Answer on Question#38369 – Math – Algebra

Find an equation for the linear model of the situation below and use it to make a prediction. A train is traveling north at a constant rate. At 3:00 P.M. it is 55 miles north of a city. At 4:15 P.M. it is 80 miles north of the city. If d represents the distance in miles, and t represents the time in hours, how many miles north of the city will the train be at 5:45 P.M.?

Solution:

$Let\ t - the\ time\ in\ hours\ after\ 3\ PM;$

$d - distance\ traveled;$

So, we know two ordered pairs (4:15 P.M. is 1.25 hours after 3 PM):

$$(0, 55), (1.25, 80)$$

$$d = mt + 55$$

Plugging in 1.25 for t and 80 for d:

$$80 = 1.25 \cdot m + 55$$

Now find the slope m and get:

$$m = 20$$

Our equation should be:

$$d = 20t + 55$$

Plugging in 2.75 for t (because 5:45 is 2.75 hours after 3 PM), we get:

$$d = 20 \cdot (2.75) + 55 = 55 + 55 = 110\ miles$$

Answer: the train will be $110\ miles$ north.