

Review of Percentages

You have learned about several kinds of percentage problems:

1. Converting from fraction to decimal to percentage. The percentage is always 100 times the decimal, which means moving the decimal point two spots to the left. You should memorize:

$$\frac{1}{8} = 12.5\%, \quad \frac{1}{4} = 25\%, \quad \frac{3}{8} = 37.5\%, \quad \frac{5}{8} = 62.5\%, \quad \frac{3}{4} = 75\%, \quad \frac{7}{8} = 87.5\%.$$

2. The percent proportion equation:

$$\frac{\textit{Part}}{\textit{Whole}} = \frac{\textit{Percent}}{100}$$

3. The percentage equation:

$$\textit{Part} = (\textit{Decimal of the percentage}) \cdot \textit{Whole}$$

4. The hard part is usually figuring out what is the Part and what is the Whole. Look for the word “of”. The Whole is usually right after “of”. For example, in “What percentage of 10 is 100?”, the Whole is 10, and the Part is 100.

5. In applications, the percentage may be a “rate”. It might be a Tax Rate, or a Commission Rate, or a Discount Rate, or an Interest Rate.

The Part will usually be (1) the amount of tax paid, or (2) the Commission, or (3) the Discount, or (4) the Interest amount.

6. With “Simple interest”, the amount of interest is the interest rate times the principal times the number of years, where “the principal” means the amount borrowed or lent. The tricky part is figuring out what the number of years is, if the problem gives number of months instead.

7. With “Compound interest”, the amount of interest is bigger than with simple interest, because interest must be paid on the previous interest earned. Each year, the interest isn’t paid right away; it’s added to the principal, so the next year, the interest rate is multiplied by that bigger amount. The first year, if the interest rate is 10% and the principal is \$1,000, the interest is $.1 \cdot \$1,000 = \100 . The second year, the interest is $.1 \cdot \$1,000 + .1 \cdot \$100 = \$110$.

The compound interest table tells you how much to multiply the principal to get the “compound amount”, the amount that must be repaid at the end. The amount of Interest is the compound amount minus the principal. In the 2-year example above, the compound amount would be \$1,210, and the principal is \$1,000, so the interest is \$210.

Now let's try some problems. You can use calculators on them. I will ask one person at a time, and the rest of you try them too. Then I will ask how to do an approximate the answer.

First, think for each one of what a reasonable scale of answer would be—1%, or 10%, or 100%? Doubling the part to get the whole, or something else? Cutting the whole in half to get the part, or something else?

1. 14 gallons of paint is what percentage of 43 gallons? First: is it about 1% or 10% or 100%?
2. 16 gallons is what percentage of 110 gallons? First: is it about 1% or 10% or 100%?
3. What percentage of 45 gallons is 4 gallons? First: is it about 1% or 10% or 100%?
4. If we had 23 gallons at first, and then increased it by 55 gallons, what is the percentage increase? First: is it about 1% or 10% or 100%?
5. If your weight increased by 19% from 85 pounds, how much did it increase? First: Did it increase by more 50 pounds?
6. If you weighed 63 pounds originally, and your weight increased by 3.32%, how much would you weigh? First: More than 100 pounds, or less?
7. What is your weight if you used to weigh 88 pounds, but then your weight rose 35% over the next two years? First: More than 100 pounds?
8. If 12.4 tons of coal is used, and that was 19% of the amount of coal in the coal pile, how much did the coal pile weigh? First: More than 20 tons?
9. If 2.1 tons of steel is 88% of the amount of steel the car company uses each hour, how much does it use each hour? First: More than 10 tons?
10. If 2.7% of the usual daily tonnage of sulphuric acid was used today— 180 tons— what is the usual daily tonnage? First: More than 1,000 tons?
11. The catch of fish this week was 334% of the catch last week, which was 4.3 tons. How much was caught this week? First: More than 8 tons?
12. If 2.2% of men are convicted of burglary this year and that number is 234,333 men, what is the total population of men? First: Is it more than 1 million?
13. Mr. Jones's corn yield was 208 bushels per acre last year, but fell by 12.5% this year. What is the yield this year? First: More than 100 bushels per acre?
14. If 99.2% of the chestnut trees were killed by the blight and 21 are left, how many were there originally? First: More than 100?
15. If we had 23 gallons of paint today, and then increased it by 55 gallons, what percentage of yesterday's amount of paint is today's? First: is it about 1% or 10% or 100%?