Name _____ Date_____

Graphing Solutions to Inequalities

The junior-high art club sells candles for a fundraiser. The first week of the fundraiser, the club sells 7 cases of candles. Each case contains 40 candles. The goal is to sell at least 13 cases. During the second week of the fundraiser, the club meets its goal. Write, solve, and graph an inequality that can be used to find the possible number of candles sold the second week.

1. Ben has agreed to play fewer video games and spend more time studying. He has agreed to play less than 10 hours of video games each week. On Monday through Thursday, he plays video games for a total of $5\frac{1}{2}$ hours. For the remaining 3 days, he plays video games for the same amount of time each day. Find t, the amount of time he plays video games, for each of the 3 days. Graph your solution.

2. Gary's contract states that he must work more than 20 hours per week. The graph below represents the number of hours he can work in a week.

   a. Write an algebraic inequality that represents the number of hours, h, Gary can work in a week.

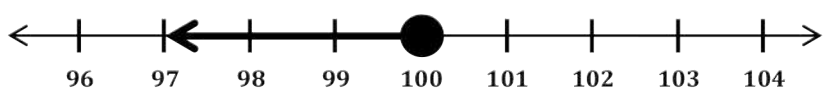
   b. Gary is paid $\$15.50$ per hour in addition to a weekly salary of $\$50$. This week he wants to earn more than $\$400$. Write an inequality to represent this situation.

   c. Solve and graph the solution form part (b). Round to the nearest hour.

3. Sally's bank account has $\$650$ in it. Every week, Sally withdraws $\$50$ to pay for her dog sitter. What is the maximum number of weeks that Sally can withdraw the money so there is at least $\$75$ remaining in the account? Write and solve an inequality to find the solution, and graph the solution on a number line.

4. On a cruise ship, there are two options for an Internet connection. The first option is a fee of $\$5$ plus an additional $\$0.25$ per minute. The second option costs $\$50$ for an unlimited number of minutes. For how many minutes, m, is the first option cheaper than the second option? Graph the solution.

5. The length of a rectangle is 100 centimeters, and its perimeter is greater than 400 centimeters. Henry writes an inequality and graphs the solution below to find the width of the rectangle. Is he correct? If yes, write and solve the inequality to represent the problem and graph. If no, explain the error(s) Henry made.

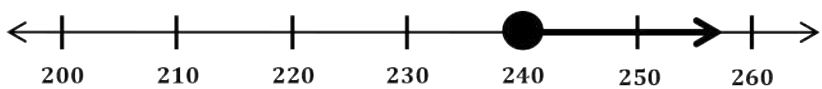


The junior-high art club sells candles for a fundraiser. The first week of the fundraiser, the club sells 7 cases of candles. Each case contains 40 candles. The goal is to sell at least 13 cases. During the second week of the fundraiser, the club meets its goal. Write, solve, and graph an inequality that can be used to find the minimum number of candles sold the second week.

Let n represent the number candles sold the second week.

$$\frac{n}{40} + 7 \geq 13$$
$$\frac{n}{40} + 7 - 7 \geq 13 - 7$$
$$\frac{n}{40} \geq 6$$
$$(40)\left(\frac{n}{40}\right) \geq 6(40)$$
$$n \geq 240$$

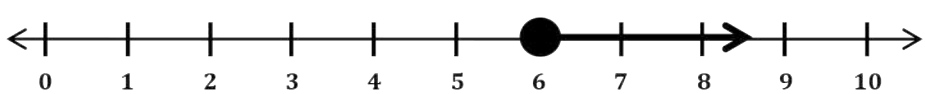
The minimum number of candles sold the second week was 240 candles.



OR

Let n represent the number of cases of candles sold the second week.

$$40n + 280 \geq 520$$
$$40n + 280 - 280 \geq 520 - 280$$
$$40n + 0 \geq 240$$
$$\left(\frac{1}{40}\right)(40n) \geq 240\left(\frac{1}{40}\right)$$
$$n \geq 6$$



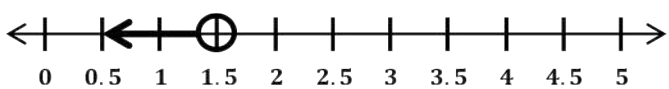
The minimum number of cases sold the second week was 6. Since there are 40 candles in each case, the minimum number of candles sold the second week would be $(40)(6) = 240$.

1. Ben has agreed to play fewer video games and spend more time studying. He has agreed to play less than 10 hours of video games each week. On Monday through Thursday, he plays video games for a total of $5\frac{1}{2}$ hours. For the remaining 3 days, he plays video games for the same amount of time each day. Find t, the amount of time he plays video games for each of the 3 days. Graph your solution.

Let t represent the time in hours spent playing video games.

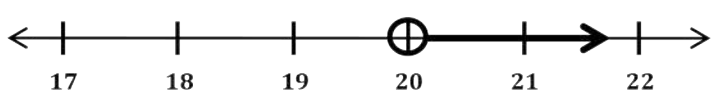
$$3t + 5\frac{1}{2} < 10$$
$$3t + 5\frac{1}{2} - 5\frac{1}{2} < 10 - 5\frac{1}{2}$$
$$3t + 0 < 4\frac{1}{2}$$
$$\left(\frac{1}{3}\right)(3t) < \left(\frac{1}{3}\right)\left(4\frac{1}{2}\right)$$
$$t < 1.5$$

Graph:



Ben plays less than 1.5 hours of video games each of the three days.

2. Gary's contract states that he must work more than 20 hours per week. The graph below represents the number of hours he can work in a week.



a. Write an algebraic inequality that represents the number of hours, h, Gary can work in a week.

$h > 20$

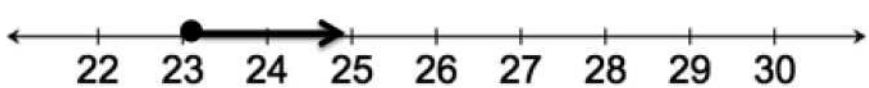
b. Gary is paid $\$15.50$ per hour in addition to a weekly salary of $\$50$. This week he wants to earn more than $\$400$. Write an inequality to represent this situation.

$15.50h + 50 > 400$

c. Solve and graph the solution form part (b). Round your answer to the nearest hour.

$$15.50h + 50 - 50 > 400 - 50$$
$$15.50h > 350$$
$$\left(\frac{1}{15.50}\right)(15.50h) > 350\left(\frac{1}{15.50}\right)$$
$$h > 22.58$$

Gary has to work 23 or more hours to earn more than $\$400$.

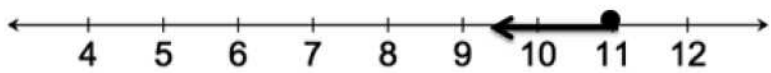


3. Sally's bank account has $\$650$ in it. Every week, Sally withdraws $\$50$ to pay for her dog sitter. What is the maximum number of weeks that Sally can withdraw the money so there is at least $\$75$ remaining in the account? Write and solve an inequality to find the solution, and graph the solution on a number line.

Let w represent the number of weeks Sally can withdraw the money.

$$650 - 50x \geq 75$$
$$650 - 50x - 650 \geq 75 - 650$$
$$-50x \geq -575$$
$$\left(\frac{1}{-50}\right)(-50x) \geq \left(\frac{1}{-50}\right)(-575)$$
$$x \leq 11.5$$

The maximum number of weeks Sally can withdraw the weekly dog sitter fee is 11 weeks.

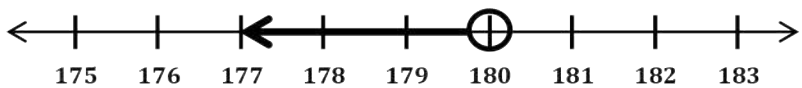


4. On a cruise ship, there are two options for an Internet connection. The first option is a fee of $\$5$ plus an additional $\$0.25$ per minute. The second option costs $\$50$ for an unlimited number of minutes. For how many minutes, m, is the first option cheaper than the second option? Graph the solution.

Let m represent the number of minutes of Internet connection.

$$5 + 0.25m < 50$$
$$5 + 0.25m - 5 < 50 - 5$$
$$0.25m + 0 < 45$$
$$\left(\frac{1}{0.25}\right)(0.25m) < \left(\frac{1}{0.25}\right)(45)$$
$$m < 180$$

If there are less than 180 minutes, or 3 hours, used on the Internet, then the first option would be cheaper. If 180 minutes or more are planned, then the second option is more economical.



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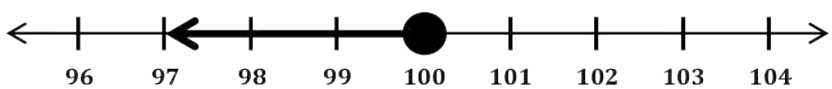

Henry's graph is incorrect. The inequality should be $2(100) + 2w > 400$. When you solve the inequality, you get $w > 100$. The circle on 100 on the number line is correct; however, the circle should be an open circle since the perimeter is not equal to 400. Also, the arrow should be pointing in the opposite direction because the perimeter is greater than 400, which means the width is greater than 100. The given graph indicates an inequality of less than or equal to.