06 - Proportions and Change

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Outline

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Direct Proportions

- When something increases by a proportion, this is called a direct proportion.
- Suppose we have a proportion $a : b :: c : d$. If an increase in a causes a proportional increase in c, then $a : b :: c : d$ is a direct proportion.
- You must read the nature of a problem to know whether it is increasing and therefore a direct proportion.

Inverse Proportions

- When something decreases by a proportion, this is called an inverse proportion.
- Using the letters a, b, c, and d from the previous problem, if an increase in a causes a decrease in c, then the corresponding inverse proportion is $a : b :: d : c$.
- You must read the nature of a problem to know whether it is decreasing and therefore an inverse proportion.

Increasing, Amount, and Markup

Recall the term amount.

$$\text{amount} = \text{base} + \text{percentage}$$

Decreasing, Difference, Discount

Recall the term difference.

$$\text{difference} = \text{base} - \text{percentage}$$

Problem 3

If a staff of 4ft casts a shadow 7ft in length, what is the height of a tower which casts a shadow of 198ft at the same time?

Problem 4

A homeowner sells their house at a loss of 20%. If the selling price was $\$60,000.00$, what was the original price of the home?

Problem 5

In the erection of a house I paid twice as much for material as for labor. Had I paid 6% more for material, and 9% more for labor, my house would have cost $1284.00; what was its cost?