

Inverse Functions and Their Representations Diagnostic Assessment Height and Weight -

The formula $W = \frac{25}{7}h - \frac{800}{7}$ approximates the recommended minimum weight in pounds for a person h inches tall, where $62 \leq h \leq 76$.

(a) What is the recommended minimum weight for someone 70 inches tall?

(c) Find a formula for the inverse.

(d) Evaluate the inverse for 150 pounds and interpret the result.

(e) What does the inverse compute? In other words, what does the inverse function tell you about this situation?

Engage – Inverse Relationships

In mathematics, there are basic operations that can be considered inverse operations. Addition and subtraction are inverse operations. The same is true for multiplication and division. Although every function does not necessarily have an inverse that is a function too, we can determine the inverse of a function by simply switching the input and output values. The symbol we use to denote the inverse of $f(x)$ is $f^{-1}(x)$.

1) The table below represents a function C that computes the percentage of the time that the sky is cloudy in Augusta, Georgia, for 6 months where x corresponds to the standard numbers for the months.

Cloudy Skies in Augusta

x(month)	1	2	3	4	5	6
C(x) %	43	40	39	29	28	26

(a) Construct a table of the inverse for this relationship.

Explore – Weighty Pets

Calories in food provide essential energy, for you as well as your pet. But how much should you be feeding your pet and how does the size and weight of your pet influence the amount of food they need?

1. The adult weight of your dog is determined by the number of calories you feed your puppy. The function $w(k) = \left(\frac{k}{240}\right)^3$ relates the number of kilocalories per day, k , to the adult weight of the dog (in kilograms), w .

b) If you feed your puppy 800 kcal a day, what is their predicted adult weight? Round to the nearest tenth.

c) Complete the table to predict the adult weight of your pet with each of the different diet plans. Round to the nearest tenth.

(kcal a day)	600	800	1000
(weight in kg)			

d) If you want your dog to weigh 40 kg, how many calories should you feed him a day?

2. The ideal adult weight for a golden retriever is about 30 kg. How many calories a day should you feed a golden retriever to achieve this ideal weight? Show how you got your answer.

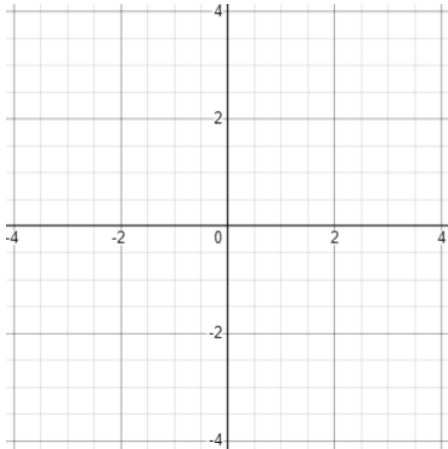
3. The ideal adult weight for a Schnauzer is about 9 kg. How many calories a day should you feed a Schnauzer to achieve this ideal weight? Show how you got your answer.

4. Write an equation $k(w)$ that outputs the number of calories you should feed a dog whose ideal weight is w kg.

Inverse Functions and Their Representations Formative Assessment

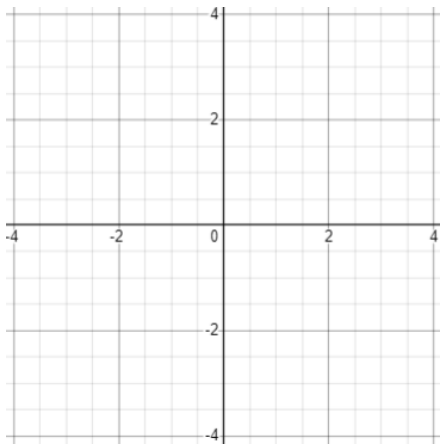
1) If $f(x) = 5 - 2x$, find $f^{-1}(x)$.

2) Use the following graph to sketch $g(x) = x + 1$.



b) Calculate $g^{-1}(x)$ and then sketch $g^{-1}(x)$ in the same graph.

3) Use the following graph to sketch $h(x) = (x - 1)^2 - 2$.



b) Calculate $h^{-1}(x)$ and then sketch $h^{-1}(x)$ in the same graph.

4) The formula $F = \frac{9}{5}C + 32$ converts a Celsius temperature to Fahrenheit temperature.

(c) Find a formula for the inverse.

(d) What Celsius temperature is equivalent to 68 °F?

5) The global sea level could rise due to partial melting of the polar ice caps. The table represents a function R that models this expected rise in sea level in centimeters for the year t . (This model assumes no changes in current trends).

t (year)	1990	2000	2030	2070	2100
R(t) (centimeters)	0	1	18	44	66

b) Use $R(t)$ to construct a table for $R^{-1}(t)$.
