

\[

\]




0

## $\frac{2}{4}$ 50\%  <br> 0.5

$$
\begin{gathered}
\frac{3}{4} \\
75 \% \\
\hline \quad \mid \\
\hline 0.75
\end{gathered}
$$


0 5 1 5
0\%

 20\%
 0.20



## $\mid$



| I have | Who has |
| :---: | :---: |
| 0.125 | 0.25 as a percentage? |

## I have

## Who has

$25 \% \quad \frac{3}{4}$ as a percentage?

| I have | Who has |
| :---: | :---: |
| $75 \%$ | $10 \%$ of 85 ? |


| I have | Who has |
| :---: | :---: |
| 8.5 | $25 \%$ of $80 ?$ |

I have
9\%

Who has
0.01 as a percentage? ?

I have
20

Who has
$\frac{9}{100}$ as a percentage?

Who has
$25 \%$ of 80 ?

| I have | Who has |
| :---: | :---: |
| $1 \%$ | $40 \%$ of 60 ? |

## I have

## Who has

24
$\frac{6}{10}$ as a percentage?

I have
$6.8 \%$
Who has
$30 \%$ of 70 ?

I have
70\%
1.08 as a fraction?

| I have <br> $\frac{108}{100}$ | Who has |
| :---: | :---: |
|  |  |

## I have

## Who has

$80 \%$ of 90 ?
I have
Who has
$59 \%$ as a decimal fraction?
I have
Who has
0.59
0.73 as a fraction?
I have
Who has
0.31 as a percentage?


## Maths Mastery Percentages

## Out of a Hundred

Write the percentages represented by these:


28\%


11\%


79\%

Create some percentage representations for a partner to write the percentage.

## Out of a Hundred

Write the percentages represented by these:


95\%


56\%


4\%

Create some percentage representations for a partner to write the percentage.

## Tenths as a Percentage

What percentage does each square represent?

$$
\begin{array}{|l|l|l|l|l|l|l|l|}
\hline & & & & & & & \\
\hline
\end{array}
$$

Write the percentages represented by these:
 70\%


90\%


10\%
Create some percentage representations for a partner to write the percentage.

## Percentage, Fraction and Decimal

Work with a partner.

Partner One: Say a decimal to two decimal places, a percentage or a fraction as hundredths.

Partner Two: Say the
equivalent
fraction/decimal
number/percentage.
E.g.

$$
\frac{29}{100}
$$


$29 \%$

Try writing, or saying and writing the fraction, percentage or decimal number.

## Fractions to Percentages

Aim: To know and calculate the percentages equivalent to common fractions.
In all cases round decimals to an appropriate number of decimal places. Look for any patterns or repeating (recurring) digits.
For equivalent percentages you do not know, look for patterns, use doubling and halving or divide the numerator by the denominator and multiply by 100.

1. Write all the fractions for $\frac{1}{16}$ to $\frac{15}{16}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

2. Write all the fractions for $\frac{1}{20}$ to $\frac{19}{20}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

| $\frac{1}{20}$ | $\frac{1}{10}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

3. Write all the fractions for $\frac{1}{12}$ to $\frac{11}{12}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

| $\frac{1}{12}$ |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |  |  |  |

4. Write all the fractions for $\frac{1}{9}$ to $\frac{8}{9}$. Below each write the equivalent percentage.

| $\frac{1}{9}$ |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |

5. Calculate the equivalent percentage to the sevenths. Answer each to 4 decimal places.

| $\frac{1}{7}$ |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

## Fractions to Percentages Answers

Aim: To know and calculate the percentages equivalent to common fractions.
In all cases round decimals to an appropriate number of decimal places. Look for any patterns or repeating (recurring) digits.
For equivalent percentages you do not know, look for patterns, use doubling and halving or divide the numerator by the denominator and multiply by 100.

1. Write all the fractions for $\frac{1}{16}$ to $\frac{15}{16}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

| $\frac{1}{16}$ | $\frac{1}{8}$ | $\frac{3}{16}$ | $\frac{1}{4}$ | $\frac{5}{16}$ | $\frac{3}{8}$ | $\frac{7}{16}$ | $\frac{1}{2}$ | $\frac{9}{16}$ | $\frac{5}{8}$ | $\frac{11}{16}$ | $\frac{3}{4}$ | $\frac{13}{16}$ | $\frac{7}{8}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $6.25 \%$ | $12.5 \%$ | $18.75 \%$ | $25 \%$ | $31.25 \%$ | $37.5 \%$ | $43.75 \%$ | $50 \%$ | $56.25 \%$ | $62.5 \%$ | $68.75 \%$ | $75 \%$ | $81.25 \%$ | $87.5 \%$ |
| 16 |  |  |  |  |  |  |  |  |  |  |  |  |  |

2. Write all the fractions for $\frac{1}{20}$ to $\frac{19}{20}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

| $\frac{1}{20}$ | $\frac{1}{10}$ | $\frac{3}{20}$ | $\frac{1}{5}$ | $\frac{1}{4}$ | $\frac{3}{10}$ | $\frac{7}{20}$ | $\frac{2}{5}$ | $\frac{9}{20}$ | $\frac{1}{2}$ | $\frac{11}{20}$ | $\frac{3}{5}$ | $\frac{13}{20}$ | $\frac{7}{10}$ | $\frac{3}{4}$ | $\frac{4}{5}$ | $\frac{17}{20}$ | $\frac{9}{10}$ | $\frac{19}{20}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $5 \%$ | $10 \%$ | $15 \%$ | $20 \%$ | $25 \%$ | $30 \%$ | $35 \%$ | $40 \%$ | $45 \%$ | $50 \%$ | $55 \%$ | $60 \%$ | $65 \%$ | $70 \%$ | $75 \%$ | $80 \%$ | $85 \%$ | $90 \%$ | $95 \%$ |

3. Write all the fractions for $\frac{1}{12}$ to $\frac{11}{12}$, writing the fraction in its smallest form. Below each write the equivalent percentage.

| $\frac{1}{12}$ | $\frac{1}{6}$ | $\frac{1}{4}$ | $\frac{1}{3}$ | $\frac{5}{12}$ | $\frac{1}{2}$ | $\frac{7}{12}$ | $\frac{2}{3}$ | $\frac{3}{4}$ | $\frac{5}{6}$ | $\frac{11}{12}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $8.33 \%$ | $16.67 \%$ | $25 \%$ | $33.33 \%$ | $41.67 \%$ | $50 \%$ | $58.33 \%$ | $66.67 \%$ | $75 \%$ | $83.33 \%$ | $91.67 \%$ |

4. Write all the fractions for $\frac{1}{9}$ to $\frac{8}{9}$. Below each write the equivalent percentage.

| $\frac{1}{9}$ | $\frac{2}{9}$ | $\frac{1}{3}$ | $\frac{4}{9}$ | $\frac{5}{9}$ | $\frac{2}{3}$ | $\frac{7}{9}$ | $\frac{8}{9}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $11.11 \%$ | $22.22 \%$ | $33.33 \%$ | $44.44 \%$ | $55.56 \%$ | $66.67 \%$ | $77.78 \%$ | $88.89 \%$ |

5. Calculate the equivalent percentage to the sevenths. Answer each to 4 decimal places.

| $\frac{1}{7}$ | $\frac{2}{7}$ | $\frac{3}{7}$ | $\frac{4}{7}$ | $\frac{5}{7}$ | $\frac{6}{7}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $14.2857 \%$ | $28.5714 \%$ | $42.8571 \%$ | $57.1429 \%$ | $71.4286 \%$ | $85.7143 \%$ |

$\frac{1}{2}$
$\frac{1}{3}$
$\frac{2}{3}$

75\%
50\%
95\%
$\frac{1}{4}$
$\frac{3}{4}$
$\frac{1}{5}$

67\%
5\%
35\%

## $\frac{2}{5}$

## $\frac{3}{5}$

$\frac{4}{5}$

## 40\%

## 30\%

90\%

## 1 <br> 10

55\%

## 33\%

15\%

## 9 <br> $\overline{10}$

## 45\%

## 85\%

## 25\%

$\frac{7}{20}$
$\frac{9}{20}$
$\frac{11}{20}$

80\%
70\%
65\%

## Fractions to Percentages

Aim: To know the percentages equivalent to common fractions.
Cut out the fraction cards and percentage cards and match the fractions to the equivalent percentage. You could also use some of the matching cards to play matching pairs or other matching games.

Use this sheet to record your results, or write them in your book.


## Fractions to Percentages Answers

Aim: To know the percentages equivalent to common fractions.
Cut out the fraction cards and percentage cards and match the fractions to the equivalent percentage. You could also use some of the matching cards to play matching pairs or other matching games.

Use this sheet to record your results, or write them in your book.

| $\frac{1}{2}$ | 50\% | $\frac{1}{5}$ | 20\% | $\frac{1}{20}$ | 5\% |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\frac{1}{3}$ | 33\% |  | 40\% | $\frac{3}{20}$ | 15\% |
| $\frac{2}{3}$ | 67\% | $\frac{3}{5}$ | 60\% | $\frac{7}{20}$ | 35\% |
| $\frac{1}{4}$ | 25\% |  | 80\% | $\frac{9}{20}$ | 45\% |
| $\frac{3}{4}$ | 75\% | $\frac{1}{10}$ | 10\% | $\frac{11}{20}$ | 55\% |
|  |  | $\frac{3}{10}$ | 30\% | $\frac{13}{20}$ | 65\% |
|  |  | $\frac{7}{10}$ | 70\% | $\frac{17}{20}$ | 85\% |
|  |  | $\frac{9}{10}$ | 90\% | $\frac{19}{20}$ | 95\% |

## Fractions to Percentages

Aim: To know and calculate the percentages equivalent to common fractions.

1. Write the equivalent percentage to each fraction. Round any decimal answers to one decimal place.
$\frac{1}{2}=\square$

2. Write the fractions in order from smallest to largest. Look at the percentages to help you order the fractions.

## Fractions to Percentages Answers

Aim: To know and calculate the percentages equivalent to common fractions.

1. Write the equivalent percentage to each fraction. Round any decimal answers to one decimal place.
$\frac{1}{2}=50 \%$
$\frac{1}{6}=5 \frac{1}{20}=5 \%$
$\frac{1}{3}=33 \%$
$\frac{5}{6}=83.3 \%$

$$
\frac{3}{20}=15 \%
$$

$$
\frac{2}{3}=67 \%
$$

$$
\frac{1}{8}=12.5 \% \quad \frac{7}{20}=35 \%
$$

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

$$
\frac{3}{8}=37.5 \%
$$

$$
\frac{9}{20}=45 \%
$$

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

$$
\frac{5}{8}=62.5 \%
$$

$$
\frac{11}{20}=55 \%
$$

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

$$
\frac{7}{8}=87.5 \%
$$

$$
\frac{13}{20}=65 \%
$$

$$
\frac{2}{5}=40 \%
$$

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

$$
\frac{17}{20}=85 \%
$$

$$
\frac{3}{5}=60 \%
$$

$$
\frac{3}{10}=30 \%
$$

$$
\frac{19}{20}=95 \%
$$

$$
\frac{4}{5}=80 \%
$$

$$
\begin{aligned}
& \frac{7}{10}=70 \% \\
& \frac{9}{10}=90 \%
\end{aligned}
$$

## Fractions to Percentages Answers

2. Write the fractions in order from smallest to largest. Look at the percentages to help you order the fractions.
$\frac{1}{20}, \frac{1}{10}, \frac{1}{8}, \frac{3}{20}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{3}{10}, \frac{1}{3}, \frac{7}{20}, \frac{3}{8}, \frac{2}{5}, \frac{9}{20}, \frac{1}{2}$,
$\frac{11}{20}, \frac{3}{5}, \frac{5}{8}, \frac{13}{20}, \frac{2}{3}, \frac{7}{10}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{17}{20}, \frac{7}{8}, \frac{9}{10}, \frac{19}{20}$.

## $\frac{5}{6}$ <br> $\frac{3}{8}$

$\frac{1}{3}$
66\% Fractions to $95 \%$ Percentages $\frac{1}{7}$


## Halves, Quarters and Eighths

Remember the equivalent fractions for halves, quarters and eighths.

| $\frac{1}{2}$ |  |  |  | $\frac{2}{2}$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\frac{1}{4}$ |  | $\frac{2}{4}$ |  | $\frac{3}{4}$ |  | $\frac{4}{4}$ |  |
| $\frac{1}{8}$ | $\frac{2}{8}$ | $\frac{3}{8}$ | $\frac{4}{8}$ | $\frac{5}{8}$ | $\frac{6}{8}$ | $\frac{7}{8}$ | $\frac{8}{8}$ |

$$
\begin{aligned}
& \frac{1}{2}=\frac{2}{4}=\frac{4}{8} \\
& \frac{1}{4}=\frac{2}{8} \text { and } \frac{3}{4}=\frac{6}{8}
\end{aligned}
$$

This will help you find the equivalent percentages.

## Halving and Combining

Many equivalent percentages can be found by doubling and halving known percentages.

$$
\begin{aligned}
& \frac{1}{2}=50 \% \\
& \frac{1}{4} \text { is half of } \frac{1}{2} \text { so } \frac{1}{4}=25 \% \\
& \frac{3}{4}=\frac{1}{2}+\frac{1}{4}=50 \%+25 \%=75 \%
\end{aligned}
$$

We can extend this to $\frac{1}{8}, \frac{3}{8}, \frac{5}{8}$ and $\frac{7}{8}$.

$$
\begin{aligned}
& \frac{1}{8} \text { is half of } \frac{1}{4} \text { so } \frac{1}{8}=\frac{1}{2} \text { of } 25 \%=12.5 \% \\
& \frac{3}{8}=\frac{1}{4}+\frac{1}{8}=25 \%+12.5 \%=37.5 \% \\
& \frac{5}{8}=\frac{1}{2}+\frac{1}{8}=50 \%+12.5 \%=62.5 \% \\
& \frac{7}{8}=\frac{3}{4}+\frac{1}{8}=75 \%+12.5 \%=87.5 \%
\end{aligned}
$$

## Fifths and Tenths

Remember the equivalent fractions for halves, fifths and tenths.

| $\frac{1}{2}$ |  |  |  | $\frac{2}{2}$ |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\frac{1}{5}$ |  | $\frac{2}{5}$ |  | $\frac{3}{5}$ |  | $\frac{4}{5}$ | $\frac{5}{5}$ |  |  |
| $\frac{1}{10}$ | $\frac{2}{10}$ | $\frac{3}{10}$ | $\frac{4}{10}$ | $\frac{5}{10}$ | $\frac{6}{10}$ | $\frac{7}{10}$ | $\frac{8}{10}$ | $\frac{9}{10}$ | $\frac{10}{10}$ |

$$
\frac{1}{2}=\frac{5}{10}
$$

$$
\frac{1}{5}=\frac{2}{10}
$$

$$
\frac{2}{5}=\frac{4}{10}
$$

$$
\frac{3}{5}=\frac{6}{10}
$$

$$
\frac{4}{5}=\frac{8}{10}
$$

## Halving and Combining

Fifths and tenths are mainly found by combining the required number of tenths as $\frac{1}{10}=10 \%$

$$
\begin{aligned}
& \frac{5}{10}=\frac{1}{2}=50 \% \\
& \frac{1}{5}=\frac{2}{10}=20 \%, \frac{2}{5}=40 \%, \frac{3}{5}=60 \%, \frac{4}{5}=80 \% \\
& \frac{1}{10}=10 \%, \frac{3}{10}=30 \%, \frac{7}{10}=70 \%, \frac{9}{10}=90 \%
\end{aligned}
$$

## Thirds, Sixths and Twelfths

Remember the equivalent fractions for halves, thirds, sixths and twelfths.

| $\frac{1}{2}$ |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\frac{1}{3}$ |  |  |  | $\frac{2}{3}$ |  |  |  | $\frac{3}{3}$ |  |  |  |
| $\frac{1}{6}$ |  | $\frac{2}{6}$ |  | $\frac{3}{6}$ |  | $\frac{4}{6}$ |  | $\frac{5}{6}$ |  | $\frac{6}{6}$ |  |
| $\frac{1}{12}$ | $\frac{2}{12}$ | $\frac{3}{12}$ | $\frac{4}{12}$ | $\frac{5}{12}$ | $\frac{6}{12}$ | $\frac{7}{12}$ | $\frac{8}{12}$ | $\frac{9}{12}$ | $\frac{10}{12}$ | $\frac{11}{12}$ | $\frac{12}{12}$ |
| $\begin{aligned} & \frac{1}{2}=\frac{3}{6}=\frac{6}{12} \\ & \frac{1}{3}=\frac{2}{6}=\frac{4}{12} \text { and } \frac{2}{3}=\frac{4}{6}=\frac{8}{12} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\frac{1}{6}=\frac{2}{12} \text { and } \frac{5}{6}=\frac{10}{12}$ |  |  |  |  |  |  |  |  |  |  |  |

## Halving and Combining

Many of the equivalent percentages for thirds, sixths and twelfths use the recurring 3333 or 6666 . Use this along with halving and combining to find the equivalent percentages.

$$
\frac{1}{3}=33.3 \%, \frac{2}{3}=66.66 \% \text { rounded to } 66.7 \%
$$

When halving $33.3 \%$ we know half of $32=16$ and use half of $1.33 \approx 0.67$ so $\frac{1}{6}=16.7 \%$.

Look for the best way to combine the percentages to find all the equivalents.

## Combining Twenty-Fifths

We know that $25 \times 4=100$ so $\frac{1}{25}=4 \%$.
To find the equivalent percentage of $\frac{12}{25}$ we multiply 12 by 4 .
$\frac{12}{25}=48 \%$.
Try other twenty-fifths.

## Calculating Equivalent Percentages

Equivalent percentages can be calculated by dividing the numerator by the denominator (to find the equivalent decimal) and multiplying by 100 to give the percentage.

$$
\begin{array}{lcl}
\frac{1}{2} & 2 \longdiv { 1 . 0 } & 0.5 \times 100=50 \% \\
& \\
\frac{5}{8} & 8 \longdiv { 5 . 0 0 0 } & 0.625 \times 100=62.5 \%
\end{array}
$$

## Calculating Sevenths

$$
\left.\begin{array}{lll}
\frac{1}{7} & 7 \longdiv { 1 . 0 0 0 0 0 0 } \times 1 0 0 = 1 4 . 2 8 5 7 \% \\
& & \\
& & 0.285714 \\
\frac{2}{7} & 7 & 2.000000
\end{array}\right] 100=28.5714 \%,
$$

## Calculating Sevenths

$$
\begin{array}{ll}
\frac{4}{7} & 7 \longdiv { 4 . 0 0 0 0 0 0 } \times 1 0 0 = 5 7 . 1 4 2 8 \% \\
& \\
\frac{5}{7} & 7 \longdiv { 5 . 0 0 0 0 0 0 } \times 1 0 0 = 7 1 . 4 2 8 5 \% \\
& \\
\frac{7}{7} & 7 \longdiv { 6 . 0 0 0 0 0 0 } \times 1 0 0 = 8 5 . 7 1 4 2 \%
\end{array}
$$

## Calculating Sevenths

$14.2857 \% \quad 28.5714 \% \quad 42.8571 \% \quad 57.1428 \% \quad 714.4285 \% \quad 85.7142 \%$

What do you notice about the pattern made by the equivalent percentages to the sevenths? Look at the order of the digits.

The digits are always in the same order, starting with a different digit each time.

Which digits are never used?
3,6 and 9


## I have...



## Who has ...?

## 0.9

I have...
Who has ...?

## 90\%

I have...
Who has ...?

## $30 \%$

## I have...

Who has ...?

# 65 100 





## I have...

## 0.2

## Who has ...?

### 0.68

I have...
Who has ...?
68\%

I have...
Who has ...?

### 0.35

I have...


Who has ...?


## I have...

## 25\%

## Who has ...?



I have...


Who has ...?


I have...
Who has ...?

## 70\%

## I have...



Who has ...?

## 45\%

## I have...

## 45 100

## Who has ...?

## 33.3\%

I have...


Who has ...?


Who has ...?

## 1 \%

## I have...

### 0.01

Who has ...?


## I have...

### 0.125

I have...

## Who has ...?

## 150\%

## 1.5

Who has ...?
50\%

