

## Solving Problems with Multi-Step Percentages on the ISEE Middle and Upper Level

LESSON GOAL: Correctly answer word problems and quantitative comparisons with multi-step percentages, without falling into common wrong answer traps.

### ISEE Middle-Level Quantitative Comparison:

The original price of a bicycle was \$100.00.

**Column A**

The amount saved after a 20% discount

**Column B**

The amount saved after two separate discounts of 10% and 10%

**Helpful tip:** It's tempting to say that the two columns are equal, but it's a trick! **For multi-step percentage problems, always calculate each step separately.**

**Solution:**

STEP 1: Calculate column A. Since the price is \$100, we can mentally calculate that 20% is **\$20**.

STEP 2: For column B, calculate it in two steps.

1st, 10% of 100 = 10;  $100 - 10 = \$90$

2nd, 10% of 90 = 9;  $90 - 9 = \$81$

**\$19** is saved. **Column A is greater.**

**Helpful Tip:** Once we've figured out that we're going to subtract a number smaller than 10 from 90, we know column A will be the greater discount, and we don't have to finish the calculation.

### ISEE Upper-Level Quantitative Comparison:

In March, a bicycle went on sale for 10% off. In April, the sale price was raised by 10%.

**Column A**

The price of the bicycle in February, before either discount

**Column B**

The price of the bicycle in April

**Helpful tip:** For a percentage problem in which no price or number is given, plug in a number, preferably 100, and then solve one step at a time.

**Solution:**

STEP 1: Assign a starting price of \$100 to the bicycle. This is equal to column A.

STEP 2: For column B, calculate it in two steps.

March: 10% of 100 = 10;  $100 - 10 = \$90$

April: 10% of 90 = 9;  $90 + 9 = \$99$

**Column A is greater.**

**Helpful Tip:** Pay attention to the wording of the question when doing percentage comparisons. If the question asks for the greater discount, the lower price will be correct. If it asks for the greater number, the higher price will be correct.