## Solving Inequalities



## Inequality Symbols

- $x>y$

$$
\text { - } x \geq y
$$

- $x<y$

$$
\text { - } x \leq y
$$

- Remember, we solve these just like equations
- You will have to graph your answer on a number line
- Don't forget the special rule when you multiply and divide by a negative


## Examples

(1) $\underset{-1}{1}$

$$
\begin{aligned}
& x \geq 2 \\
& \text { (Q) }-\frac{7}{5} x \leq-11,-\frac{5}{2} \\
& x \geq 5 \frac{5}{2} \rightarrow x \geq 27.5 \\
& 5-\frac{2}{5} x \leq-11 \cdot 5 \\
& \frac{-2 x}{-2} \leq-\frac{55}{-2}
\end{aligned}
$$

$$
\begin{aligned}
& x \geq 27.5
\end{aligned}
$$


(3.) $-\frac{3}{4} x>12.4$ $\frac{-3 x}{-3}>\frac{48}{-3}$ $x<-16$

(4.)

$$
\begin{gathered}
8 x-44 \leq-12+2 x-8 \\
8 x-44 \leq-20+2 x \\
-2 x \quad-2 x
\end{gathered}
$$

$$
6 x-44 \leq-20
$$



$$
\frac{6 x}{6} \leq \frac{24}{6}
$$

$$
x \leq 4
$$




$$
\begin{aligned}
& 2 x-4 \geq-30 x+12 \\
&+30 x+30 x \\
& \hline 32 x-4 \geq 12 \\
&+4+4
\end{aligned}
$$

$$
\frac{32 x}{32} \geq \frac{16}{32}
$$

$$
x \geq 1 / 2
$$



$$
\begin{aligned}
& \text { (5) } 3(2-x)<10-3(x-6) \\
& 6-3 x<10-3 x+18 \\
& \begin{array}{rrr}
6-3 x<28 & -3 x \\
+3 x & +3 x
\end{array} \\
& 6<28 \\
& \{\times \mid \text { 留 }
\end{aligned}
$$


(7.) $\frac{1}{3}(4 x+3) \geq \frac{2}{3} x+2$
$\frac{4}{3} x+1 \geq \frac{2}{3} x+2$
$-\frac{2}{3} x \quad-\frac{2}{3} x$
$\frac{\frac{2}{3} x+1 \geq \begin{array}{r}2 \\ -1 \\ -1 \\ \frac{2}{3} x \geq 1.3\end{array}}{\frac{1}{2}+1}$
$\frac{2 x}{2} \geq \frac{3}{2}$
$x \geq 3 / 2$
$x \geq 1.5$


A shipping container will be used to transport several 100-kilogram crates across the country by rail. The greatest weight that can be loaded into the container is 25500 kilograms. Other shipments weighing a total of 9600 kilograms have already been loaded into the container. Write and solve an inequality which can be used to determine $x$, the number of 100 -kilogram crates that can be loaded into the shipping container.


$$
\begin{aligned}
100 x & +9600 \leq 25500 \\
-9600 & -9600 \\
\frac{100 x}{100} & \leq \frac{15.900}{100} \\
x & \leq 159
\end{aligned}
$$

A rental car company charges $\$ 51.20$ per day to rent a car and $\$ 0.12$ for every mile driven. Jerry wants to rent a car, knowing that:

- He plans to drive 200 miles.
- He has at most $\$ 280$ to spend.

Write and solve an inequality which can be used to determine $d$, the number of days Jerry can afford to rent while staying within his budget.

$$
\begin{aligned}
& 51.20 d+0.12(200) \leq 280 \\
& 51.20 d+24 \leq 280 \\
&-24-24 \\
& \frac{51.20 d}{51.20} \leq \frac{256}{51.20} \\
& d \leq 5
\end{aligned}
$$

$$
\begin{aligned}
& 10 n-7(n+2)>5 n-12 \\
& 10 n-7 n-14>5 n-12 \\
& 3 n-14>5 n-12 \\
& -3 n \quad-3 n \\
& -14>2 n-12 \\
& +12 \quad+12 \\
& \frac{-2}{2}>\frac{d}{2} \\
& -1>n
\end{aligned}
$$

