Lesson 9: Representing Proportional Relationships with Equations

Problem Set

1. A person who weighs $100$ pounds on Earth weighs $16.6 lb.$ on the moon.
	1. Which variable is the independent variable? Explain why.
	2. What is an equation that relates weight on Earth to weight on the moon?
	3. How much would a $185$-pound astronaut weigh on the moon? Use an equation to explain how you know.
	4. How much would a man who weighs $50$ pounds on the moon weigh on Earth?
2. Use this table to answer the following questions.

|  |  |
| --- | --- |
| **Number of Gallons of Gas** | **Number of Miles Driven** |
| $$0$$ | $$0$$ |
| $$2$$ | $$62$$ |
| $$4$$ | $$124$$ |
| $$10$$ | $$310$$ |

* 1. Which variable is the dependent variable, and why?
	2. Is the number of miles driven proportionally related to the number of gallons of gas consumed? If so, what is the equation that relates the number of miles driven to the number of gallons of gas?
	3. In any ratio relating the number of gallons of gas and the number of miles driven, will one of the values always be larger? If so, which one?
	4. If the number of gallons of gas is known, can you find the number of miles driven? Explain how this value would be calculated.
	5. If the number of miles driven is known, can you find the number of gallons of gas consumed? Explain how this value would be calculated.
	6. How many miles could be driven with $18$ gallons of gas?
	7. How many gallons are used when the car has been driven $18$ miles?
	8. How many miles have been driven when half a gallon of gas is used?
	9. How many gallons of gas have been used when the car has been driven for a half mile?
1. Suppose that the cost of renting a snowmobile is $\$37.50$ for $5$ hours.
	1. If $c$ represents the cost and $h$ represents the hours, which variable is the dependent variable? Explain why.
	2. What would be the cost of renting $2$ snowmobiles for $5$ hours?
2. In Katya’s car, the number of miles driven is proportional to the number of gallons of gas used. Find the missing value in the table.

|  |  |
| --- | --- |
| **Number of Gallons** | **Number of Miles Driven** |
| 0 | 0 |
| $$4$$ | $$112$$ |
| $$6$$ | $$168$$ |
|  | $$224$$ |
| $$10$$ | $$280$$ |

* 1. Write an equation that will relate the number of miles driven to the number of gallons of gas.
	2. What is the constant of proportionality?
	3. How many miles could Katya go if she filled her $22$-gallon tank?
	4. If Katya takes a trip of $600$ miles, how many gallons of gas would be needed to make the trip?
	5. If Katya drives $224$ miles during one week of commuting to school and work, how many gallons of gas would she use?