Write and solve an inequality for each situation. Show your solution using a graph.

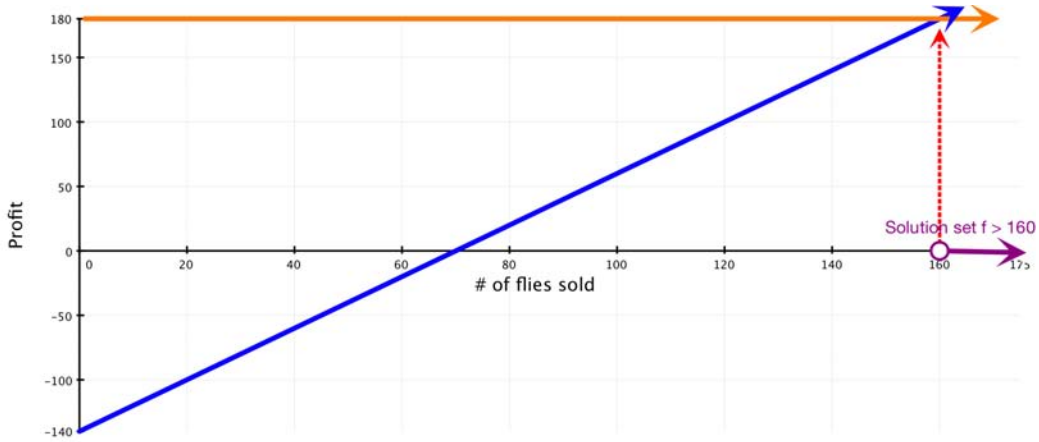
1. Jacob wants to make some flies for fishing to sell at an upcoming sports show. The cost of equipment to make the flies is $140. He plans to sell each fly for $2. How many flies will he need to sell if he wants to make a profit greater than $180?

Inequality $2f - 140 > 180$ where f is the number of flies

2f represents $2 for each fly sold. The cost of the equipment to make the flies ($140) is subtracted from 2f. This expression, 2f - 140, represents the profit that Jacob wants to be greater than $180.

$2f - 140 > 180$	original inequality
$+140 \quad +140$	add 140 to both sides of the inequality
$2f > 320$ $\frac{2f}{2} > \frac{320}{2}$	divide both sides of the inequality by two
$f > 160$	Solution

Graph



Jacob will need to sell more than 160 flies to make a profit greater than $180.

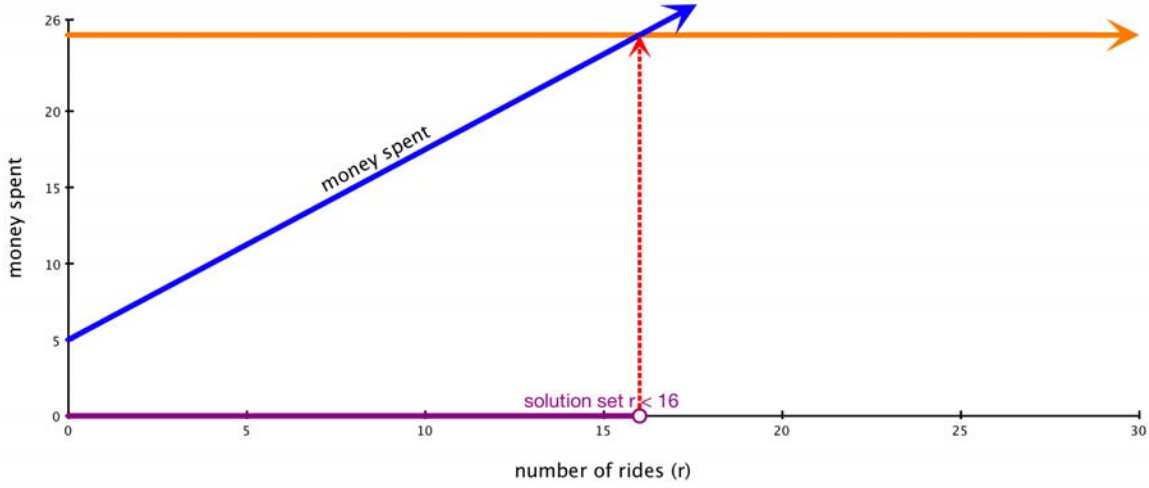
2. Kerri is going to the amusement park with her friends. Rides cost $1.25 each. In addition, the amusement park charges a $5 entry fee. Kerri's mother has asked her to spend less than $25. How many rides can Kerri go on?

Inequality $1.25r + 5 < 25$

1.25r represents $1.25 cost for each ride and $5 is added to the expression since there is $5 entry fee.

$1.25r + 5 < 25$	original inequality
$-5 \quad -5$	subtract 5 from both sides of the inequality
$1.25r < 20$ $\frac{1.25r}{1.25} < \frac{20}{1.25}$	divide both sides of the inequality by 1.25
$r < 16$	solution

Graph



Kerri will need to go on fewer than 16 rides to spend less than $25.

3. Addison put $50.00 on his lunch card at the beginning of the month. Lunch costs $2.25 per day. Addison is sent a message when his lunch account falls below $5.00. When should Addison expect a message?

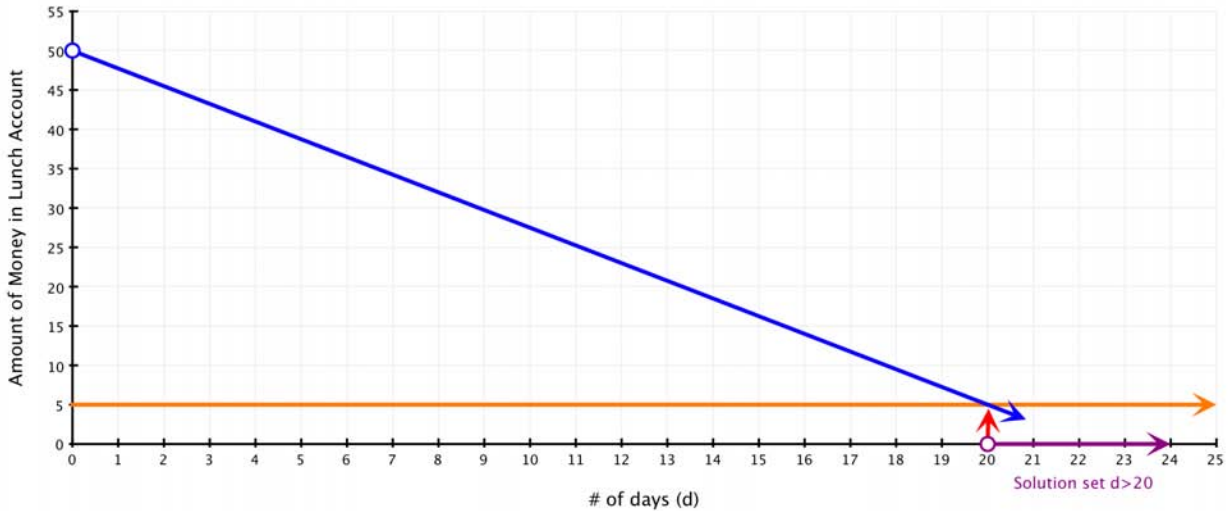
Inequality $50 - 2.25d < 5$

2.25d represents $2.25 cost for each day. This cost is subtracted from the $50 in the account at the beginning of the month. The *less than* symbol is used because the message will be sent when the account is less than $5.

$50 - 2.25d < 5$	original inequality
-50 -50	subtract 50 from both sides of the inequality
$\frac{-2.25d}{-2.25} > \frac{-45}{-2.25}$	divide by -2.25 on both sides of the inequality; reverse the inequality symbol
$d > 20$	solution

Graph

If the number of days was less than 20, notice the amount of money remains greater than $5. When multiplying or dividing by a negative value the relation changes, so the inequality symbol needs to reverse ("flip") for the solution to make sense.



After 20 days Addison will receive a message that his lunch account is below $5.00.

MakingSense

4. Jordan has a new car. The car has a low fuel light near the gas gauge that lights up when there is less than ⅛ of a tank of gas remaining. Jordan fills her car to its capacity of 12 gallons. She starts out on a trip driving at a rate that consumes 2½ gallons of gas per hour. After how many hours will the light be on?

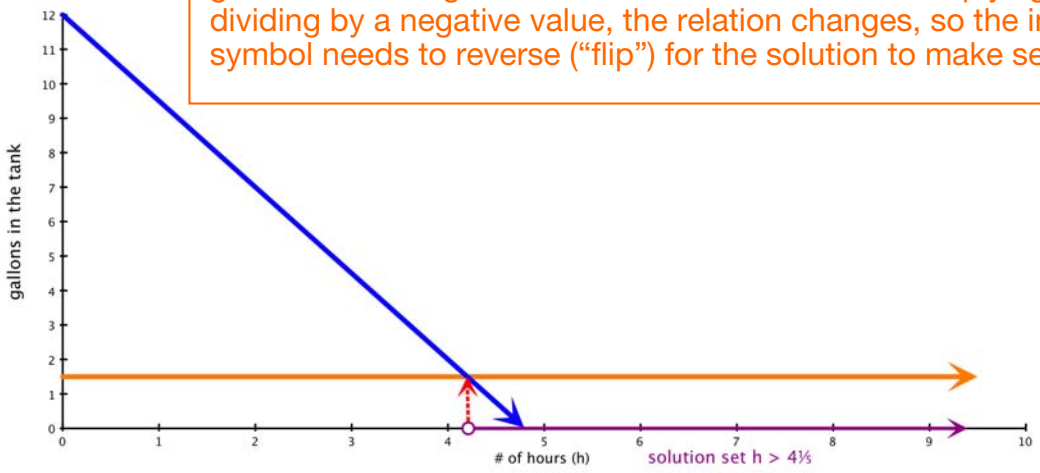
Inequality $12 - 2\frac{1}{2}h < 1\frac{1}{2}$

2½ h represents 2½ gallons for each hour. This is subtracted from the 12 gallons in the tank at the beginning of the trip. ⅛ of a tank is equivalent to 1½ gallons because ⅛ of 12 gallons is 1½ gallons. The *less than* symbol is used because the low fuel indicator lights when there is less than ⅛ of a tank.

$12 - 2\frac{1}{2}h < 1\frac{1}{2}$	original inequality
-12 -12	subtract 12 from both sides of the inequality
$-2\frac{1}{2}h < -10\frac{1}{2}$ $\frac{-2\frac{1}{2}h}{-2\frac{1}{2}} > \frac{-10\frac{1}{2}}{-2\frac{1}{2}}$	divide both sides of the inequality by -2½; reverse the inequality symbol
$h > \frac{21}{5}$ or $4\frac{1}{5}$	solution

Graph

If the number of hours was less than 4⅕, notice the number of gallons remains greater than ⅛ of a tank. When multiplying or dividing by a negative value, the relation changes, so the inequality symbol needs to reverse ("flip") for the solution to make sense.



After 4⅕ hours, the low fuel light will turn on.