Exercise 21

For the following exercises, consider this scenario: The weight of a newborn is 7.5 pounds. The baby gained one-half pound a month for its first year.

If the function W is graphed, find and interpret the x- and y-intercepts.

Solution

Because the baby's weight increases at a constant rate, a linear function can be used to model it. The slope is 0.5, the rate that the baby's weight increases (in pounds per month), and the initial weight is 7.5 (in pounds).

$$W(t) = 0.5t + 7.5$$

To determine the y-intercept, set $t = 0$.

$$W(0) = 0.5(0) + 7.5 = 7.5$$

Therefore, the y-intercept is $(0, 7.5)$. To determine the x-intercept, set $W = 0$ and solve for t.

$$0 = 0.5t + 7.5$$

$$-0.5t = 7.5$$

$$t = \frac{7.5}{-0.5} = -15$$

Therefore, the x-intercept is $(-15, 0)$. This indicates that the baby would have a weight of zero 15 months prior to being born, assuming a constant growth rate of 0.5 pounds per month.