# Fractions, Decimals and %

| Decimals & Fractions | Examples |
|---|---|
| **To change a decimal to a fraction**: use the place value of the last digit | $0.85 = \dfrac{85}{100} = \dfrac{17}{20}$   $\div 5$   $\div 5$   hundredths    On a calculator press: $85 \ a^b/_c \ 100 =$ |
| **To change a fraction to a decimal**: divide the top by the bottom | $\dfrac{4}{5} = 4 \div 5 = \mathbf{0.8}$ |

| Fractions, Decimals & % | Examples |
|---|---|
| **To write a % as a fraction or decimal**, divide by 100 | $64\% = 64 \div 100 = 0.64$ <br><br> $64\% = \dfrac{64}{100} = \dfrac{16}{25}$ <br><br> On a calculator press: $64 \ a^b/_c \ 100 =$ |
| **To write a decimal or fraction as a %** multiply by 100 | $0.125 = 0.125 \times 100 = 12.5\%$ <br><br> $\dfrac{2}{5} = \dfrac{2}{5} \times 100$   (i.e. $\dfrac{2}{5}$ of 100) <br><br> $2 \div 5 \times 100 = \mathbf{40\%}$   or $2 \ a^b/_c \ 5 \times 100 = 40\%$ |

*Some to try*:

1 Write these decimals as fractions:

| 0.3 = | 0.5 = | 0.6 = | 0.02 = |
|---|---|---|---|
| 0.05 = | 0.25 = | 0.36 = | 0.125 = |

2   Write these fractions as decimals:

| | | | |
|---|---|---|---|
| $\frac{7}{10} =$ | $\frac{1}{5} =$ | $\frac{2}{5} =$ | $\frac{3}{4} =$ |
| $\frac{7}{8} =$ | $\frac{2}{3} =$ | $\frac{9}{20} =$ | $\frac{7}{25} =$ |

3   Write these percentages as decimals:

| | | | |
|---|---|---|---|
| 3% = | 30% = | 25% = | 80% = |
| 8% = | 12% = | 67% = | 17.5% = |

4   Write these percentages as fractions:

| | | | |
|---|---|---|---|
| 20% = | 75% = | 5% = | 30% = |
| 40% = | 15% = | 24% = | 35% = |

5   Write these decimals as percentages:

| | | | |
|---|---|---|---|
| 0.25 = | 0.5 = | 0.7 = | 0.07 = |
| 0.45 = | 0.09 = | 0.4 = | 0.375 = |

6   Write these fractions as percentages:

| | | | |
|---|---|---|---|
| $\frac{1}{10} =$ | $\frac{1}{5} =$ | $\frac{9}{10} =$ | $\frac{3}{4} =$ |
| $\frac{4}{5} =$ | $\frac{17}{20} =$ | $\frac{1}{3} =$ | $\frac{2}{3} =$ |

# Fractions to Decimals

**Complete this table.**

| Fraction | Decimal |
|:---:|:---:|
| $\dfrac{1}{10}$ | |
| $\dfrac{1}{5}$ | |
| $\dfrac{3}{10}$ | |
| $\dfrac{2}{5}$ | |
| $\dfrac{1}{2}$ | |
| $\dfrac{3}{5}$ | |
| $\dfrac{7}{10}$ | |
| $\dfrac{4}{5}$ | |
| $\dfrac{9}{10}$ | |
| $\dfrac{1}{4}$ | |
| $\dfrac{3}{4}$ | |

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# Decimals to Fractions

**Complete this table.**

| Decimal | Fraction |
|---------|----------|
| 0.1 | |
| 0.2 | |
| 0.3 | |
| 0.4 | |
| 0.5 | |
| 0.6 | |
| 0.7 | |
| 0.8 | |
| 0.9 | |
| 0.25 | |
| 0.75 | |

# Fractions and Decimals

**Draw a line from each decimal to the equivalent fraction.**

| | |
|---|---|
| 0.1 | |
| 0.2 | |
| 0.3 | |
| 0.4 | |
| 0.5 | |
| 0.6 | |
| 0.7 | |
| 0.8 | |
| 0.9 | |
| 0.25 | |
| 0.75 | |

$\dfrac{1}{5}$

$\dfrac{1}{10}$

$\dfrac{3}{5}$

$\dfrac{2}{5}$

$\dfrac{7}{10}$

$\dfrac{1}{2}$    $\dfrac{9}{10}$    $\dfrac{1}{4}$

$\dfrac{3}{4}$

$\dfrac{4}{5}$

$\dfrac{3}{10}$

# Percentages to Decimals

**Complete this table.**

| % | Decimal |
|---|---------|
| 1% | |
| 2% | |
| 3% | |
| 4% | |
| 5% | |
| 6% | |
| 7% | |
| 8% | |
| 9% | |

| % | Decimal |
|---|---------|
| 10% | |
| 20% | |
| 30% | |
| 40% | |
| 50% | |
| 60% | |
| 70% | |
| 80% | |
| 90% | |

# Percentages to Fractions

**Complete this table.**

| % | Fraction |
|---|---|
| 1% | |
| 2% | |
| 3% | |
| 4% | |
| 5% | |
| 6% | |
| 7% | |
| 8% | |
| 9% | |

| % | Fraction |
|---|---|
| 10% | |
| 20% | |
| 30% | |
| 40% | |
| 50% | |
| 60% | |
| 70% | |
| 80% | |
| 90% | |

# Decimals to Percentages

**Complete this table.**

| Decimal | % |
|---------|---|
| 0.1 | |
| 0.2 | |
| 0.3 | |
| 0.4 | |
| 0.5 | |
| 0.6 | |
| 0.7 | |
| 0.8 | |
| 0.9 | |
| 0.25 | |
| 0.75 | |

| Decimal | % |
|---------|---|
| 0.01 | |
| 0.02 | |
| 0.03 | |
| 0.04 | |
| 0.05 | |
| 0.06 | |
| 0.07 | |
| 0.08 | |
| 0.09 | |
| 0.025 | |
| 0.075 | |

# Fractions to Percentages

**Complete this table.**

| Fraction | % |
|:---:|:---:|
| $\dfrac{1}{10}$ | |
| $\dfrac{1}{5}$ | |
| $\dfrac{3}{10}$ | |
| $\dfrac{2}{5}$ | |
| $\dfrac{1}{2}$ | |
| $\dfrac{3}{5}$ | |
| $\dfrac{7}{10}$ | |
| $\dfrac{4}{5}$ | |
| $\dfrac{9}{10}$ | |
| $\dfrac{1}{4}$ | |
| $\dfrac{3}{4}$ | |

# Fractions, Decimals and %

**Fill the gaps in the table:**

| Percentage | Fraction | Decimal |
|:---:|:---:|:---:|
| 10% | | |
| | | 0.2 |
| | $\dfrac{3}{10}$ | |
| 40% | | |
| | | 0.5 |
| | $\dfrac{3}{5}$ | |
| 70% | | |
| | | 0.8 |
| | $\dfrac{9}{10}$ | |
| 25% | | |
| | $\dfrac{3}{4}$ | |

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**Teacher Notes**

**Unit**   Foundation Level: *Managing money* & *Making sense of dat*a

**Notes**
Although questions that ask candidates to write a percentage as a decimal or fraction (or vice versa) occur very frequently on the examination papers for these FSMQs, candidates often cannot do this.  For example the Examiner's Report on the January 2007 Making sense of data examination states that in question 4 when candiates were asked to write 5% as a fraction and as a decimal 'relatively few candidates obtained the fraction $\frac{5}{100}$, and of those who did it was rare to see this fraction simplified from to $\frac{5}{100}$ to $\frac{1}{20}$' and 'it was common to see 5% turned into the decimal 0.5 instead of 0.05.'

Pages 1 and 2 of this resource give a brief summary of the methods that students are likely to use for conversions in a test (when they have access to a calculator) followed by a practice exercise.  Pages 3 to 10 provide a series of worksheets that can be used for frequent reminders, possibly as session starters.  They can also be used in discussions about the patterns and links between the results.

The internet also provides a range of user-friendly resources to give practice in converting between fractions,decimals and %.  Some useful links are given below:
http://www.bbc.co.uk/skillswise/numbers/fractiondecimalpercentage/comparing/comparing all3/game.shtml
http://nrich.maths.org/public/viewer.php?obj_id=1249
http://nrich.maths.org/public/viewer.php?obj_id=2739
http://www.woodlands-junior.kent.sch.uk/maths/fractions/#Percentages
http://mathgoodies.com/lessons/vol4/challenge_vol4.html
http://www.active-maths.co.uk/fractions/whiteboard/fracdec_index.html

Of course conversions from one form to another should be used as often as possible in real contexts.  For example, writing sale offers such as '$\frac{1}{3}$ OFF' in terms of a % (or vice versa), working out what a pay rise of 5% means in terms of a fraction or what a part-time worker's fractional salary expressed as a decimal is as a % of a full-time salary.

**Answers**

1

| | | | |
|---|---|---|---|
| $0.3 = \frac{3}{10}$ | $0.5 = \frac{1}{2}$ | $0.6 = \frac{3}{5}$ | $0.02 = \frac{1}{50}$ |
| $0.05 = \frac{1}{20}$ | $0.25 = \frac{1}{4}$ | $0.36 = \frac{9}{20}$ | $0.125 = \frac{1}{8}$ |

2

| | | | |
|---|---|---|---|
| $\frac{7}{10} = 0.7$ | $\frac{1}{5} = 0.2$ | $\frac{2}{5} = 0.4$ | $\frac{3}{4} = 0.75$ |
| $\frac{7}{8} = 0.875$ | $\frac{2}{3} = 0.67$ (2 dp) | $\frac{9}{20} = 0.45$ | $\frac{7}{25} = 0.28$ |

3

| | | | |
|---|---|---|---|
| 3% = 0.03 | 30% = 0.3 | 25% = 0.25 | 80% = 0.8 |
| 8% = 0.08 | 12% = 0.12 | 67% = 0.67 | 17.5% = 0.175 |

4

| | | | |
|---|---|---|---|
| 20% = $\frac{1}{5}$ | 75% = $\frac{3}{4}$ | 5% = $\frac{1}{20}$ | 30% = $\frac{3}{10}$ |
| 40% = $\frac{2}{5}$ | 15% = $\frac{3}{20}$ | 24% = $\frac{6}{25}$ | 35% = $\frac{7}{20}$ |

5

| | | | |
|---|---|---|---|
| 0.25 = 25% | 0.5 = 50% | 0.7 = 70% | 0.07 = 7% |
| 0.45 = 45% | 0.09 = 9% | 0.4 = 40% | 0.375 = 37.5% |

6

| | | | |
|---|---|---|---|
| $\frac{1}{10} = 10\%$ | $\frac{1}{5} = 20\%$ | $\frac{9}{10} = 90\%$ | $\frac{3}{4} = 75\%$ |
| $\frac{4}{5} = 80\%$ | $\frac{17}{20} = 85\%$ | $\frac{1}{3} = 33.3\%$ (1 dp) | $\frac{2}{3} = 66.7\%$ (1 dp) |

# Fractions to Decimals

| Fraction | Decimal |
|:---:|:---:|
| $\dfrac{1}{10}$ | 0.1 |
| $\dfrac{1}{5}$ | 0.2 |
| $\dfrac{3}{10}$ | 0.3 |
| $\dfrac{2}{5}$ | 0.4 |
| $\dfrac{1}{2}$ | 0.5 |
| $\dfrac{3}{5}$ | 0.6 |
| $\dfrac{7}{10}$ | 0.7 |
| $\dfrac{4}{5}$ | 0.8 |
| $\dfrac{9}{10}$ | 0.9 |
| $\dfrac{1}{4}$ | 0.25 |
| $\dfrac{3}{4}$ | 0.75 |

# Decimals to Fractions

| Decimal | Fraction |
|---------|----------|
| 0.1 | $\frac{1}{10}$ |
| 0.2 | $\frac{1}{5}$ |
| 0.3 | $\frac{3}{10}$ |
| 0.4 | $\frac{2}{5}$ |
| 0.5 | $\frac{1}{2}$ |
| 0.6 | $\frac{3}{5}$ |
| 0.7 | $\frac{7}{10}$ |
| 0.8 | $\frac{4}{5}$ |
| 0.9 | $\frac{9}{10}$ |
| 0.25 | $\frac{1}{4}$ |
| 0.75 | $\frac{3}{4}$ |

# Fractions and Decimals

| 0.1 | | $\frac{1}{5}$ |
| 0.2 | | |
| | | $\frac{1}{10}$ |
| 0.3 | $\frac{3}{5}$ | |
| 0.4 | | $\frac{2}{5}$ |
| 0.5 | $\frac{7}{10}$ | |
| 0.6 | | |
| 0.7 | $\frac{1}{2}$   $\frac{9}{10}$   $\frac{1}{4}$ | |
| 0.8 | | |
| 0.9 | | $\frac{3}{4}$ |
| 0.25 | | $\frac{4}{5}$ |
| 0.75 | $\frac{3}{10}$ | |
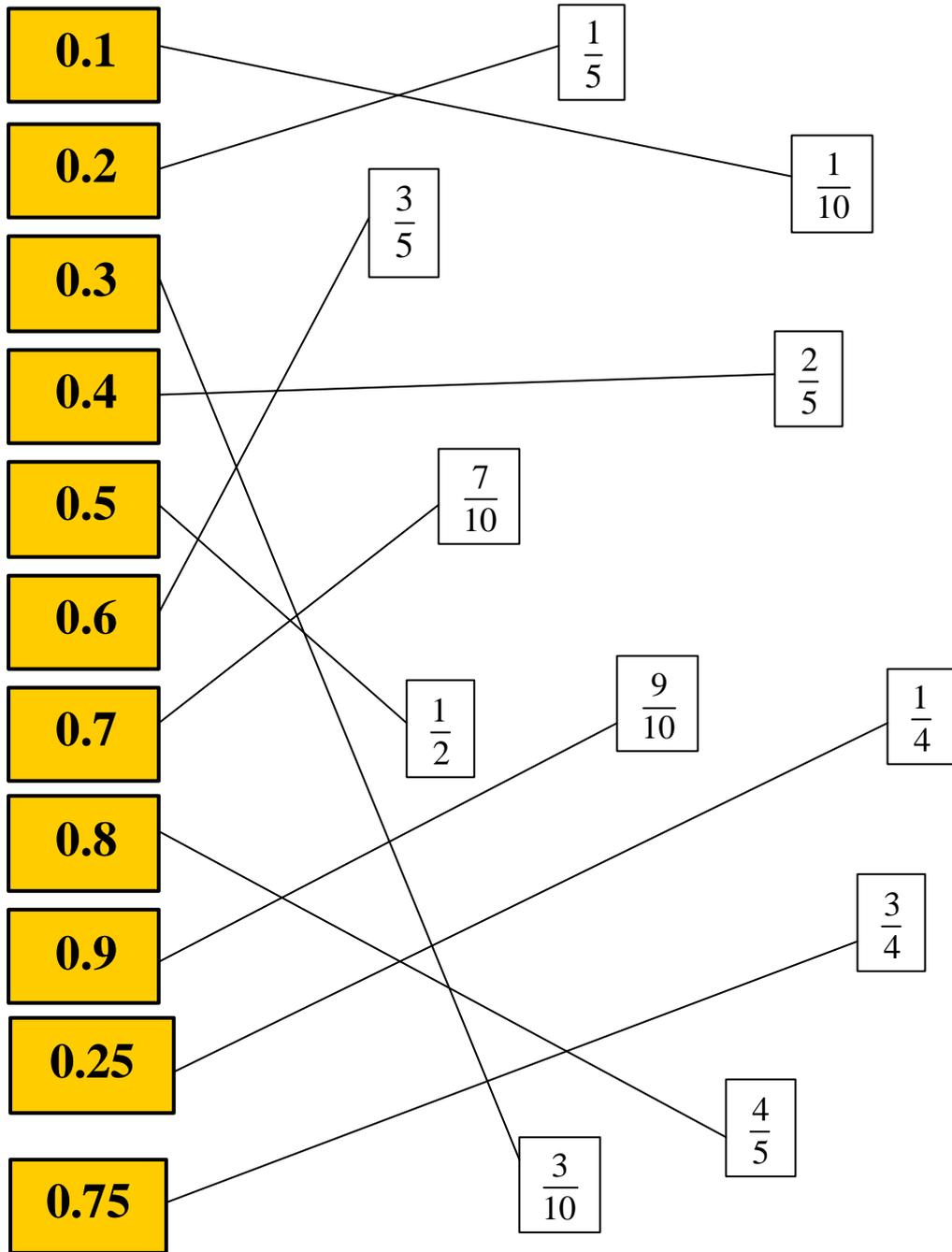
# Percentages to Decimals

| % | Decimal |
|---|---------|
| 1% | 0.01 |
| 2% | 0.02 |
| 3% | 0.03 |
| 4% | 0.04 |
| 5% | 0.05 |
| 6% | 0.06 |
| 7% | 0.07 |
| 8% | 0.08 |
| 9% | 0.09 |

| % | Decimal |
|---|---------|
| 10% | 0.1 |
| 20% | 0.2 |
| 30% | 0.3 |
| 40% | 0.4 |
| 50% | 0.5 |
| 60% | 0.6 |
| 70% | 0.7 |
| 80% | 0.8 |
| 90% | 0.9 |

# Percentages to Fractions

| % | Fraction |
|---|---|
| 1% | $\frac{1}{100}$ |
| 2% | $\frac{1}{50}$ |
| 3% | $\frac{3}{100}$ |
| 4% | $\frac{1}{25}$ |
| 5% | $\frac{1}{20}$ |
| 6% | $\frac{3}{50}$ |
| 7% | $\frac{7}{100}$ |
| 8% | $\frac{2}{25}$ |
| 9% | $\frac{9}{100}$ |

| % | Fraction |
|---|---|
| 10% | $\frac{1}{10}$ |
| 20% | $\frac{1}{5}$ |
| 30% | $\frac{3}{10}$ |
| 40% | $\frac{2}{5}$ |
| 50% | $\frac{1}{2}$ |
| 60% | $\frac{3}{5}$ |
| 70% | $\frac{7}{10}$ |
| 80% | $\frac{4}{5}$ |
| 90% | $\frac{9}{10}$ |

# Decimals to Percentages

| Decimal | % |
|---------|-----|
| 0.1 | 10% |
| 0.2 | 20% |
| 0.3 | 30% |
| 0.4 | 40% |
| 0.5 | 50% |
| 0.6 | 60% |
| 0.7 | 70% |
| 0.8 | 80% |
| 0.9 | 90% |
| 0.25 | 25% |
| 0.75 | 75% |

| Decimal | % |
|---------|-----|
| 0.01 | 1% |
| 0.02 | 2% |
| 0.03 | 3% |
| 0.04 | 4% |
| 0.05 | 5% |
| 0.06 | 6% |
| 0.07 | 7% |
| 0.08 | 8% |
| 0.09 | 9% |
| 0.025 | 2.5% |
| 0.075 | 7.5% |

# Fractions to Percentages

| Fraction | % |
|:---:|:---:|
| $\dfrac{1}{10}$ | 10% |
| $\dfrac{1}{5}$ | 20% |
| $\dfrac{3}{10}$ | 30% |
| $\dfrac{2}{5}$ | 40% |
| $\dfrac{1}{2}$ | 50% |
| $\dfrac{3}{5}$ | 60% |
| $\dfrac{7}{10}$ | 70% |
| $\dfrac{4}{5}$ | 80% |
| $\dfrac{9}{10}$ | 90% |
| $\dfrac{1}{4}$ | 25% |
| $\dfrac{3}{4}$ | 75% |

# Fractions, Decimals and %

| Percentage | Fraction | Decimal |
|:---:|:---:|:---:|
| 10% | $\dfrac{1}{10}$ | 0.1 |
| 20% | $\dfrac{1}{5}$ | 0.2 |
| 30% | $\dfrac{3}{10}$ | 0.3 |
| 40% | $\dfrac{2}{5}$ | 0.4 |
| 50% | $\dfrac{1}{2}$ | 0.5 |
| 60% | $\dfrac{3}{5}$ | 0.6 |
| 70% | $\dfrac{7}{10}$ | 0.7 |
| 80% | $\dfrac{4}{5}$ | 0.8 |
| 90% | $\dfrac{9}{10}$ | 0.9 |
| 25% | $\dfrac{1}{4}$ | 0.25 |
| 75% | $\dfrac{3}{4}$ | 0.75 |