



- Subtract the given percents from 100%, to find the remaining percent.

**Q.** According to a projection for 2020, 39% of the U.S. population will be aged between 0 - 29 and 35% between 30 - 59. What percent of the population will be aged 60 or more?

$$\begin{aligned} \text{A. } & 100\% - 39\% - 35\% \\ & = 100\% - 74\% \\ & = \mathbf{26\%} \end{aligned}$$

**a)** Approximately 59% of the athletes at the 2000 Sydney Olympics were male. What percent of the athletes were female?

$$100\% - 59\% = \boxed{41\%}$$

**b)** School is approximately 60% of the calendar year in the Russian Federation. What percent do holidays account for?

$$100\% - 60\% = \boxed{\phantom{00\%}}$$

**c)** The green-yellow 18-carat gold is 75% gold and the rest is silver. What percent is silver?

$$\phantom{100\% - 75\%} = \boxed{\phantom{00\%}}$$

**d)** If 89% of the West Point military academy graduates are male, what percent are females?

$$\phantom{100\% - 89\%} = \boxed{\phantom{00\%}}$$

**e)** If 78% of the Supreme Court justices are male, what percent are females?

$$\phantom{100\% - 78\%} = \boxed{\phantom{00\%}}$$

**f)** If the cucumber is 96% water, what percent do the other components make?

$$\phantom{100\% - 96\%} = \boxed{\phantom{00\%}}$$

**g)** In 2007, 25% of employed women in the U.S. worked in part-time jobs. What percent of women worked in full-time jobs?

$$\phantom{100\% - 25\%} = \boxed{\phantom{00\%}}$$

**h)** If 37.5% of the adult teeth are incisors and canines, what percent is formed by molars and pre-molars?

$$\phantom{100\% - 37.5\%} = \boxed{\phantom{00\%}}$$

**i)** Approximately 60.5% of the world population lives in Asia and 13.5% lives in North and South America. What percent of the population lives in the rest of the world?

$$100\% - 60.5\% - 13.5\% = \boxed{\phantom{00\%}}$$

**j)** Approximately 27.2% of the world population is aged between 0 and 14 years and 65.2% between 15 and 64 years. What percent of the population is aged 65 years and over?

$$\phantom{100\% - 27.2\% - 65.2\%} = \boxed{\phantom{00\%}}$$

**k)** If England occupies 57% and Scotland occupies 34% of Great Britain (the main island of the United Kingdom), what percent is occupied by Wales?

$$\phantom{100\% - 57\% - 34\%} = \boxed{\phantom{00\%}}$$

**l)** At the 2008 Beijing Olympics, 39% of the medals won by Germany were gold and 24% were silver. What percent of the medals were bronze?

$$\phantom{100\% - 39\% - 24\%} = \boxed{\phantom{00\%}}$$

**Skill 11.3** Finding a percent of multiples of 100 (1).

- Change the percent to a fraction out of 100.  
Example:  $40\% = \frac{40}{100}$
- Rewrite the question as a multiplication (change “of” to “ $\times$ ”).
- Change the whole number to a fraction over 1.  
Example:  $7 = \frac{7}{1}$
- Cross simplify the fractions before multiplying.  
(see skill 10.4, page 58)

Hint:

To find  $10\% = \frac{1}{10} \Rightarrow$  divide by 10

$5\% =$  half of  $10\%$

$20\% = \frac{1}{5} \Rightarrow$  divide by 5

$25\% = \frac{1}{4} \Rightarrow$  divide by 4

$50\% = \frac{1}{2} \Rightarrow$  divide by 2

OR

- First find 10%.
- Then multiply by the amount needed to make the required percent, i.e. multiply by 3 to get 30%.

**Q.**  $40\%$  of  $\$6.00 =$

**A.**  $40\%$  of  $\$6.00 =$   
 $= 40\%$  of 600 Convert \$ to cents  
 $= \frac{40}{100} \times \frac{600}{1}$  Simplify:  $\div 100$   
 $= 40 \times 6$   
 $= 240$  cents  
 $= \mathbf{\$2.40}$

OR **A.**  $600 \div 10 =$  Find 10%  
 $= 60$  cents  
 $60 \times 4$  Multiply by 4 to get 40%  
 $= 240$  cents  
 $= \mathbf{\$2.40}$

**a)**  $24\%$  of 100 = Divide by 100  
 $= \frac{24}{100} \times \frac{100}{1}$  24

**b)**  $85\%$  of 100 =  

**c)**  $69\%$  of 100 =  

**d)**  $9\%$  of 100 =  

**e)**  $7\%$  of 100 =  

**f)**  $50\%$  of 100 =  

**g)**  $75\%$  of 400 =  
 $= \frac{75}{100} \times \frac{400}{1}$   
 $= 75 \times 4 =$   

**h)**  $10\%$  of 300 = Divide 300 by 10  
 

**i)**  $30\%$  of 500 = Find 10% first  
 

**j)**  $60\%$  of 200 =  
   
  =  

**k)**  $25\%$  of 800 =  
  =   =  

**l)**  $70\%$  of 600 =  
  =   =

**Skill 11.3** Finding a percent of multiples of 100 (2).

**m)** 5% of 300 =  

$$= \frac{5}{100} \times \frac{300}{1}$$

$$= 5 \times 3 = \boxed{\phantom{00}}$$

**n)** 5% of 500 =  
 Find 10%  

$$500 \div 10 = 50$$
 5% is half of 10%  

$$50 \div 2 = \boxed{\phantom{00}}$$

**o)** 5% of 700 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**p)** 50% of 700 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**q)** 20% of 200 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**r)** 40% of 500 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**s)** 80% of 400 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**t)** 90% of 300 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**u)** 15% of 400 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00}}$$

**v)** 50% of \$5.00 =  

$$= \dots$$

$$= \dots = \boxed{\$ \phantom{00}}$$

**w)** 20% of \$3.00 =  

$$= \dots$$

$$= \dots = \boxed{\$ \phantom{00}}$$

**x)** 75% of \$6.00 =  

$$= \dots$$

$$= \dots = \boxed{\$ \phantom{00}}$$

**y)** 5% of \$4.00 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00} \text{¢}}$$

**z)** 40% of \$3.50 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00} \text{¢}}$$

**zz)** 30% of \$4.50 =  

$$= \dots$$

$$= \dots = \boxed{\phantom{00} \text{¢}}$$

### Skill 11.4 Finding a percent of any number (1).

- Change the percent to a fraction out of 100.  
Example:  $40\% = \frac{40}{100}$
- Rewrite the question as a multiplication (change “of” to “ $\times$ ”).
- Change the whole number to a fraction over 1.  
Example:  $7 = \frac{7}{1}$
- Cross simplify the fractions before multiplying.  
(see skill 10.4, page 58)

Hint:

To find  $1\% = \frac{1}{100} \Rightarrow$  divide by 100

$12.5\% = \frac{1}{8} \Rightarrow$  divide by 8

$33\frac{1}{3}\% = \frac{1}{3} \Rightarrow$  divide by 3

$66\frac{2}{3}\% = \frac{2}{3} \Rightarrow$  divide by 3  
multiply by 2

OR

- First find 10%.
- Then multiply by the amount needed to make the required percent, i.e. multiply by 3 to get 30%.

Q.  $66\frac{2}{3}\%$  of 270 =

A.  $66\frac{2}{3}\%$  of 270 =  
 $= \frac{2}{3} \times \frac{270}{1}$  *Simplify:  $\div 3$*   
 $= 2 \times 90$   
 $= 180$

Substitute  $66\frac{2}{3}\%$  with  $\frac{2}{3}$

Change “of” to “ $\times$ ”

Change 270 to  $\frac{270}{1}$

Multiply  $\frac{2}{3}$  by  $\frac{270}{1}$

a)  $20\%$  of 50 =  
 $= \frac{20}{100} \times \frac{50}{1}$  *Simplify:  $\div 10$ , twice*  
 $= 2 \times 5 = 10$

b)  $70\%$  of 240 = *Find 10% first*  
 $240 \div 10 = 24$   
 $24 \times 7 =$  *Multiply by 7 to get 70%*

c)  $80\%$  of 20 =  
 =  
 =

d)  $40\%$  of 80 =  
 =  
 =

e)  $60\%$  of 250 =  
 =  
 =

f)  $30\%$  of 140 =  
 =  
 =

g)  $70\%$  of 120 =  
 =  
 =

h)  $5\%$  of 40 =  
 =  
 =

i)  $5\%$  of 120 =  
 =  
 =

j)  $15\%$  of 60 =  
 $10\%$   $60 \div 10 = 6$  *Find 10% first*  
 $5\%$   $6 \div 2 = 3$  *5% is half of 10%*  
 $15\%$   $6 + 3 =$

k)  $35\%$  of 80 =  
 $10\%$   
 $5\%$   
 $35\%$

l)  $45\%$  of 120 =  
 $10\%$   
 $5\%$   
 $45\%$

## Skill 11.4 Finding a percent of any number (2).

m) 25% of 180 =

$$= \frac{25}{100} \times \frac{180}{1}$$

Simplify:  $\div 5$

$$= \frac{90}{2} = \boxed{\phantom{00}}$$

Divide by 10

n) 75% of 40 =

$$= \frac{75}{100} \times \frac{40}{1}$$

$$= \frac{30}{4} = \boxed{\phantom{00}}$$

o) 75% of 120 =

$$= \frac{75}{100} \times \frac{120}{1}$$

$$= \frac{90}{4} = \boxed{\phantom{00}}$$

p) 15% of 40 =

$$= \frac{15}{100} \times \frac{40}{1}$$

Simplify:  $\div 10$

$$= \frac{6}{10} = \boxed{\phantom{00}}$$

q) 6% of 30 =

$$= \frac{6}{100} \times \frac{30}{1}$$

$$= \frac{18}{100} = \boxed{\phantom{00}}$$

r) 8% of 80 =

$$= \frac{8}{100} \times \frac{80}{1}$$

$$= \frac{64}{100} = \boxed{\phantom{00}}$$

s) 1% of 300 =

$$= \frac{1}{100} \times \frac{300}{1}$$

$$= \frac{3}{10} = \boxed{\phantom{00}}$$

t) 1% of 150 =

$$= \frac{1}{100} \times \frac{150}{1}$$

$$= \frac{15}{10} = \boxed{\phantom{00}}$$

u) 2% of 50 =

$$= \frac{2}{100} \times \frac{50}{1}$$

$$= \frac{10}{100} = \boxed{\phantom{00}}$$

v) 12.5% of 560 =

$$= \frac{12.5}{100} \times \frac{560}{1}$$

Simplify:  $\div 8$

$$= \frac{1}{8} \times \frac{70}{1}$$

$$= \frac{70}{8} = \boxed{\phantom{00}}$$

w) 12.5% of 80 =

$$= \frac{12.5}{100} \times \frac{80}{1}$$

$$= \frac{10}{100} = \boxed{\phantom{00}}$$

x) 12.5% of 160 =

$$= \frac{12.5}{100} \times \frac{160}{1}$$

$$= \frac{20}{100} = \boxed{\phantom{00}}$$

y)  $33\frac{1}{3}\%$  of 150 =

$$= \frac{1}{3} \times \frac{150}{1}$$

Simplify:  $\div 3$

$$= \frac{50}{1} = \boxed{\phantom{00}}$$

z)  $33\frac{1}{3}\%$  of 180 =

$$= \frac{1}{3} \times \frac{180}{1}$$

$$= \frac{60}{1} = \boxed{\phantom{00}}$$

A)  $33\frac{1}{3}\%$  of 60 =

$$= \frac{1}{3} \times \frac{60}{1}$$

$$= \frac{20}{1} = \boxed{\phantom{00}}$$

B)  $66\frac{2}{3}\%$  of 90 =

$$= \frac{2}{3} \times \frac{90}{1}$$

$$= \frac{60}{1} = \boxed{\phantom{00}}$$

C)  $66\frac{2}{3}\%$  of 150 =

$$= \frac{2}{3} \times \frac{150}{1}$$

$$= \frac{100}{1} = \boxed{\phantom{00}}$$

D)  $66\frac{2}{3}\%$  of 210 =

$$= \frac{2}{3} \times \frac{210}{1}$$

$$= \frac{140}{1} = \boxed{\phantom{00}}$$

### Skill 11.5 Working with percents greater than 100%.

- Change the percent to a fraction out of 100.  
Example:  $150\% = \frac{150}{100}$
- Rewrite the question as a multiplication (change “of” to “ $\times$ ”).
- Change the whole number to a fraction over 1.  
Example:  $7 = \frac{7}{1}$
- Cross simplify the fractions before multiplying.  
(see skill 10.4, page 58)

Hint:

To find  $10\% = \frac{1}{10} \Rightarrow$  divide by 10

$20\% = \frac{1}{5} \Rightarrow$  divide by 5

$200\% = \frac{2}{1} \Rightarrow$  multiply by 2

$300\% = \frac{3}{1} \Rightarrow$  multiply by 3

OR

- First find 100% or other multiples of 100%.
- Then find the remaining percent.
- Add the results.

Q.  $350\%$  of  $40 =$

A.  $350\%$  of  $40 =$

OR A.  $100\%$  of  $40$  is  $40$

$$= \frac{350}{100} \times \frac{40}{1} \quad \text{Simplify: } \div 10, \text{ twice}$$

$$= 35 \times 4$$

$$= \mathbf{140}$$

So  $300\%$  is triple that, or  $120$   
 $50\%$  of  $40$  is  $20$   
 So  $350\%$  of  $40$  is  
 $120 + 20 = \mathbf{140}$

a)  $200\%$  of  $60 =$

$$= \frac{200}{100} \times \frac{60}{1} \quad \text{Simplify: } \div 10, \text{ twice}$$

$$= 20 \times 6 = \mathbf{120}$$

b)  $300\%$  of  $50 =$

$$=$$

$$= \mathbf{\quad}$$

c)  $400\%$  of  $70 =$

$$=$$

$$= \mathbf{\quad}$$

d)  $120\%$  of  $80 =$

$100\%$  of  $80 = 80$  Find 100%

$20\%$  of  $80 = 16$  Find 20%

Add the results  
 $80 + 16 = \mathbf{\quad}$

e)  $110\%$  of  $90 =$

$$=$$

$$= \mathbf{\quad}$$

f)  $250\%$  of  $30 =$

$$=$$

$$= \mathbf{\quad}$$

g)  $250\%$  of  $40 =$

$$= \frac{250}{100} \times \frac{40}{1}$$

$$= 25 \times 4 = \mathbf{\quad}$$

h)  $140\%$  of  $50 =$

$$=$$

$$= \mathbf{\quad}$$

i)  $220\%$  of  $80 =$

$$=$$

$$= \mathbf{\quad}$$

j)  $130\%$  of  $60 =$

$$= \mathbf{\quad}$$

k)  $120\%$  of  $70 =$

$$= \mathbf{\quad}$$

l)  $350\%$  of  $40 =$

$$= \mathbf{\quad}$$

**Skill 11.6** Working with percents to find discounts and sale prices.

- Calculate the percent of the given amount. (see skill 11.3, page 67 and skill 11.4, page 69)

To find the **sale price** if a **discount** is applied:

- Subtract this result from the given amount.

To find the **total amount** if a **sales tax** is applied:

- Add this result to the given amount.

**Q.** If a sales tax of 6% is applied on a purchase of \$200, what is the total amount that must be paid?

**A.** Sales tax: 6% of 200 =

$$= \frac{6}{100} \times \frac{200}{1}$$

$$= 6 \times 2 = 12$$

Total:  $200 + 12 = \mathbf{\$212}$

**a)** If a \$30 T-shirt is reduced by 15%, what is the discount?

discount: 15% of 30 =

$$= \frac{15}{100} \times \frac{30}{1} = \frac{45}{10} = \mathbf{\$4.50}$$

**b)** If a \$120 bike is reduced by 25%, what is the discount?

discount:

$$= \mathbf{\$}$$

**c)** If a \$3000 laptop is reduced by 20%, what is the sale price?

discount: 20% of 3000 =

$$= \frac{20}{100} \times \frac{3000}{1} = 600$$

(Divide by 100)

sale price:  $\$3000 - \$600 = \mathbf{\$}$

**d)** If a \$500 dress is discounted by 40%, what is the sale price?

discount:

$$= \mathbf{\$}$$

**e)** If a sales tax of 4% is applied on a purchase of \$500, what is the total amount that must be paid?

sales tax: 4% of 500 =

$$= \mathbf{\$}$$

total:  $\$500 + \mathbf{\$} = \mathbf{\$}$

**f)** If a sales tax of 5% is applied on a purchase of \$120, what is the total amount that must be paid?

sales tax:

$$= \mathbf{\$}$$

total:  $\mathbf{\$} = \mathbf{\$}$

**g)** If a sales tax of 6% is applied on a restaurant bill of \$80, what is the total amount that must be paid?

sales tax:

$$= \mathbf{\$}$$

total:  $\mathbf{\$} = \mathbf{\$}$

**h)** If a sales tax of 4% is applied on a purchase of \$60, what is the total amount that must be paid?

sales tax:

$$= \mathbf{\$}$$

total:  $\mathbf{\$} = \mathbf{\$}$

## Skill 11.7 Writing one number as a percent of another number.

- Form a fraction using the two numbers.

EITHER

- Multiply this fraction by 100%:  $\text{fraction} = \text{fraction} \times 100\%$

*Hint: 100% equals 1 and does not change the value of the fraction.*

- Simplify the resulting fraction and/or change it to a mixed number if necessary. (see skill 9.1, page 39)

OR

- Find an equivalent fraction with the denominator 100, by multiplying or dividing both the numerator and denominator by the same number.
- Write this fraction as a percent. (see skill 12.9, page 84)

*Hint: Both numbers must represent the same unit of measurement.*

**Q.** Write as a percent:  
23 out of 50.

**A.** 23 out of 50 = OR

$$= \frac{23}{50} \times 100\%$$

$$= \frac{23}{\cancel{50}^2} \times \frac{100}{1} \% \quad \text{Simplify: } \div 50$$

$$= \frac{23}{1} \times 2$$

$$= 46\%$$

**A.** 23 out of 50 =

$$= \frac{23 \times 2}{50 \times 2}$$

$$= \frac{46}{100}$$

$$= 46\%$$

**a)** Write as a percent:  
10 out of 40.

$$= \frac{10}{40} \times \frac{100}{1} \% \quad \text{Simplify: } \div 10$$

$$= \frac{100}{4} = 25\%$$

**b)** Write as a percent:  
15 out of 20.

$$= \frac{15}{20} \times \frac{100}{1} \%$$

$$= \quad = \quad$$

**c)** Write as a percent:  
45 out of 50.

$$= \quad = \quad$$

**d)** Write as a percent:  
12 out of 60.

$$\frac{12 \div 12}{60 \div 12} = \frac{1}{5} \quad \text{Simplify: } \div 12$$

$$= \frac{1 \times 20}{5 \times 20} = \frac{20}{100} = \quad \text{Find equivalent fraction}$$

**e)** Write as a percent:  
9 out of 90.

$$= \quad = \quad$$

**f)** Write as a percent:  
300 out of 1500.

$$= \quad = \quad$$

**g)** Write as a percent:  
20 cents out of \$2.00.

$$\$2.00 = 200 \text{ cents} \quad \text{Change \$ to cents}$$

$$\frac{20 \div 2}{200 \div 2} = \frac{10}{100} = \quad$$

**h)** Write as a percent:  
45 min out of 3 hours.

$$= \quad = \quad$$

**i)** Write as a percent:  
15 min out of 2 hours.

$$= \quad = \quad$$

**Skill 11.8** Calculating profit or loss as a percent of the cost price.

- Calculate the profit or the loss, as the difference between the selling and the cost price.
- Express the profit or the loss as a percent of the cost price. (see skill 11.7, page 73)

**Q.** A shop buys jackets in bulk for \$50 each, then sells them for \$95 each. Calculate the profit on each jacket as a percent of the cost price.

**A.** *profit:*  $\$95 - \$50 = \$45$   
*profit out of cost price:*  $\$45 \text{ out of } \$50 = \frac{45}{50}$   
 $= \frac{45}{50} \times \frac{100}{1}\% = \frac{450}{5}\%$   
 $= \mathbf{90\%}$

**a)** Lorien lost \$40 on a ring costing \$400. What was her loss as a percent of the cost price?

*loss:* \$40

*loss out of cost:* \$40 out of \$400 =

$= \frac{40}{400} \times \frac{100}{1}\% = \frac{40}{4}\%$  =

**b)** The Cycle Center made \$30 profit on a bicycle costing \$150. What was the profit as a percent of the cost price?

*profit:*

*profit out of cost:*

=

**c)** John made \$20 profit on a tool box costing \$100. What was his profit as a percent of the cost price?

*profit:*

*profit out of cost:*

=

**d)** Jason lost \$15 on a book costing \$30. What was his loss as a percent of the cost price?

*loss:*

*loss out of cost:*

=

**e)** Serena bought a car for \$5000. If she later sold it for \$3500, find the loss as a percent of the cost price.

=

**f)** A shop buys uniforms in bulk for \$75 each, then sells them for \$100 each. Find the profit as a percent of the cost price.

=

**g)** Tea bought a table for \$400. If she later sold it for \$350, find the loss as a percent of the cost price.

=

**h)** A painting was bought for \$6000. If it was later sold for \$7500, find the profit as a percent of the cost price.

=