**Activity 4.2.2 Application Problems for Direct and Inverse Variation**

1. The **area** of a circle varies directly with the square of the radius. Given the formula of the area of a circle: A = $πr^{2}$. What happens to A when r is doubled, when r is tripled?
2. The **surface area** of a cube varies directly with the square of the length of its side. Given the formula of the surface area of a cube: SA = 6$x^{2}$, what happens to the surface area when the side is doubled, when it is tripled, when it is 100 times more?

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1. The **volume** of a cube is directly proportional to the cube of the length of its edge. What is the effect on the volume when the side is doubled, when it is tripled, when it is 100 times more?

1. Compare the surface area to the volume as the side was doubled, tripled, 100 times more?

1. **Can Giants exist**? Two people of different size who have the same proportions will have the same build.
2. A person’s mass is directly proportional to the cube of his/her height.

How much more would a giant's mass be, who has similar build, and height of 2256 cm tall (about 74 feet) to a person who is 188 cm tall, (about 6’ 2”)?

1. The mass a person’s legs will support is directly proportional to the square of his/her height. How much more would a giant's surface area be, who has similar build, and height of 2256 cm tall (about 74 feet) to a person who is 188 cm tall, (about 6’ 2”)?
2. Explain why Giants can’t exist.
3. Boyle’s Law states that the volume *v* of a fixed amount of gas (at a constant temperature) is inversely proportional to the pressure *p* of the gas.
4. If a pressure of 58 pounds per square inch (psi) compresses the gas to a volume of 460 cubic feet, write the equation expressing volume in terms of pressure.
5. What would be the volume if the pressure is 96 psi?
6. If you want to compress the gas to 375 cubic feet, what pressure would you need? (Round to the nearest whole number)
7. When you swim in deep water, there can be a lot of water pressure. The pressure *p* in your ears varies directly with the depth *d* at which you swim.. Each foot of water creates water pressure of 0.43 per square inch (psi).
8. Write an equation to express this situation.
9. Predict the pressure at:

9ft 25ft 50ft 150ft

1. Suppose y varies inversely as the fourth power of x. If y = 60 when x = 2
	* + - 1. Write an equation expressing y in terms of x.
				2. Find y when x = 5.
2. The intensity *I* of light varies inversely as the square of the observer’s distance *d* from the light source. Suppose the light intensity is 40 lumens when the observer is 5.8 yards from the light.
	* + - 1. Write the equation for the intensityin terms of its distance for this situation.
				2. Find the light intensity when the distance between the observer and the light source is 12 yards away.

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