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Scouting for Prizes! Modeling Linear Inequalities

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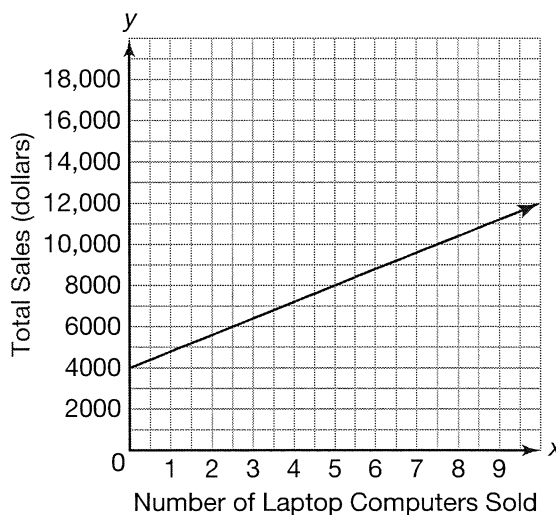
Vocabulary

Define the term in your own words.

1. solve an inequality

Problem Set

Carlos works at an electronics store selling computer equipment. He can earn a bonus if he sells \$10,000 worth of computer equipment this month. So far this month, he has sold \$4000 worth of computer equipment. He hopes to sell additional laptop computers for \$800 each to reach his goal. The function $f(x) = 800x + 4000$ represents Carlos's total sales as a function of the number of laptop computers he sells.



Use the graph to write an equation or inequality to determine the number of laptop computers Carlos would need to sell to earn each amount.

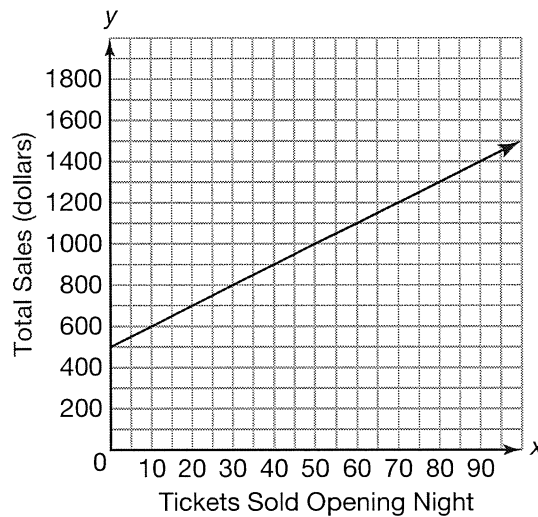
- 1. at least \$10,000
- 2. less than \$7000

Carlos would need to sell at least 8 laptop computers.
 $x \geq 8$

- 3. less than \$6000
- 4. at least \$9000

- 5. more than \$12,000
- 6. exactly \$8000

Elena works at the ticket booth of a local playhouse. On the opening night of the play, tickets are \$10 each. The playhouse has already sold \$500 worth of tickets during a presale. The function $f(x) = 10x + 500$ represents the total sales as a function of tickets sold on opening night.

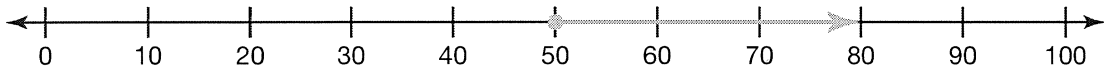


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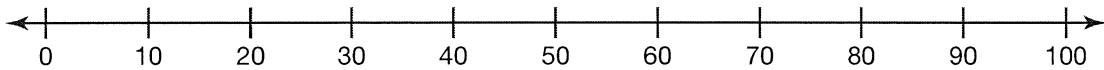
Use the graph of the function to answer each question. Graph each solution on the number line.

7. How many tickets must Elena sell in order to make at least \$1000?

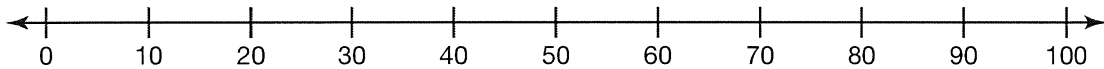
Elena must sell at least 50 tickets. $x \geq 50$



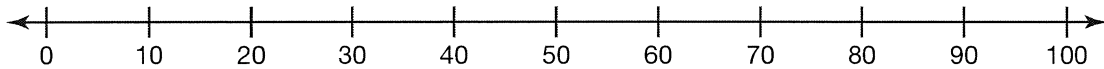
8. How many tickets must Elena sell in order to make less than \$800?



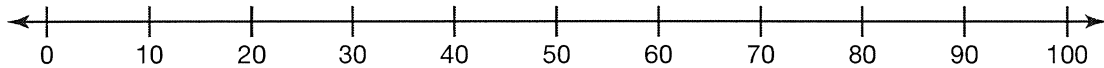
9. How many tickets must Elena sell in order to make at least \$1200?



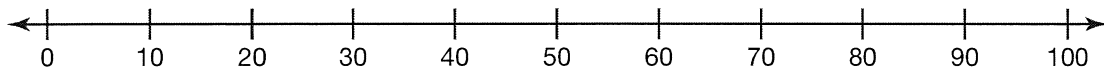
10. How many tickets must Elena sell in order to make exactly \$1400?



11. How many tickets must Elena sell in order to make less than \$600?



12. How many tickets must Elena sell in order to make exactly \$900?



Leon plays on the varsity basketball team. So far this season he has scored a total of 52 points. He scores an average of 13 points per game. The function $f(x) = 13x + 52$ represents the total number of points Leon will score this season. Write and solve an inequality to answer each question.

- 13.** How many more games must Leon play in order to score at least 117 points?

$$f(x) = 13x + 52$$

$$117 \leq 13x + 52$$

$$65 \leq 13x$$

$$5 \leq x$$

Leon must play in 5 or more games to score at least 117 points.

- 14.** How many more games must Leon play in order to score fewer than 182 points?

- 15.** How many more games must Leon play in order to score more than 143 points?

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16. How many more games must Leon play in order to score at least 100 points?



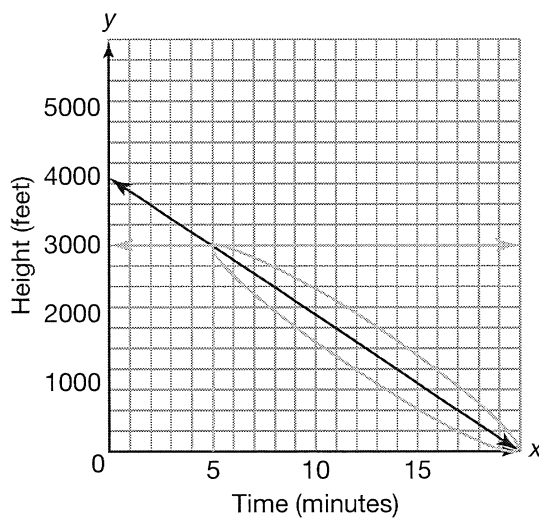
17. How many more games must Leon play in order to score fewer than 85 points?

18. How many more games must Leon play in order to score more than 200 points?

Draw an oval on the graph to represent the solution to each question. Write the corresponding inequality statement.

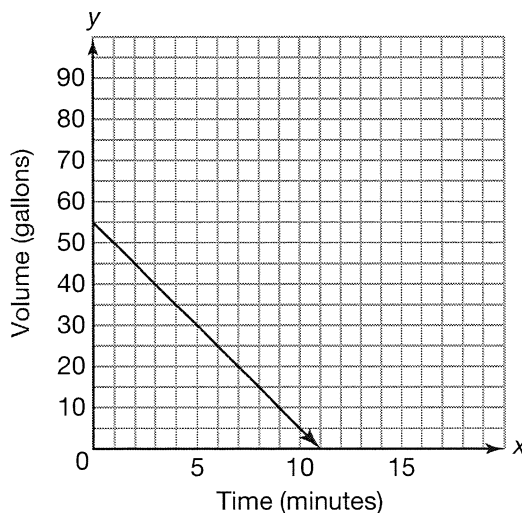
- 19.** A hot air balloon at 4000 feet begins its descent. It descends at a rate of 200 feet per minute. The function $f(x) = -200x + 4000$ represents the height of the balloon as it descends. How many minutes have passed if the balloon is below 3000 feet?

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More than 5 minutes have passed if the balloon is below 3000 feet.
 $x > 5$

- 20.** A bathtub filled with 55 gallons of water is drained. The water drains at a rate of 5 gallons per minute. The function $f(x) = -5x + 55$ represents the volume of water in the tub as it drains. How many minutes have passed if the tub still has more than 20 gallons of water remaining in it?

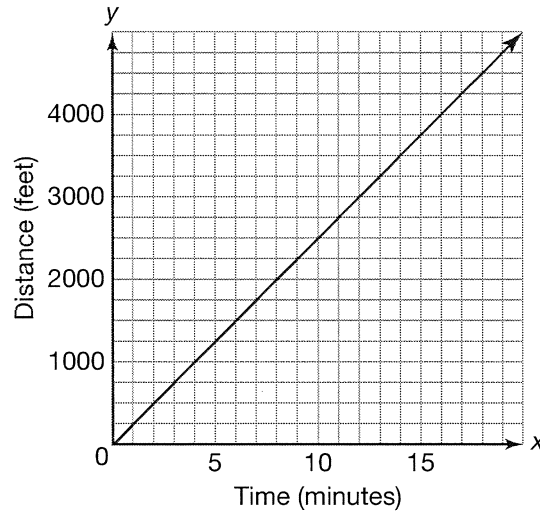


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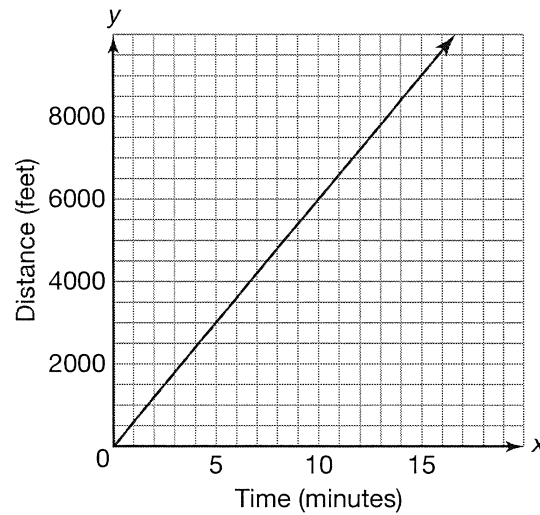
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21. Lea is walking to school at a rate of 250 feet per minute. Her school is 5000 feet from her home. The function $f(x) = 250x$ represents the distance Lea walks. How many minutes have passed if Lea still has more than 2000 feet to walk?

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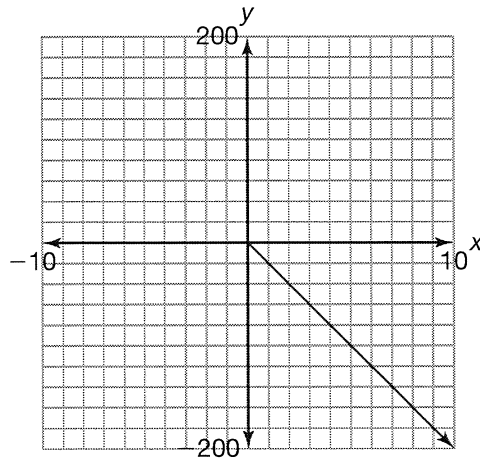


22. Franco is riding his bike to school at a rate of 600 feet per minute. His school is 9000 feet from his home. The function $f(x) = 600x$ represents the distance Franco rides. How many minutes have passed if Franco has less than 3000 feet left to ride?



23. A submarine is diving from the surface of the water at a rate of 20 feet per minute. The function $f(x) = -20x$ represents the depth of the submarine as it dives. How many minutes have passed if the submarine is at least 160 feet below the surface?

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24. A scuba diver is diving from the surface of the water at a rate of 14 feet per minute. The function $f(x) = -14x$ represents the depth of the diver as he dives. How many minutes have passed if the diver is less than 42 feet below the surface?

