

Name: ANSWER KEY

Score: \_\_\_\_\_

For children between ages 6 and 10, height  $y$  (in inches) is a linear function of age  $t$  (in years). The height of a certain child is 48 inches at age 6 and 50.5 inches at age 7.

a. (5) Express  $y$  as a function of  $t$ .

Underlined phrase  $\Rightarrow y = mt + b$  ( $6 \leq t \leq 10$ )

$$\begin{aligned} * \quad & \begin{cases} 48 = m \cdot 6 + b \\ 50.5 = m \cdot 7 + b \end{cases} \end{aligned}$$

Subtract the two equations:  $-2.5 = -m \Rightarrow m = 2.5$

$$\therefore 48 = 2.5(6) + b$$

$$\Rightarrow b = 48 - 2.5(6) = 33$$

$$\boxed{y = 2.5t + 33} \quad (6 \leq t \leq 10)$$

b. (2) How do you interpret the slope of the line?

$m = 2.5$  is the annual gain in height

c. (1) Predict the height of the child at age 10.

$$y = 2.5(10) + 33 = 25 + 33 = \boxed{58''}$$

d. (2) At what age will the child attain the height of 52 inches?

$$52 = 2.5t + 33 \Rightarrow 2.5t = 52 - 33 = 19 \Rightarrow t = 19/2.5 = \boxed{7.6 \text{ yr}}$$

\* Alternatively,  $(6, 48)$  and  $(7, 50.5)$  are two points on line.

$$\therefore m = \frac{50.5 - 48}{7 - 6} = 2.5$$

$$\therefore \text{by point-slope form } y - 48 = 2.5(t - 6) \Rightarrow y = 2.5t - 15 + 48 = 2.5t + 33$$