

Section 7-4 Percents

The word percent means per one hundred.

↓ ↓
divided by 100

$$\text{So, } 30\% = \frac{30}{100}$$

Look at the percent symbol ... it is telling you to divide by 100.

%

ex1 Convert to a percent.

$$a) 0.25 = 25\%$$

* Trick: move decimal 2 places to the right and add % sign. Why?

$$0.25 \cdot \frac{100}{100} = \frac{0.25 \cdot 100}{100} = \frac{25}{100} = 25\%$$

$$b) 0.001 = 0.1\%$$

c) $\frac{2}{5}$

Convert to decimal

$$\begin{array}{r} 0.4 \\ 5 \overline{) 2.0} \\ \underline{- 20} \\ 0 \end{array}$$

$0.4 = \boxed{40\%}$

or (if possible) write as $\frac{n}{100}$

$$\begin{array}{r} \times 20 \\ 2 = 40 \\ 5 \quad 100 \end{array}$$

$\boxed{40\%}$

d) $\frac{1}{6}$

$$\begin{array}{r} .1666... \\ 6 \overline{) 1.0000} \\ \underline{- 6} \downarrow \\ 40 \\ \underline{- 36} \downarrow \\ 40 \\ \underline{- 36} \downarrow \\ 4 \end{array}$$

So, $\boxed{16.\overline{6}\%}$

ex 2 Convert to a decimal

$$a) 27\% = \boxed{0.27}$$

To convert to a % you move decimal point 2 places to the right and add the % symbol.

So, it makes sense that to convert to a decimal you move the decimal point 2 places to the left and remove the % symbol.

$$b) \underset{\sim 3}{3}\% = \boxed{0.03}$$

$$c) \underset{\sim 100}{100}\% = \boxed{1}$$

$$d) 21\frac{3}{4}\% = 21.75\% = \boxed{0.2175}$$

$$e) \frac{2}{9}\% = 0.\bar{2}\% = \boxed{0.00\bar{2}}$$

$$\sim 0.2$$

Application problems involving percents usually take on 1 of 3 forms:

1. Given the whole & part, find the percent.
2. Given the whole & percent, find the part.
3. Given the percent & part, find the whole.

ex 3 If \$800 of a \$2000 loan has been paid off, what percent is this?

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100} \quad \text{or} \quad \frac{\text{part}}{\text{total}} = \frac{\%}{100}$$

$$\frac{800}{2000} = \frac{x}{100}$$

We solve proportions by cross multiplying.

$$\frac{800}{2000} = \frac{2000x}{2000}$$

$$40 = x$$

So, 40% has been paid off.

ex 4 A \$189,500 house requires a 5% down payment. How much is the down payment?

$$\frac{x}{189500} = \frac{5}{100}$$

$$\frac{100}{100} x = \frac{947500}{100}$$

$$x = \$9,475$$

proportion

5% of 189,500

$$(0.05)(189,500)$$

$$\boxed{\$9,475}$$

equation

Mental Math with Percents

Benchmarks: $\frac{1}{2} = 0.5 = 50\%$

$\frac{1}{4} = 0.25 = 25\%$

$\frac{3}{4} = 0.75 = 75\%$

$\frac{1}{5} = 0.2 = 20\%$

$\frac{1}{10} = 0.1 = 10\%$

ex 5 Explain how to mentally compute.

a) 50% of 120

that's just half of 120 = 60

b) 20% of 60

10% benchmark

10% of 60 = 6

So, 20% of 60 = $2(6) = 12$

$$2 \times 6 = 12$$

and put the decimal
where it makes
sense

0.12? NO

1.20? NO

12.00? YES

120.00? NO

c) 75% of 84

$$\frac{3}{4} \cdot \overset{21}{84} = 63$$

1

d) 15% of 80

10% benchmark

$$10\% \text{ of } 80 = 8$$

$$5\% \text{ is half of } 10\% \text{ so } \frac{1}{2}(8) = 4$$

$$\left. \begin{array}{l} 10\% \text{ of } 80 = 8 \\ 5\% \text{ is half of } 10\% \text{ so } \frac{1}{2}(8) = 4 \end{array} \right\} 8 + 4 = 12$$

e) 80% of 300

10% benchmark

$$10\% \text{ of } 300 = 30$$

$$80\% \text{ of } 300 = 8(30) = 240$$

$$8(3) = 24$$

put decimal
point where it
makes sense
.24.0.

f) 20% OFF of \$50

why?

10% benchmark

$$10\% \text{ of } 50 = 5$$

$$\text{So, } 20\% \text{ of } 50 = 2(5) = 10$$

$$\$50 - \$10 = \$40$$

$$8(5) = 40$$

put decimal
where it makes
sense

20% off means
you pay 80% of
the price

ex 6 Estimate mentally

a) 20% of \$113

$$20\% \text{ of } \$100 = \boxed{20}$$

b) 33% of 44

30% of 40

$$10\% \text{ of } 40 = 4$$

$$30\% \text{ of } 40 = 3(4) = \boxed{12}$$

end 7-4