

# Business Calculus, Spring 2004

## Quiz #1

Name: \_\_\_\_\_

Section Time: \_\_\_\_\_

TA's Name: \_\_\_\_\_

1. A car manufacturer has a cost function  $C(x) = A + Bx$ , which gives the total cost of producing  $x$  cars. Past records have shown that

$$C(150) = \$1,350,000$$

$$C(250) = \$2,150,000$$

Use this information to solve for the constants  $A$  and  $B$ . How much are this manufacturer's fixed costs? (Hint for the last part: Fixed costs are the costs incurred even when there are no cars produced, i.e. when  $x = 0$ ).

**Solution:** There are many different ways to solve this problem. One way is to recognize that the unknown equation is in slope-intercept form (i.e.  $y = mx + b$ ) and solve for these two parameters. For the slope we have the cost values on the y-axis and the number of cars on the x-axis, so

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{2,150,000 - 1,350,000}{250 - 150} = \frac{800,000}{100} = 8000.$$

Thus  $B = 8000$ . This is also the variable cost, which means that every extra car produced will cost \$8000 more. To determine  $A$  we now know that  $C(x) = A + 8000x$ , so using the fact that  $C(150) = 1,350,000$  we have

$$1,350,000 = A + 8000 * 150$$

$$1,350,000 = A + 1,200,000$$

$$A = 150,000.$$

This is also the fixed cost, because even if we don't produce any cars we still have that the cost is  $C(0) = 150,000 + 8000 * 0 = 150,000$ .