

## Exploring Discounts

### Part A

A quoted price for an item in a store might be adjusted in various ways before you learn the actual amount you have to pay.

Some adjustments are figured as a percent of the quoted price. But they may either increase what you pay (as when there is a 6% sales tax), or decrease what you pay (as when there is a 10% discount).

1. Write a function that will add 6% sales tax to the price of an item
2. Write a function that subtracts 10% from the price.

Other adjustments are stated as absolute dollar amounts. These too may either increase what you pay (as when there is, say, a fixed delivery charge of \$40), or decrease what you pay (as when there is an item marked \$20 off).

3. Write a function that adds \$40 to the price.
4. Write a function that subtracts \$20 from the price.

What makes this interesting mathematically is that a percent adjustment and an absolute adjustment may both operate at the same time. The question that arises is:

**"How does the *order* in which these adjustments apply affect the final amount you pay?"**

### Part B

For each of the four problems below, show both "orders" as function compositions, and use the functions to solve the problems. Show all your work and justify your reasoning.

5. You are buying a laptop computer. The price is \$1879.99. The store is offering a 20% discount. Sales tax is 6.3%. Do you want to take the discount before or after you pay the tax? Explain
6. You purchased a new entertainment center for your home for \$2500.00. There is a \$150 delivery charge and 6.3% sales tax on the furniture. Do you want to add the delivery charges in before the tax or after? Explain
7. You saw the same furniture at another store. They are selling it for \$2850.00, but with 10% off if you use a coupon. They also charge \$150 for delivery. Also, if you purchase in February, there is no sales tax. Do you want to take the reduction and then add the delivery charge, or the other way around? Explain.
8. You are purchasing an HD-TV to put in the Entertainment Center. It is listed for \$2099.99, with an instant rebate of \$100. If you buy it today, there is a 15% markdown. Do you want the rebate subtracted before the discount?

**Part C**

9. Study the examples. Is the following statement true sometimes, always, or never?

When composing functions, the order of composition matters.

Use examples from this exploration to justify your answer