

Problems related to percents

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1. A percentage is a number expressed as a fraction of 100. One percent is defined as the following:

$$1\% = \frac{1}{100}$$

- (a) Write the following percentages as fractions. Simplify all of the fractions.

- 17%

- 60%

- 15%

- (b) Write the following fractions as percentages.

- $\frac{1}{4}$

- $\frac{2}{5}$

- $\frac{13}{50}$

- $\frac{23}{50}$

2. A pizza is divided into 12 equal slices. Johnny ate 75% of the pizza. How many slices of pizza did he eat?

3. A giant pizza is divided into 20 equal slices. Clara ate 8 slices. What percentage of the pizza did she eat?

4. After Ana ate 25% of a pizza, there were 12 slices left. How many slices were originally in the pizza?

5. The price of an apple is $\frac{4}{5}$ of the price of a pear. Let a be the price of an apple, and p be the price of a pear.

(a) Relate a to p by completing the statement below.

$$a =$$

(b) What percentage of the price of a pear is the price of an apple?

(c) What fraction of the price of an apple is the price of a pear?

(d) What percentage of the price of an apple is the price of a pear?

6. A gallon of milk is twice as expensive as a loaf of bread. Let m denote the price of a gallon of milk and b denote the price of a loaf of bread.

(a) Relate m to b .

(b) What percentage of the price of a gallon of milk is the price of a loaf of bread?

(c) How many percents more is the price of milk compared to the price of bread?

7. An eraser is 20% of the price of a pencil. Let e be the price of an eraser, and p be the price of a pencil.

(a) Relate e to p .

(b) By how many percents is the pen more expensive than the pencil?

8. If the price of eggs dropped by 60%, by what percentage would the price need to be raised in order to return to the original price?

9. Amy put a certain amount of money into the bank. At the end of each year, the amount of money in the bank increases by 25%. After how many years will the amount of money she has be over twice the amount she had in the beginning?

10. Two bobcats are running a race. The length of the baby bobcat's jump is $\frac{1}{2}$ of the mother bobcat's jump. However, the baby bobcat makes $\frac{3}{2}$ as many jumps as the mother bobcat. Who is going to win the race?
11. The price of apples dropped so that you can now buy 25% more apples paying the same price as before. By what percentage did the price drop?
12. The humidity (the percentage of water) of mushrooms is 99%. The humidity of dried mushrooms is 98%. How many kilograms of dried mushrooms can you make starting from 100 kg of freshly picked mushrooms?

13. The price of Halloween decorations dropped by a certain percentage on Halloween. The next day, the price dropped by the same percentage so that the final price was 25% of the original price. By what percentage did the price drop each time? (Hint: use fractions instead of percents.)

14. After the price of an adventure park ticket was discounted twice by 60%, the final price was \$36.

(a) What was the price of the ticket before the discounts?

(b) What was the total percentage discount (the discount needed to get from the initial price to the final price)?

15. John left 100 grams of a 1% salt solution on the table. After the water evaporated for some time, the remaining solution was a 2% salt solution. How much of the solution was left? (Note: A salt solution contains water and salt, and the salt does not vaporize.)

16. The population of a town increased by 25% two years ago, and then dropped by 25% last year. If the population is now 4500 people, what was the population two years ago?

17. John bought a car for \$20,000. He sold the car for a 30% profit (meaning that the amount of money he sold the car for was 30% more than the amount he bought it). John then wanted to buy a car more expensive than the previous car he owned. He had to raise 30% more money in order to buy the new car. What was his overall profit or loss?

18. A merchant bought an item at a certain cost. He tried to sell the item at a certain price but was not successful. After dropping the price by 20%, he was able to sell the item and make a 20% profit (when compared to the price that he paid for the item). If the merchant sold the item without the discount, what would be his profit?

Math Kangaroo Problems

19. There are five containers in a treasure chest. In each container there are three boxes and in each box there are 10 golden coins. The treasure chest, the containers, and the boxes are all locked. How many locks do you need to open to get 50 coins?
20. On the right side of a certain two-digit number the same number has been written, creating a four-digit number. How many times greater is the new four-digit number than the original two-digit number?