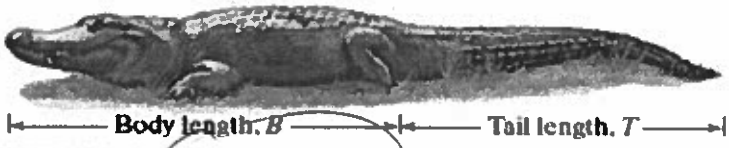
Student: _____ **Date:** _____	**Instructor:** Andreas Lazari **Course:** Math1111-Summer2018	**Assignment:** Section 3.7 Homework

1. An alligator's tail length, T, varies directly as its body length, B. An alligator with a body length of 7 feet has a tail length of 6.3 feet. What is the tail length of an alligator whose body length is 5 feet?



$7 \to 6.3$, $5 \to X$? $\quad 7X = 5(6.3) \Rightarrow X = \frac{5(6.3)}{7} = 4.5$

The tail length is 4.5 ft. feet.
(Type an integer or decimal rounded to the nearest tenth as needed.)

2. The number of kilograms of water in a human body varies directly as the mass of the body. An 87-kg person contains 58 kg of water. How many kilograms of water are in a 75-kg person?

$\frac{87}{75} \nearrow \searrow \frac{58}{X} \Rightarrow 87X = 75(58)$, $X = \frac{75(58)}{87} = 50$

50 kg of water are in a 75-kg person.

3. The record height of a man to date is 8 feet 11 inches (107 inches). If all men had identical body types, their weights would vary directly as the cube of their heights. Assume that all men do have identical body types. If a man who is 5 feet 10 inches tall (70 inches) weighs 170 pounds, approximately how much would a man with a height of 9 feet (108 inches) weigh?

$\frac{70^3}{108^3} \nearrow \searrow \frac{170}{X} \Rightarrow 70^3 X = 170(108^3)$

$\Rightarrow X = \frac{170(108^3)}{70^3} = 624.347$

A man with a record height of 9 feet would weigh approximately 624 lbs.
(Do not round until the final answer. Then round to the nearest whole number as needed.)

4. The figure shows that a bicyclist tips the cycle when making a turn. The angle B, formed by the vertical direction and the bicycle, is called the banking angle. The banking angle varies inversely as the cycle's turning radius. When the turning radius is 10 feet, the banking angle is 18°. What is the banking angle when the turning radius is 4.5 feet?

$\frac{1}{10} \nearrow \searrow \frac{18^\circ}{X} \Rightarrow \frac{1}{10} X = \frac{1}{4.5}(18)$

$\Rightarrow X = \frac{\frac{1}{4.5}(18)}{\frac{1}{10}} = 40^\circ$

B = 40 ° (Type an integer or a decimal.)

5. Radiation machines, used to treat tumors, produce an intensity of radiation that varies inversely as the square of the distance from the machine. At 3 meters, the radiation intensity is 62.5 milliroentgens per hour. What is the intensity at a distance of 1.5 meters?

$\frac{1}{3^2} \nearrow \searrow \frac{62.5}{X}$

$\frac{1}{3^2} X = 62.5\left(\frac{1}{1.5^2}\right)$

$\Rightarrow X = \frac{62.5\left(\frac{1}{1.5^2}\right)}{\frac{1}{3^2}} = 250.$

The intensity is 250 milliroentgens per hour. (Round to the nearest tenth as needed.)

6. Body-mass index, or BMI, takes both weight and height into account when assessing whether an individual is underweight or overweight. BMI varies directly as one's weight, in pounds, and inversely as the square of one's height, in inches. In adults, normal values for the BMI are between 20 and 25, inclusive. Values below 20 indicate that an individual is underweight and values above 25 indicate that an individual is overweight. A person who weighs 180 pounds and is 5 feet, or 60 inches, tall has a BMI of 35.15. Use the four-step procedure for solving variations to determine what the BMI is, to the nearest tenth, for a 155-pound person who is 5 feet 7 inches tall. Is this person underweight, normal, or overweight?

What is the BMI of a 155-pound person who is 5 feet 7 inches tall?

24.3 (Round to the nearest tenth as needed.)

Is this person underweight, normal, or overweight according to their BMI?

- ○ **A.** Overweight
- ○ **B.** Underweight
- ● **C.** Normal

$(180)\left(\frac{1}{60^2}\right)$ → 35.15

$(155)\left(\frac{1}{67^2}\right)$ → X

$$(180)\left(\frac{1}{60^2}\right)X = (35.15)(155)\left(\frac{1}{67^2}\right)$$

$$\Rightarrow X = \frac{(35.15)(155)\left(\frac{1}{67^2}\right)}{(180)\left(\frac{1}{60^2}\right)} = 24.2F3FF8$$

1. 4.5

2. 50

3. 624

4. 40

5. 250.0

6. 24.3

C. Normal