# 11. [Decimals / Fractions]

## Skill 11.1 Finding equivalent decimal place values.



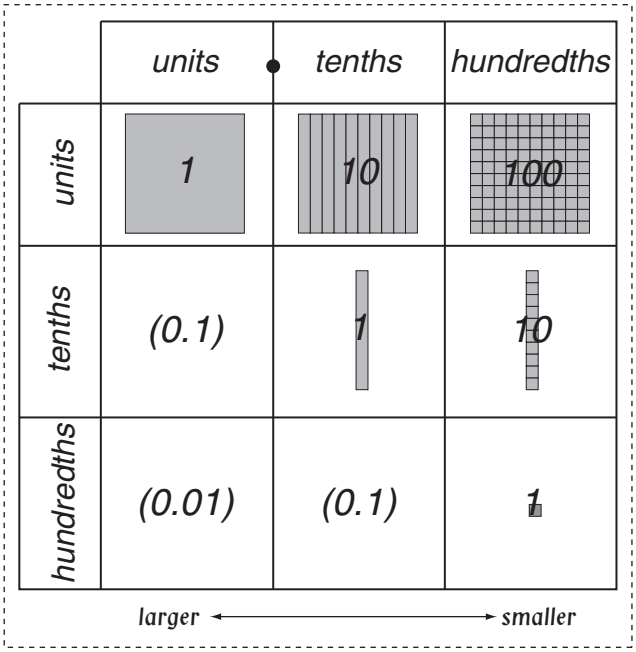
To change from **smaller** units to **larger** units
- Divide by the conversion factor (because you need less).

  Example: To change 40 hundredths to tenths
  ÷ by 10

To change from **larger** units to **smaller** units
- Multiply by the conversion factor (because you need more).

  Example: To change 4 units to tenths
  × by 10

*Hint: Conversion Factors*
*1 unit = 10 tenths = 100 hundredths*
*1 tenth = 10 hundredths*




**Q.** four = ☐ hundredths

**A.** $4 \times 100 = \mathbf{400}$

Units are larger than hundredths so you need to multiply.
$4 \times 100 = 400$

**a)** 8 tenths = 80 hundredths

*larger to smaller so multiply by 10*

$8 \times 10 = 80$

**b)** one = ☐ tenths

**c)** one = ☐ hundredths

**d)** six = ☐ tenths

**e)** seven = ☐ tenths

**f)** three = ☐ hundredths

**g)** 2 tenths = ☐ hundredths

**h)** 4 tenths = ☐ hundredths

**i)** five = ☐ tenths

**j)** six = ☐ hundredths

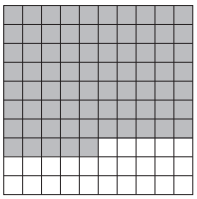
## Skill 11.2 Expressing tenths and hundredths as fractions.

- Write the number of tenths as the number out of 10.
- Write the number of hundredths as the number out of 100.
- Write the number out of 10 or 100 as the top of the fraction (numerator).

**Q.** 75 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**A.** ***75*** *out of 100* = $\frac{75}{100}$



75 hundredths is the same as 75 out of 100 or $\frac{75}{100}$

**a)** 6 tenths =

6 out of 10 = $\frac{6}{10}$

**b)** 3 tenths =

$\square$ out of 10 = $\frac{\square}{10}$

**c)** 9 tenths =

$\square$ out of 10 = $\frac{\square}{10}$

**d)** 5 tenths =

$\square$ out of 10 = $\frac{\square}{10}$

**e)** 1 tenth =

$\square$ out of 10 = $\frac{\square}{10}$

**f)** 7 tenths =

$\square$ out of 10 = $\frac{\square}{10}$

**g)** 38 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**h)** 12 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**i)** 6 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**j)** 19 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**k)** 9 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**l)** 76 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**m)** 1 hundredth =

$\square$ out of 100 = $\frac{\square}{100}$

**n)** 47 hundredths =

$\square$ out of 100 = $\frac{\square}{100}$

**o)** 29 hundredths =

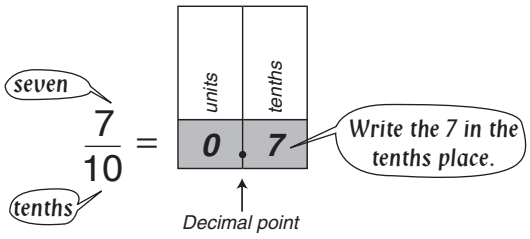
$\square$ out of 100 = $\frac{\square}{100}$

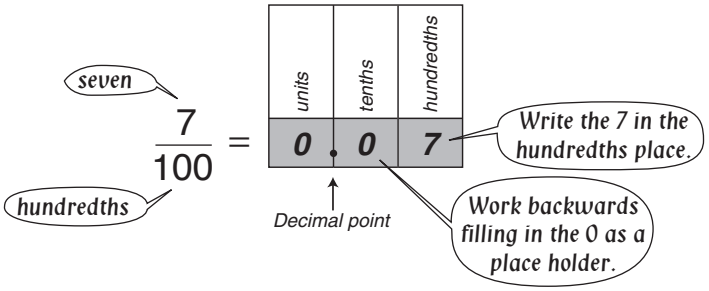
## Skill 11.3 Writing a fraction as a decimal number.

When the denominator **is** a power of 10:

- Say the fraction out loud using tenths or hundredths.
- Write the last digit of the numerator in the place spoken of in the denominator.
- Fill in the numerator working backwards to the decimal point.
- Use zeros as place holders where necessary.

Examples:



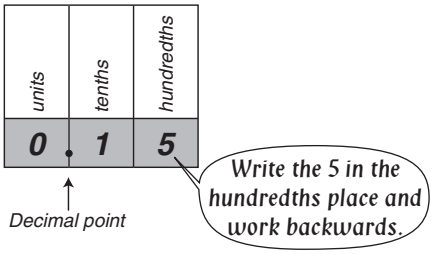




*Hint: The number of zeros in the denominator shows the number of digits after the decimal point.*

$\frac{7}{10} = 0.7$ $\qquad$ $\frac{7}{100} = 0.07$

**Q.** Write $\frac{15}{100}$ as a decimal. **A.** ***0.15***

Read as: fifteen hundredths




**a)** Which of these decimal numbers equals $\frac{5}{10}$?

A) 1.5 B) 1.05 C) 0.5

*five tenths* ..... C

**b)** Which of these decimal numbers equals $\frac{2}{10}$?

A) 2 B) 0.2 C) 2.0

..... ☐

**c)** Which of these decimal numbers equals $\frac{35}{100}$?

A) 3.05 B) 3.5 C) 0.35

..... ☐

**d)** Write $\frac{6}{10}$ as a decimal. ☐

**e)** Write $\frac{1}{10}$ as a decimal. ☐

**f)** Write $\frac{8}{100}$ as a decimal. ☐

**g)** Write $\frac{27}{100}$ as a decimal. ☐

**h)** Write $\frac{50}{100}$ as a decimal. ☐

**i)** Write $\frac{147}{1000}$ as a decimal. ☐

**j)** Complete the table.

| Decimal | Fraction |
|---|---|
| | $\frac{7}{10}$ |

**k)** Complete the table.

| Decimal | Fraction |
|---|---|
| | $\frac{13}{100}$ |

**l)** Complete the table.

| Decimal | Fraction |
|---|---|
| | $\frac{403}{1000}$ |

## Skill 11.4 Writing a decimal number as a fraction.

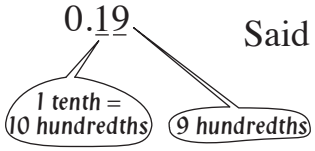


- From left to right (ignoring zeros and the decimal point) write the digits as the numerator.
- Use the place value of the last digit of the decimal number to determine the size of the denominator. (see skill 11.3, page 75)

**Q.** Write 0.19 as a fraction.

**A.** $0.19 = \frac{19}{100}$

Write 19 at the top of the fraction.
The nine is in the hundredths place.
Write 100ths as the denominator.
Said as: $\frac{19}{100}$ "nineteen hundredths"




**a)** Write 0.5 as a fraction.


$\frac{5}{10}$

**b)** Write 0.9 as a fraction.

**c)** Write 0.7 as a fraction.

**d)** Which of these fractions equals 0.8?

A) $\frac{8}{10}$ B) $\frac{18}{100}$ C) $\frac{80}{10}$

*eight tenths*

**e)** Which of these fractions equals 0.13?

A) $\frac{13}{100}$ B) $\frac{3}{10}$ C) $\frac{31}{100}$

**f)** Which of these fractions equals 0.23?

A) $\frac{3}{10}$ B) $\frac{2}{100}$ C) $\frac{23}{100}$

**g)** Which of these fractions equals 0.7?

A) $\frac{70}{10}$ B) $\frac{700}{100}$ C) $\frac{7}{10}$

**h)** Which of these fractions equals 0.45?

A) $\frac{45}{100}$ B) $\frac{4}{10}$ C) $\frac{54}{100}$

**i)** Which of these fractions equals 0.05?

A) $\frac{5}{10}$ B) $\frac{5}{100}$ C) $\frac{50}{100}$

**j)** Write 0.3 as a fraction.

**k)** Write 0.07 as a fraction.

**l)** Write 0.41 as a fraction.

**m)** Write 0.17 as a fraction.

**n)** Write 0.006 as a fraction.

**o)** Write 0.057 as a fraction.

**p)** Complete the table.

| Decimal | Fraction |
|---|---|
| 0.43 | |

**q)** Complete the table.

| Decimal | Fraction |
|---|---|
| 0.06 | |

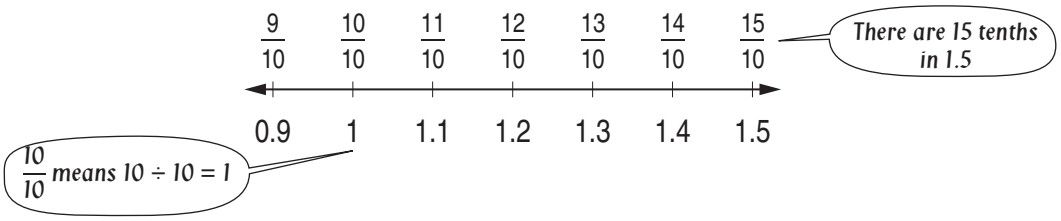
**r)** Complete the table.

| Decimal | Fraction |
|---|---|
| 0.052 | |

## Skill 11.5 Converting between fractions and decimals using a number line.

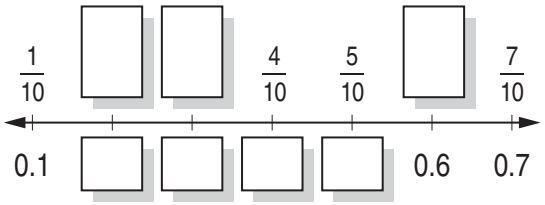


**FRACTIONS and DECIMALS on the NUMBER LINE**

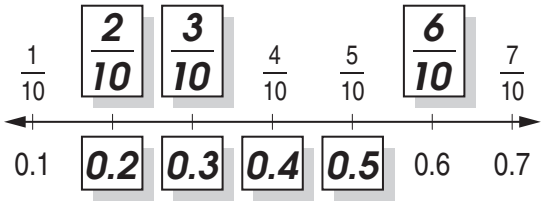



- Start from the left to complete the number line.
- Use the place value of the last digit of the decimal number to determine the size of the denominator of the fraction above. (see skill 11.3, page 75)

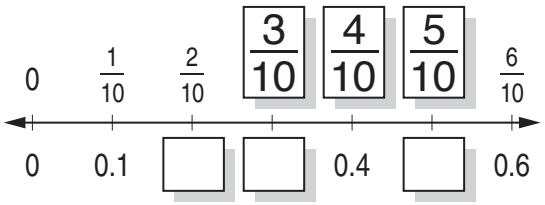
**Q.** Complete the number line.



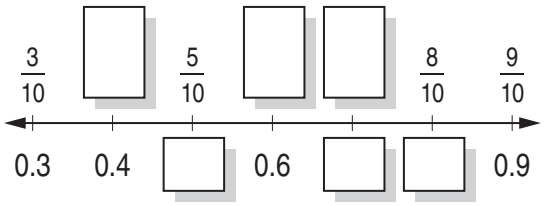

**A.**



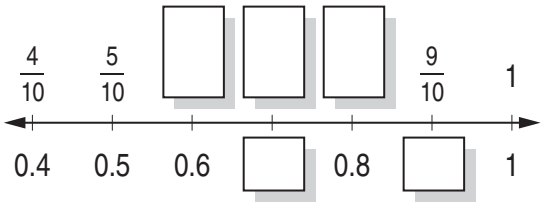

**a)** Complete the number line.



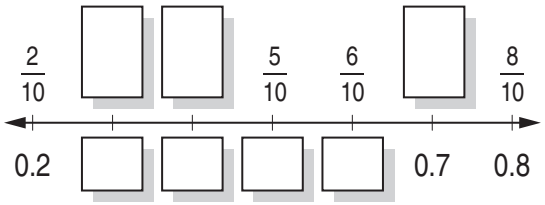

**b)** Complete the number line.



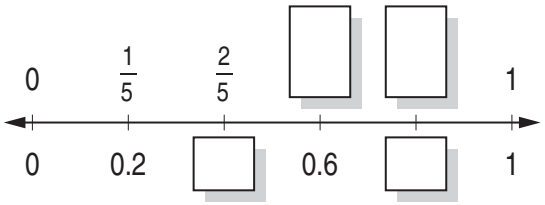

**c)** Complete the number line.



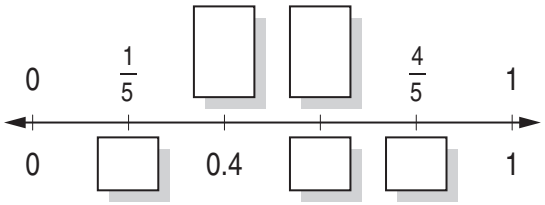

**d)** Complete the number line.



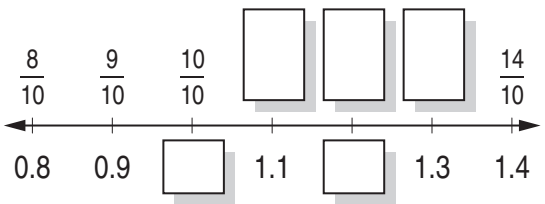

**e)** Complete the number line.



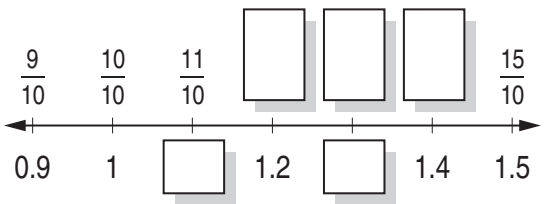

**f)** Complete the number line.




**g)** Complete the number line.




**h)** Complete the number line.



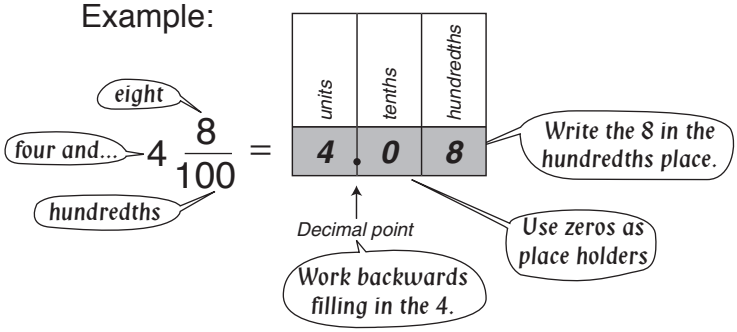

 

## Skill 11.6 Writing a mixed number as a decimal number.

When the denominator **is** a power of 10:

- Write the whole number first.
- Write the decimal point.
- Write the fraction as a decimal number.
  (see skill 11.3, page 75)

Example:




*Hint:* *The number of zeros in the denominator shows the number of digits after the decimal point.* $\frac{16}{1000} = 0.016$

When the denominator **is not** a power of 10:

- Divide the numerator by the denominator.

$\frac{13}{5}$ = 13 ÷ 5 = 2.6

*Hint:* *13 = 13.0*

$$5\overline{)13.0} = 2.6$$

**Q.** Write the mixed number $8\frac{24}{100}$ as a decimal.

**A.** ***8.24***

Write the whole number, 8 units.
Write the decimal point.
Write the numerator 24, with the last digit 4 in the hundredths place.
[No zero place holders are necessary.]

*Read as:* *Eight and twenty-four hundredths*

**a)** Write the mixed number $5\frac{7}{10}$ as a decimal.

*5 and 7 tenths =* 5.7

**b)** Write the mixed number $2\frac{46}{100}$ as a decimal.

**c)** Write the mixed number $3\frac{9}{10}$ as a decimal.

**d)** Write the mixed number $3\frac{2}{100}$ as a decimal.

**e)** Write the mixed number $6\frac{3}{10}$ as a decimal.

**f)** Write the mixed number $3\frac{1}{2}$ as a decimal.

**g)** Write the mixed number $2\frac{1}{5}$ as a decimal.

**h)** Write the mixed number $4\frac{1}{2}$ as a decimal.

**i)** Write the mixed number $3\frac{3}{5}$ as a decimal.

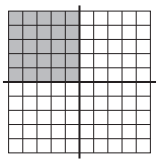
 

## Skill 11.7 Converting fractions in word form to decimals.

- Use 1 x 10 grids to visualise whole numbers and tenths.

a half = 5 tenths = 0.5

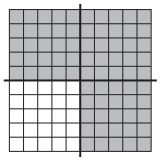
- Use 10 x 10 grids to visualise whole numbers and hundredths.



a quarter = 25 hundredths = 0.25

**Q.** Write as a decimal:
three quarters.

**A.** *three quarters* =
= *75 hundredths*
= ***0.75***



**a)** Write as a decimal:
one and a half

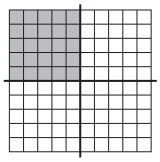
*one & 5 tenths* =

1.5

**b)** Write as a decimal:
three and a half

**c)** Write as a decimal:
eight and a half

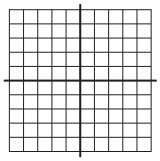
**d)** Write as a decimal:
one quarter



**e)** Write as a decimal:
four and a quarter

**f)** Write as a decimal:
seven and a quarter

**g)** Write as a decimal:
five and three quarters



**h)** Write as a decimal:
one and three quarters

**i)** Write as a decimal:
six and three quarters

## Skill 11.8 Writing an improper fraction as a decimal.

When the denominator **is** a power of 10:

- Divide the numerator by 10, 100 or 1000 by moving the decimal point the same number of places to the left as there are zeros. Examples:

÷ by 10 (1 zero ⇒ 1 place left) $16.0 \Rightarrow 1.6$
÷ by 100 (2 zeros ⇒ 2 places left) $016.0 \Rightarrow 0.16$

*Hints: Fractions are just divisions.*
*There is a decimal point and zeros which are not written, at the end of any whole number.*
*The number does not change: 16 = 16.0*

Example: $\frac{16}{10} = 16 \div 10$
$= 16.0 \div 10$
$= 16.0 \div 10$
$= 1.6$

When the denominator is **not** a power of 10:

- Multiply both the numerator and denominator by the same number to make the denominator a power of 10. Example:

$\frac{74}{50} = \frac{74}{50} \overset{\times 2}{_{\times 2}} = \frac{148}{100}$ *power of 10*

- Then divide by moving the decimal point.

Example: $\frac{148}{100} = 148 \div 100$
$= 148.0 \div 100$
$= 1.48$

**Q.** Write the improper fraction $\frac{12}{5}$ as a decimal.

**A.** $\frac{12}{5} \overset{\times 2}{_{\times 2}} = \frac{24}{10}$
$= 24.0 \div 10$
$= 24.0 \div 10$
$= \mathbf{2.4}$

Multiply the denominator and the numerator by 2 to make the denominator a power of 10.

**a)** Write the improper fraction $\frac{27}{10}$ as a decimal.

$27 \div 10$

$27. \div 10 =$ 2.7

**b)** Write the improper fraction $\frac{15}{10}$ as a decimal.

**c)** Write the improper fraction $\frac{38}{10}$ as a decimal.

**d)** Write the improper fraction $\frac{136}{100}$ as a decimal.

**e)** Write the improper fraction $\frac{245}{100}$ as a decimal.

**f)** Write the improper fraction $\frac{8}{5}$ as a decimal.

**g)** Write the improper fraction $\frac{11}{2}$ as a decimal.

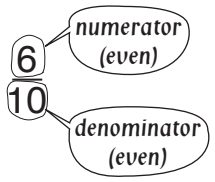
**h)** Write the improper fraction $\frac{9}{2}$ as a decimal.

**i)** Write the improper fraction $\frac{9}{5}$ as a decimal.

## Skill 11.9 Writing a decimal number as a fraction in simplest form.



- Write the decimal as a fraction with a power of 10 as the denominator.
- Decide if the fraction can be simplified.
  If both numbers, top (numerator) and bottom (denominator), can be divided by the same number then the fraction can be simplified.
  *Hint: If the numbers are both even then you can start with dividing by 2.*




- Divide both the numerator and the denominator by the same number.

$$\frac{6}{10}\ \begin{matrix}\div 2\\ \div 2\end{matrix} = \frac{3}{5}$$

**Q.** Write 0.02 as a fraction in simplest form.

**A.** $0.02 = \frac{2}{100}$ ← Write 0.02 as a fraction over 100.

$\frac{2}{100}\ \begin{matrix}\div 2\\ \div 2\end{matrix} = \frac{\mathbf{1}}{\mathbf{50}}$ ← Divide the numerator and the denominator by 2.

**a)** Write 0.4 as a fraction in simplest form.

$= \frac{4}{10}\ \begin{matrix}\div 2\\ \div 2\end{matrix}$ ..... $\frac{2}{5}$

**b)** Write 0.75 as a fraction in simplest form.

= ..... ☐

**c)** Write 0.8 as a fraction in simplest form.

= ..... ☐

**d)** Write 0.2 as a fraction in simplest form.

= ..... ☐

**e)** Write 0.15 as a fraction in simplest form.

= ..... ☐

**f)** Write 0.36 as a fraction in simplest form.

= ..... ☐

**g)** Write 0.5 as a fraction in simplest form.

= ..... ☐

**h)** Write 0.45 as a fraction in simplest form.

= ..... ☐

**i)** Write 0.06 as a fraction in simplest form.

= ..... ☐

**j)** Write 0.62 as a fraction in simplest form.

= ..... ☐

**k)** Write 0.88 as a fraction in simplest form.

= ..... ☐

**l)** Write 0.12 as a fraction in simplest form.

= ..... ☐

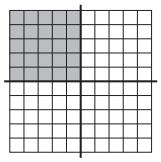
## Skill 11.10 Converting between fractions, decimals and percentages by using diagrams (1).

### Fraction as Percentage

- Find the equivalent fraction which has a denominator of 100.

*Hint: Percent means "fraction of one hundred".*

Example: One quarter = 25 out of 100



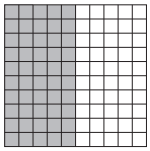
$= \frac{25}{100}$

$= \mathbf{25\%}$

### Decimal as percentage

- Move the decimal point 2 places to the right.
- Use zeros as place holders to write the decimal.
- Add the percentage sign.

Example: 0.5 = 0.5000 = **50%**



### Percentage as Fraction

*Hint: Percent means "fraction of one hundred".*

Examples: 50% = 50 out of 100

$= \frac{50}{100}$

$= \mathbf{\frac{1}{2}}$

Examples: 75% = 75 out of 100

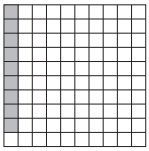
$= \frac{75}{100}$

$= \mathbf{\frac{3}{4}}$

### Percentage as decimal

- Remove the percent sign.
- Place the decimal point after the number.
- Move the decimal point 2 places to the left.
- Use zeros as place holders to write the decimal.

Example: 9% = 9.00 = **0.09**

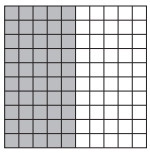


**Q.** Write 50% in decimal form.

**A.** *50%*
*= 050.0*
*= 050.0*
***= 0.5***

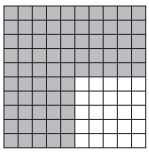
Remove the % sign.
Place the decimal point and add zeros either side of the number.
Move the decimal point 2 places to the left.

**a)** One half is what percentage?



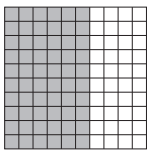
50 %

**b)** Three quarters is what percentage?



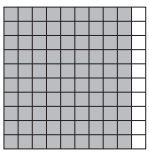
%

**c)** Six tenths is what percentage?



%

**d)** Nine tenths is what percentage?



%

## Skill 11.10 Converting between fractions, decimals and percentages by using diagrams (1).

**e)** Write 10% in decimal form.

$010.0 =$ .....

**f)** Write 25% in decimal form.

.....

**g)** Write 75% in decimal form.

.....

**h)** Write 15% in decimal form.

.....

**i)** Write 0.4 as a percentage.

..... %

**j)** Write 0.6 as a percentage.

..... %

**k)** Write 0.25 as a percentage.

..... %

**l)** Write 0.45 as a percentage.

..... %

**m)** Write 25% as a fraction.

.....

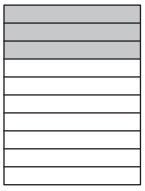
**n)** Write 75% as a fraction.

.....

**o)** Write 50% as a fraction.

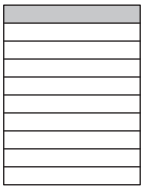
.....

**p)** Write 30% as a fraction.



.....

**q)** Write 10% as a fraction.



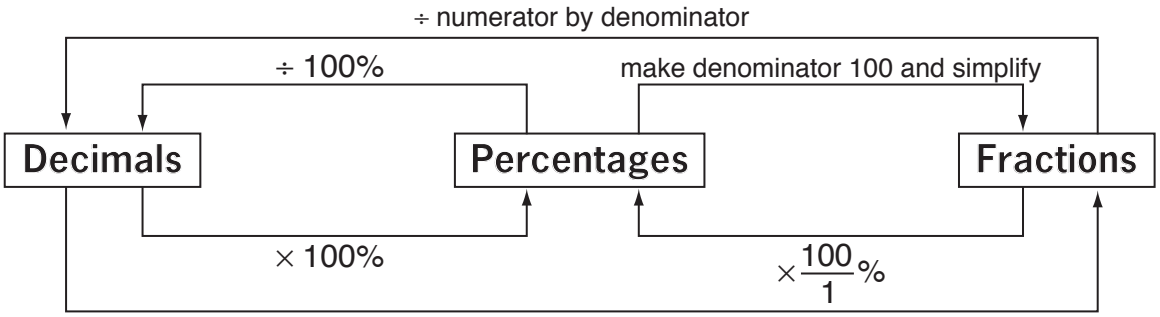
.....

**r)** Write 20% as a fraction.

.....

## Skill 11.11 Converting between decimals, fractions and percentages.

- Convert between decimals, fractions and percentages.
(see skill 11.9, page 81 and skill 11.10 page 82)




**Q.** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| | $\frac{6}{10}$ OR $\frac{60}{100}$ | |

**A.**

Decimal: $\frac{6}{10} = 6 \div 10 = \mathbf{0.6}$

Percentage: $\frac{6}{10} = \frac{60}{100} = 60$ out of $100 = \mathbf{60\%}$

| Decimal | Fraction | Percentage |
|---|---|---|
| **0.6** | $\frac{6}{10}$ OR $\frac{60}{100}$ | **60%** |

**a)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.5 | $\frac{50}{100}$ OR $\frac{1}{2}$ | 50% |

*0.5* = .....

**b)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.45 | $\frac{45}{100}$ | |

.....

**c)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| | $\frac{51}{100}$ | 51% |

.....

**d)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.85 | | 85% |

*0.85* = .....

**e)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.9 | | 90% |

.....

**f)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| | $\frac{23}{100}$ | 23% |

.....

**g)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.2 | | 20% |

*0.2* = .....

**h)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| | $\frac{75}{100}$ OR $\frac{3}{4}$ | 75% |

.....

**i)** Complete the table:

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.8 | $\frac{80}{100}$ OR $\frac{4}{5}$ | |

.....