consider $x-18000\geq -1500$

$x\geq 18000-1500$ Add 18000 to both sides of inequality

$x\geq 16,500$

Conclusion:-Solution set $=\{x/19500\geq x\geq 16,500\}$ That is the range of guesses in which Luis can win the vehicle is between 16,500 and 19500.

Answer 55PA.

The objective is to find

(a) The value of *x* if $x=3\pm 1.2$

(b) An expression involving absolute value if $x=3\pm 1.2$

(a) Consider

$x=3+1.2$

$x=4.2$

Consider

$x=3-1.2$

$x=1.8$

Conclusion :- $\boxed{x=4.2}$ or $\boxed{x=1.8}$

(b) The expression involving absolute value is $|x-3|\leq 1.2$ because the difference between the actual number and 3 is 1.2

Conclusion :- $\boxed{|x-3|\leq 1.2}$

Answer 56PA.

The objective is to tell how absolute value is used in election polls

Voters in Hamilton were supposed to vote on a new tax levy. In a poll conducted before election ,it was found that 45% were against the tax levy. The poll has a 3-point margin of error

This means that number of people against tax levy may be as high as 48% or as low as 42%.

This can be written as an inequality using absolute value as $|x-45| \le 3$ that is the difference between the actual number and 45 is within 3 points

The tax levy will pass as the number of voters who were for tax levy is highest ,that is,47% with 3 point margin of error.

Answer 57PA.

The objective is to choose the replacement set that makes $|x+5|=2$ true

If $|x|=n$, then $x=-n$ or $x=n$

Similarly if $|x+5|=2$, then $x+5=2$ or $x+5=-2$

Consider $x+5=2$

$x=2-5$

$x=-3$

OR

Consider $x+5=-2$

$x=-2-5$

$x=-7$

Conclusion:- $\boxed{x=-3}$ or $\boxed{x=-7}$ The correct answer is $\boxed{\text{option (b)}}$

Answer 58PA.

The objective is to say what we conclude about *x* if $-6<|x|<6$.

One of the solutions is $-6<x<6$

Multiply the inequality with -1

Inequality becomes $6>-x>-6$

From the above, we get to know that $-x<6$

So $\boxed{\text{option (c)}}$ that is $\boxed{-x<6}$ is right

Answer 59MYS.

The objective is to find the target zone if Rafael's maximum heart rate is 190 beats per minute.

According to problem, the target zone is the range between 60% and 80% of maximum heart rate.

So 60% of 190 is $\frac{60}{100}\cdot 190 = 114$

And 80% of 190 is $\frac{80}{100}\cdot 190 = 152$

The target zone if Rafael's maximum heart rate is 190 beats per minute is between $\boxed{114}$ and $\boxed{152}$

Answer 60MYS.

The objective is to solve the inequality and to check the solution

$2m + 7 > 17$

$2m > 17 - 7$ Add -7 on both sides of equation.

$2m > 10$

$m > \frac{10}{2}$ Divide both sides of equation with 2

$m > 5$

Conclusion:- $\boxed{m > 5}$

To check the solution

Consider $m = 6$ since $m > 5$

Substitute $m = 6$ in $2m + 7 > 17$ to check

We get $2(6) + 7 ? 17$

$12 + 7 ? 17$

$19 > 17$

Since this inequality is true, $m > 5$ is true

Answer 61MYS.

The objective is to solve the inequality and to check the solution

$-2-3x \geq 2$

$-3x \geq 2+2$ Add 2 on both sides of equation

$-3x \geq 4$

$x \leq \frac{-4}{3}$ Divide with -3 on both sides of equation

Conclusion:- $\boxed{x \leq \frac{-4}{3}}$

To check the solution

Consider $x=-3$ since $x \leq \frac{-4}{3}$

Substitute $x=-3$ in $-2-3x \geq 2$ to check

We get $-2-3(-3)?2$

$-2+9?2$

$7>2$

Since this inequality is true, $x \leq \frac{-4}{3}$ is true

Answer 62MYS.

The objective is to solve the inequality and to check the solution

$\frac{2}{3}w-3 \leq 7$

$\frac{2}{3}w \leq 7+3$ Add 3 to both sides of the equation

$w \leq 10 \cdot \frac{3}{2}$ Multiply on both sides of equation with $\frac{3}{2}$

$w \leq 15$

Conclusion:- $\boxed{w \leq 15}$

To check the solution

Consider $w=9$ since $w\le 15$

Substitute $w=9$ in $\frac{2}{3}w-3\le 7$ to check

We get $\frac{2}{3}\cdot 9-3?7$

$6-3?7$

$3<7$

Since this inequality is true, $w\le 15$ is true

Answer 63MYS.

The objective is to find the slope and *y*- intercept of equation

$2x+y=4$

$y=-2x+4$ (Add $-2x$ to both sides of equation)

This equation is of the form of equation of line $y=mx+b$

For this problem, slope $m=-2$ and *y*- intercept $b=4$

Conclusion :- $\boxed{m=-2,b=4}$

Answer 64MYS.

The objective is to find the slope and *y*- intercept of equation

$2y-3x=4$

$2y=3x+4$ (Add $3x$ to both sides of equation)

$y=\frac{3}{2}x+\frac{4}{2}$ (Divide both sides of equation with 2)

$y=\frac{3}{2}x+2$

This equation is of the form of equation of line $y=mx+b$

For this problem, slope $m=\frac{3}{2}$ and *y*- intercept $b=2$

Conclusion :- $\boxed{m=\frac{3}{2},b=2}$

Answer 65MYS.

The objective is to find the slope and *y*- intercept of equation

$\frac{1}{2}x+\frac{3}{4}y=0$

$\frac{3}{4}y=-\frac{1}{2}x$ (Add $-\frac{1}{2}x$ to both sides of equation)

$y=-\frac{1}{2}x\cdot\frac{4}{3}$ (Multiply both sides of equation with $\cdot\frac{4}{3}$)

$y=-\frac{2}{3}x$

This equation is of the form of equation of line $y=mx+b$

For this problem, slope $m=-\frac{2}{3}$ and *y*- intercept $b=0$

Conclusion :- $\boxed{m=-\frac{2}{3},b=0}$

Answer 66MYS.

The objective is to solve each equation or formula for the variable specified

$I=prt$, for *r*

Consider $I=prt$

$\frac{I}{pt}=r$ Divide both sides of equation with pt

Conclusion :- $\boxed{r=\frac{I}{pt}}$

Answer 67MYS.

The objective is to solve each equation or formula for the variable specified

$ex-2y=3z$, for *x*

Consider $ex-2y=3z$

$ex=3z+2y$ Add $2y$ to both sides of equation

$x=\frac{3z+2y}{e}$ Divide both sides of equation with e

Conclusion :- $\boxed{x=\frac{3z+2y}{e}}$

Answer 68MYS.

The objective is to solve each equation or formula for the variable specified

$\frac{a+5}{3}=7x$, for x

Consider $\frac{a+5}{3}=7x$

$x=\frac{a+5}{3\cdot 7}$ Divide both sides of equation with 7

$x=\frac{a+5}{21}$

Conclusion :- $\boxed{x=\frac{a+5}{21}}$

Answer 69MYS.

The objective is to find sum or difference

$-13+8$

When 2 numbers of different signs are added, subtract the 2 numbers and keep the greater number sign

$-13+8=-5$

Conclusion :- $\boxed{-13+8=-5}$

Answer 70MYS.

The objective is to find sum or difference

$-13.2-6.1$

When 2 numbers of same signs are added, add the 2 numbers and keep the same sign

$=-19.3$

Conclusion :- $\boxed{-13.2-6.1=-19.3}$

Answer 71MYS.

The objective is to find sum or difference

$-4.7-(-8.9)$

$=-4.7+8.9$ Product of 2 negative signs is positive sign

When 2 numbers of different signs are added, subtract the 2 numbers and keep the greater number sign

$=4.2$

Conclusion :- $\boxed{-4.7-(-8.9)=4.2}$

Answer 72MYS.

The objective is to name the property illustrated by the statement

$$10x+10y=10(x+y)$$

This is distributive property which is of the form $a(b+c)=ab+ac$.

Conclusion:- Property is **distributive property**

Answer 73MYS.

The objective is to name the property illustrated by the statement

$$(2+3)a+7=5a+7$$

This is substitution property because $2+3$ is substituted with 5

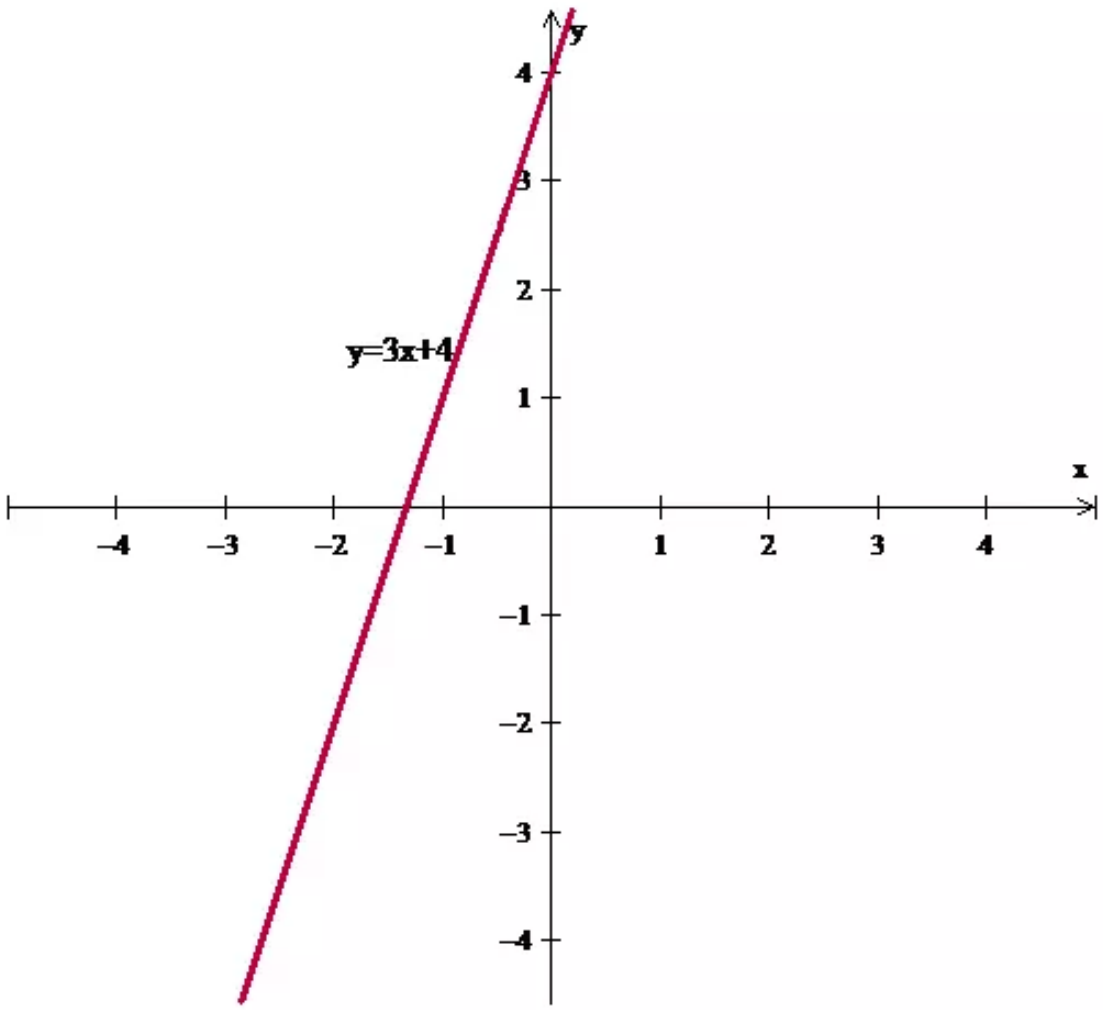
Conclusion:- Property is **substitution property**

Answer 74MYS.

The objective is to graph the equation

$$y=3x+4$$

Graph of $y=3x+4$

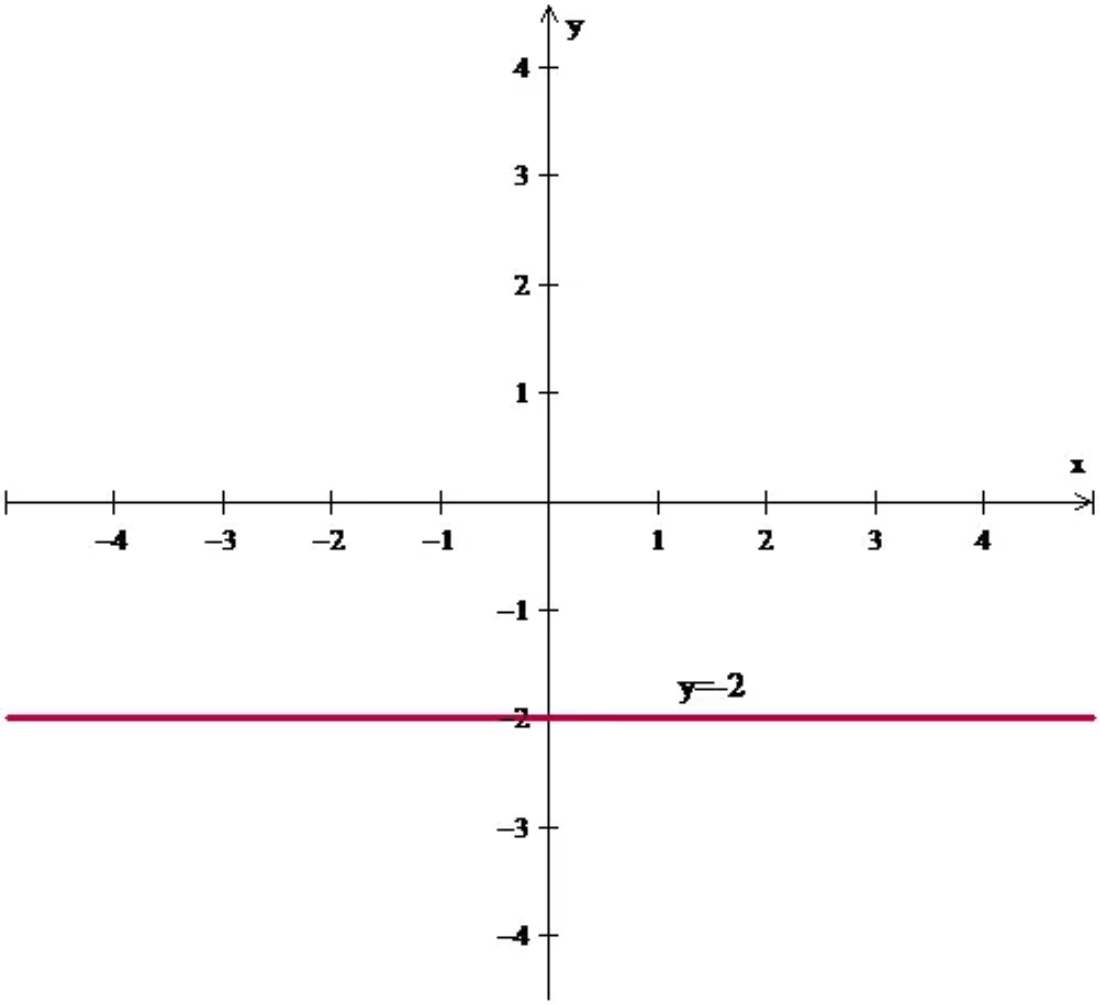


Answer 75MYS.

The objective is to graph the equation

$y = -2$

Graph of $y = -2$

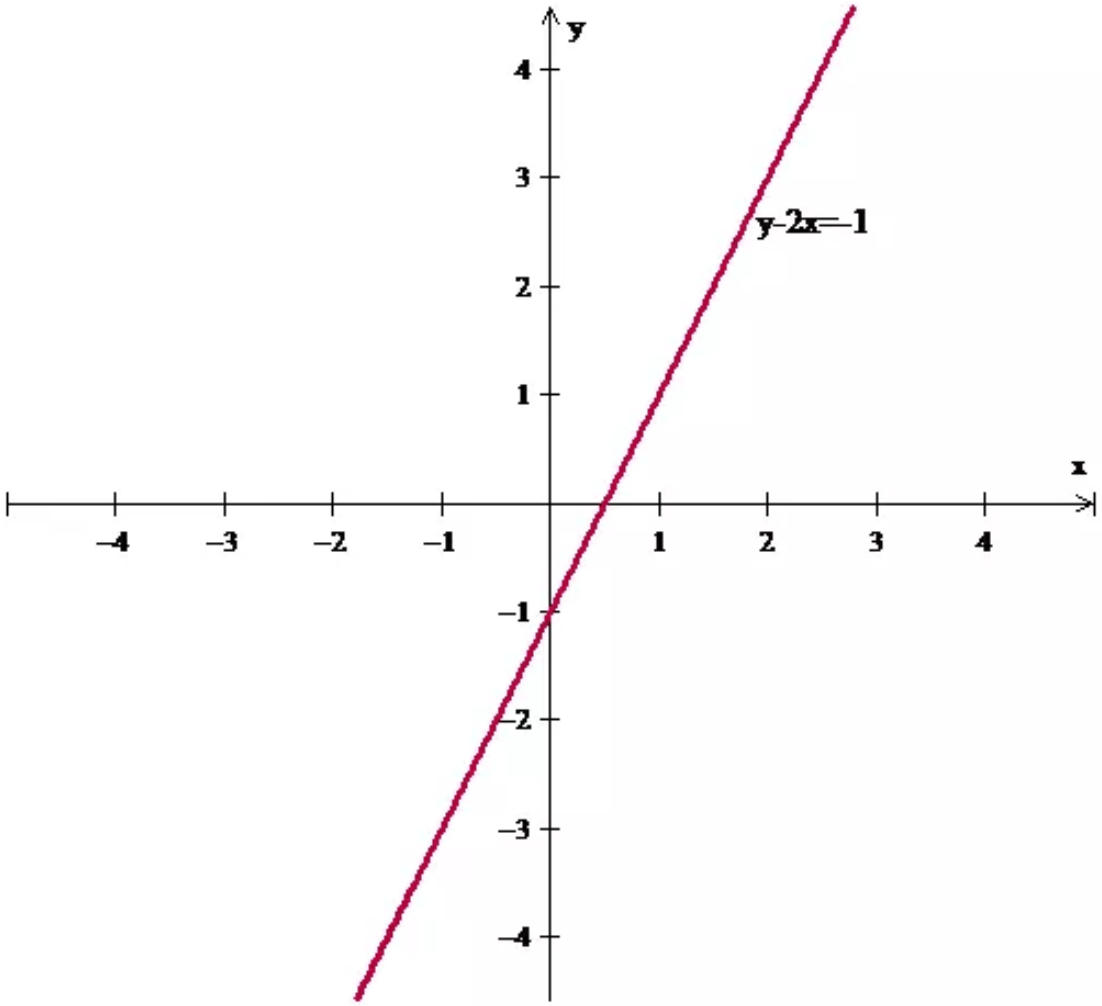


Answer 77MYS.

The objective is to graph the equation

$y-2x=-1$

Graph of $y-2x=-1$

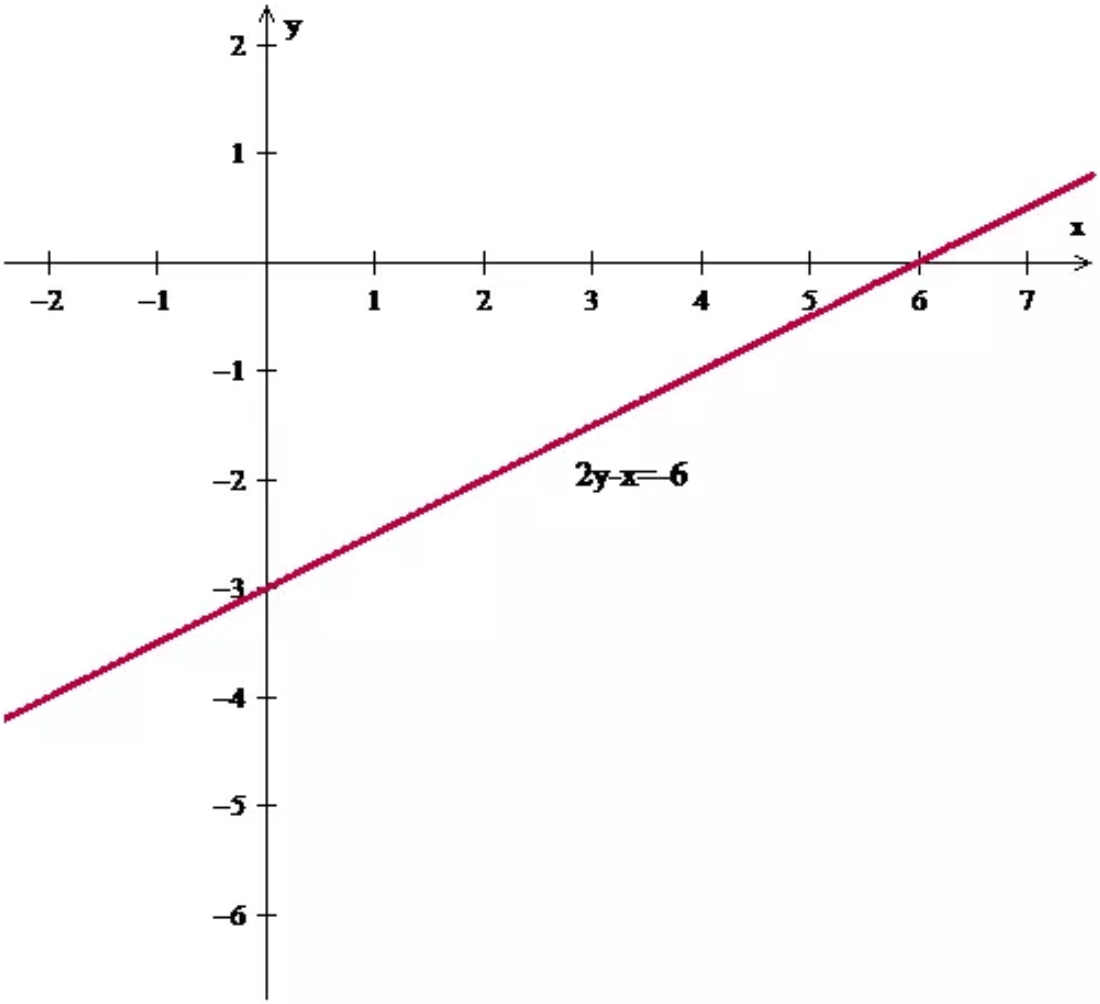


Answer 78MYS.

The objective is to graph the equation

$2y - x = -6$

Graph of $2y - x = -6$



Answer 79MYS.

The objective is to graph the equation

$$2(x+y)=10$$

Graph of $2(x+y)=10$