

### Application of Composition Functions

#### Part 1: Simple Compositions

In the mail, you receive a coupon for \$5 off of a pair of jeans. When you arrive at the store, you find that all jeans are 25% off.

Let  $x$  represent the original cost of the jeans.

1. Write a function  $f(x)$  that represents the effect of your original coupon in the mail.
2. Write a function  $g(x)$  that represents the effect of the 25% discount at the store.
3. Write a function  $h(x)$  that represents how much you would pay if you use the mail coupon first, followed by applying the discount from the store.
4. Write a function  $j(x)$  that represents how much you would pay if you use the store discount first, followed by your mail coupon.
5. You find a pair of jeans for \$36. How much would you pay for it under both schemas? If you only have \$40 with you, what's the most expensive pair of jeans you can purchase (assume this is Oregon, so no sales tax will be added)?
6. Graph both functions  $h(x)$  and  $j(x)$  in your calculator at the same time. Choose a window range that makes sense, considering that the jeans at this store go up to about \$60 original price. Describe what you see in the graphing calculator and what window ranges you used.
7. If you want to pay the least amount of money possible, which schema is better? (Should you apply the mail coupon first or the 25% first?) Is there a "break even" point on the graph, where both methods would cost the same? Explain.