

Discovery Exercise for the Chain Rule

We begin by considering a single-variable function $y(x)$, with $dy/dx = 3$ everywhere.

1. Suppose $y(40) = 100$.
 - (a) What is $y(41)$?

 - (b) What is $y(50)$?

See Check Yourself #20 at felderbooks.com/checkyourself

2. In general, if you add an arbitrary amount Δx to x , how much does y go up?

We now consider a function of two variables $z(x, y)$, with $\partial z/\partial x = 3$ and $\partial z/\partial y = -5$ everywhere.

3. If x increases by 10 while y remains constant, what happens to z ?

4. Suppose $z(40, 40) = 100$.
 - (a) What is $z(50, 40)$?

 - (b) What is $z(40, 50)$?

 - (c) What is $z(50, 50)$? *Hint: you can get there from your answers to Part (a) or Part (b). You might want to try both in order to check your answer.*

5. If $z(3, 4) = 0$, what is $z(5, 7)$?