

1. One container is filled with a mixture that is 30% acid. A second container is filled with a mixture that is 50% acid. The second container is 50% larger than the first, and the two containers are emptied into a third container. What percent of acid is the third container?
2. The store's markup on a wholesale item is 40%. The store is currently having a sale, and the item sells for 25% off the retail price. What is the percent of profit made by the store?
3. During lunch hour at a local restaurant, 90% of customers order a meat entrée and 10% order a vegetarian entrée. Of the customers who order a meat entrée, 80% order a drink. Of the customers who order a vegetarian entrée, 40% order a drink. What is the percent of customers who order a drink with their entrée?
4. Last year's spell-a-thon spelling test for a first grade class had 15% more words with four or more letters than this year's spelling test. Next year, there will be 5% less than this year. What percent more words have four or more letters in last year's test than next year's?
5. An ice cream shop sells 75% less ice cream in December than in June. Twenty percent more ice cream is sold in July than in June. By what percent did ice cream sales increase from December to July?
6. The livestock on a small farm the prior year consisted of 40% goats, 10% cows, and 50% chickens. This year, there is a 5% decrease in goats, 9% increase in cows, and 15% increase in chickens. What is the percent increase or decrease of livestock this year?
7. In a pet shelter that is occupied by 55% dogs and 45% cats, 60% of the animals are brought in by concerned people who found these animals in the streets. If 90% of the dogs are brought in by concerned people, what is the percent of cats that are brought in by concerned people?
8. An artist wants to make a particular teal color paint by mixing a 75% blue hue and 25% yellow hue. He mixes a blue hue that has 85% pure blue pigment and a yellow hue that has 60% of pure yellow pigment. What is the percent of pure pigment that is in the resulting teal color paint?
9. On Mina's block, 65% of her neighbors do not have any pets, and 35% of her neighbors own at least one pet. If 25% of the neighbors have children but no pets, and 60% of the neighbors who have pets also have children, what percent of the neighbors have children?

1. Jodie spent 25% less buying her English reading book than Claudia. Gianna spent 9% less than Claudia. Gianna spent more than Jodie by what percent?

Let c represent the amount Claudia spent, in dollars. The number of dollars Jodie spent was $0.75c$, and the number of dollars Gianna spent was $0.91c$. $0.91c \div 0.75c = \frac{91}{75} \times 100\% = 121\frac{1}{3}\%$. Gianna spent $21\frac{1}{3}\%$ more than Jodie.

2. Mr. Ellis is a teacher who tutors students after school. Of the students he tutors, 30% need help in computer science and the rest need assistance in math. Of the students who need help in computer science, 40% are enrolled in Mr. Ellis's class during the school day. Of the students who need help in math, 25% are enrolled in his class during the school day. What percent of the after-school students are enrolled in Mr. Ellis's classes?

Let t represent the after-school students tutored by Mr. Ellis.

Computer science after-school students: $0.3t$

Math after-school students: $0.7t$

After-school computer science students who are also Mr. Ellis's students: $0.4 \times 0.3t = 0.12t$

After-school math students who are also Mr. Ellis's students: $0.25 \times 0.7t = 0.175t$

Number of after-school students who are enrolled in Mr. Ellis's classes: $0.12t + 0.175t = 0.295t$

Out of all the students Mr. Ellis tutors, 29.5% of the tutees are enrolled in his classes.

1. One container is filled with a mixture that is 30% acid. A second container is filled with a mixture that is 50% acid. The second container is 50% larger than the first, and the two containers are emptied into a third container. What percent of acid is the third container?

Let t be the amount of mixture in the first container. Then the second container has $1.5t$, and the third container has $2.5t$.

The amount of acid in the first container is $0.3t$, the amount of acid in the second container is $0.5(1.5t) = 0.75t$, and the amount of acid in the third container is $1.05t$. The percent of acid in the third container is

$$\frac{1.05}{2.5} \times 100\% = 42\%.$$

2. The store's markup on a wholesale item is 40%. The store is currently having a sale, and the item sells for 25% off the retail price. What is the percent of profit made by the store?

Let w represent the wholesale price of an item.

Retail price: $1.4w$

Sale price: $1.4w - (1.4w \times 0.25) = 1.05w$

The store still makes a 5% profit on a retail item that is on sale.

3. During lunch hour at a local restaurant, 90% of the customers order a meat entrée and 10% order a vegetarian entrée. Of the customers who order a meat entrée, 80% order a drink. Of the customers who order a vegetarian entrée, 40% order a drink. What is the percent of customers who order a drink with their entrée?

Let e represent lunch entrées.

Meat entrées: $0.9e$

Vegetarian entrées: $0.1e$

Meat entrées with drinks: $0.9e \times 0.8 = 0.72e$

Vegetarian entrées with drinks: $0.1e \times 0.4 = 0.04e$

Entrées with drinks: $0.72e + 0.04e = 0.76e$. Therefore, 76% of lunch entrées are ordered with a drink.

4. Last year's spell-a-thon spelling test for a first grade class had 15% more words with four or more letters than this year's spelling test. Next year, there will be 5% less than this year. What percent more words have four or more letters in last year's test than next year's?

Let t represent this year's amount of spell-a-thon words with four letters or more.

Last year: $1.15t$

Next year: $0.95t$

$1.15t \div 0.95t \times 100\% \approx 121\%$. There were about 21% more words with four or more letters last year than there will be next year.

5. An ice cream shop sells 75% less ice cream in December than in June. Twenty percent more ice cream is sold in July than in June. By what percent did ice cream sales increase from December to July?

Let j represent sales in June.

December: $0.25j$

July: $1.20j$

$1.20 \div 0.25 = 4.8 \times 100\% = 480\%$. Ice cream sales in July increase by 380% from ice cream sales in December.

6. The livestock on a small farm the prior year consisted of 40% goats, 10% cows, and 50% chickens. This year, there is a 5% decrease in goats, 9% increase in cows, and 15% increase in chickens. What is the percent increase or decrease of livestock this year?

Let l represent the number of livestock the prior year.

Goats decrease: $0.4l - (0.4l \times 0.05) = 0.38l$ or $0.95(0.4l) = 0.38l$

Cows increase: $0.1l + (0.1l \times 0.09) = 0.109l$ or $1.09(0.1l) = 0.109l$

Chickens increase: $0.5l + (0.5l \times 0.15) = 0.575l$ or $1.15(0.5l) = 0.575l$

$0.38l + 0.109l + 0.575l = 1.064l$. There is an increase of 6.4% in livestock.

7. In a pet shelter that is occupied by 55% dogs and 45% cats, 60% of the animals are brought in by concerned people who found these animals in the streets. If 90% of the dogs are brought in by concerned people, what is the percent of cats that are brought in by concerned people?

Let c represent the percent of cats brought in by concerned people.

$$0.55(0.9) + (0.45)(c) = 1(0.6)$$

$$0.495 + 0.45c = 0.6$$

$$0.495 - 0.495 + 0.45c = 0.6 - 0.495$$

$$0.45c = 0.105$$

$$0.45c \div 0.45 = 0.105 \div 0.45$$

$$c \approx 0.233$$

About 23% of the cats brought into the shelter are brought in by concerned people.

8. An artist wants to make a particular teal color paint by mixing a 75% blue hue and 25% yellow hue. He mixes a blue hue that has 85% pure blue pigment and a yellow hue that has 60% of pure yellow pigment. What is the percent of pure pigment that is in the resulting teal color paint?

Let p represent the teal color paint.

$$(0.75 \times 0.85p) + (0.25 \times 0.6p) = 0.7875p$$

78.75% of pure pigment is in the resulting teal color paint.

9. On Mina's block, 65% of her neighbors do not have any pets, and 35% of her neighbors own at least one pet. If 25% of the neighbors have children but no pets, and 60% of the neighbors who have pets also have children, what percent of the neighbors have children?

Let n represent the number of Mina's neighbors.

Neighbors who do not have pets: $0.65n$

Neighbors who own at least one pet: $0.35n$

Neighbors who have children but no pets: $0.25 \times 0.65n = 0.1625n$

Neighbors who have children and pets: $0.6 \times 0.35n = 0.21n$

Percent of neighbors who have children: $0.1625n + 0.21n = 0.3725n$

37.25% of Mina's neighbors have children.