Decimals

Decimals

1 Highlight the largest number

0.4 0.3 0.8 1.2 0.7

2 Highlight the largest number

0.42 0.4 0.3 0.5 0.2

3 Highlight the largest number

0.41 0.45 0.04 0.402 0.4

Fill in the missing numbers

0.6	0.7	0.8	0.9	1·0	1·1

Fill in the missing numbers

0.3	0.4	0.5	0.6	0·7	0·8

Fill in the missing numbers

1.5	1.6	1.7	1.8	1·9	2·0

Fill in the missing numbers

0.11	0.12	0.13	0.14	0·15	0·16

Fill in the missing numbers

0.25	0.26	0.27	0.28	0·29	0·30

Write these in order of size, smallest to largest

0.4 0.3 0.12 1.2 1.01

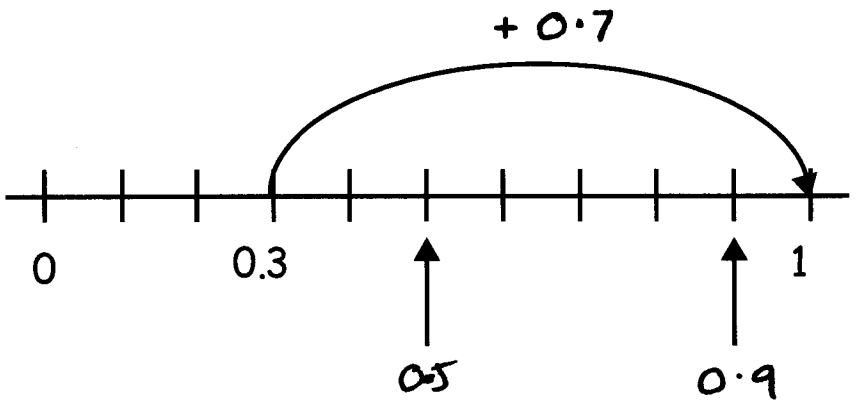
0·12	0·3	0·4	1·01	1·2

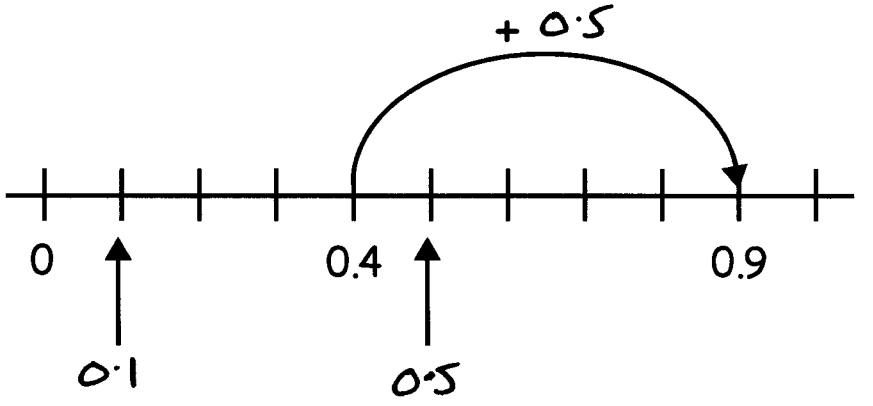
Write these in order of size, smallest to largest

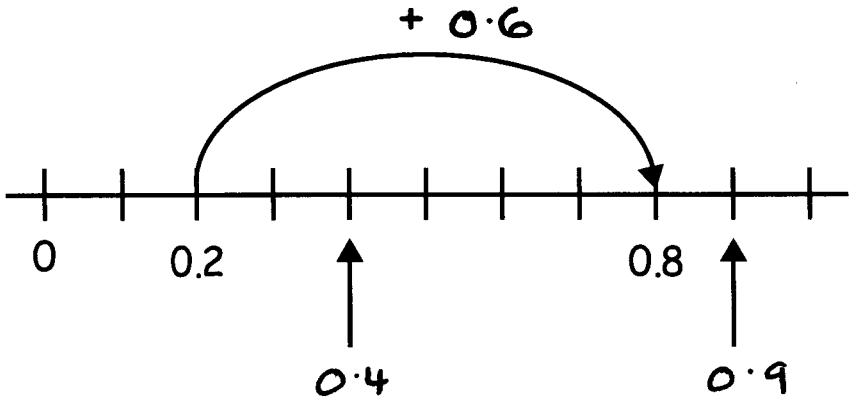
0.3 0.32 0.03 0.2 0.23

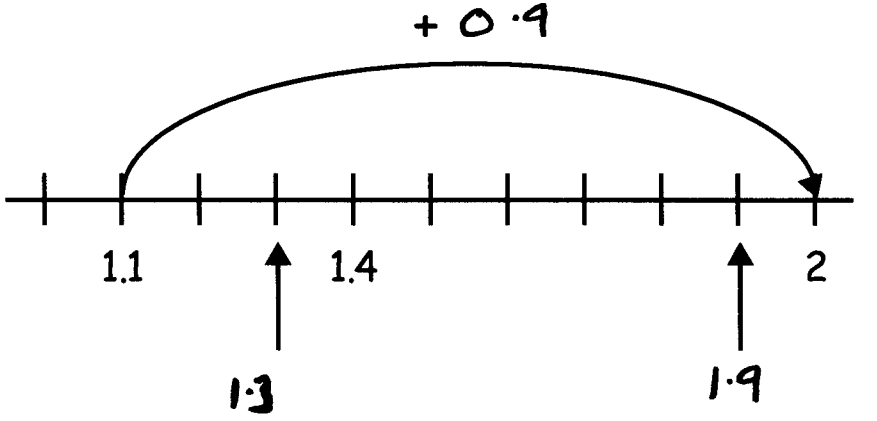
0·03	0·2	0·23	0·3	0·32

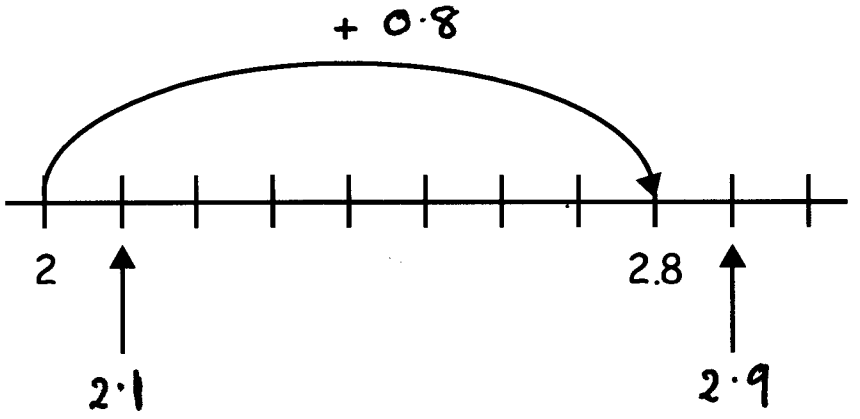
For each scale, write down the numbers that the arrows are point to and the number you have to add to make the jump

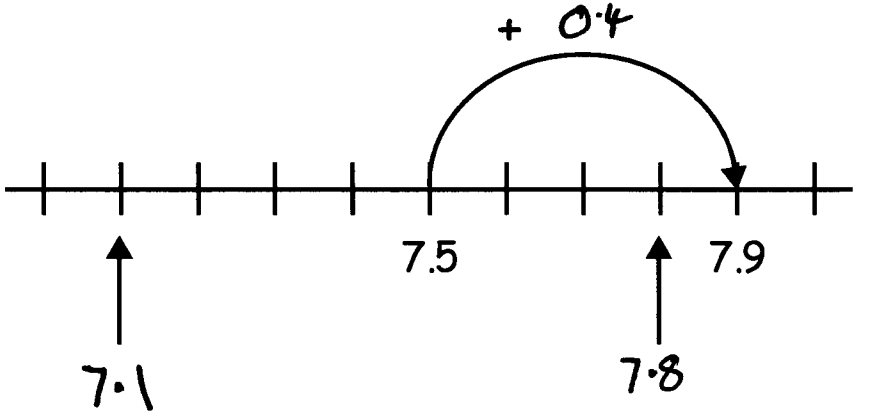












Decimals - Add, take, times and divide

Adds (line numbers in their columns)

1) 8 + 0.6

10	1	0.1	0.01
	8	.	
	0	. 6	
	8	. 6	

2) 0.3 + 0.8

10	1	0.1	0.01
	0	. 3	
	0	. 8	
	1	. 1	

1

3) 1.2 + 0.86

10	1	0.1	0.01
	1	. 2	
	0	. 8	6
	2	. 0	6

1

4) 12 + 8.2 + 0.8

10	1	0.1	0.01
1	2	.	
	8	. 2	
	0	. 8	
2	1	. 0	

1 1

5) 0.38 + 6 + 0.04

10	1	0.1	0.01
	0	. 3	8
	6	.	
	0	. 0	4
	6	. 4	2

1

6) 0.08 + 12.2 + 0.8

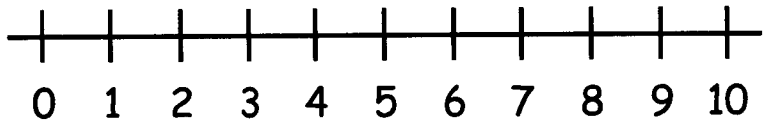
10	1	0.1	0.01
	0	. 0	8
1	2	. 2	
	0	. 8	
1	3	. 0	8

1

Takes

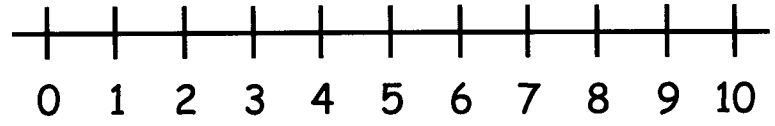
7) 7.4 - 1.6

10	1	0.1	0.01
	6 7	1 4	
	1	6	
	5	8	



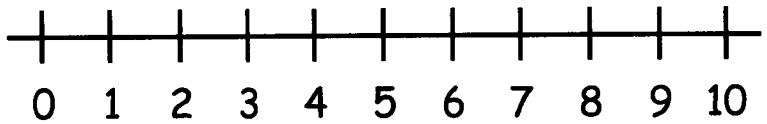
9) 10 - 2.6

10	1	0.1	0.01
0 ~~1~~	~~8~~ 9	1 0	
	2	6	
	7	4	



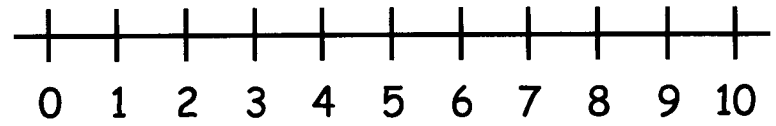
8) 8.2 - 3.7

10	1	0.1	0.01
	7 ~~8~~	1 2	
	3	7	
	4	5	



10) 9.4 - 4.8

10	1	0.1	0.01
	~~5~~ 4	1 4	
	4	8	
	4	6	



Multiplication

11) 3 x 0.4 1·2 3 x 4 = 12

12) 6 x 0.3 1·8 6 x 3 = 18

13) 5 x 0.4 2

14) 0.4 x 7 2·8

15) 0.6 x 8 4·8

Division

16) 3.2 ÷ 4 0·8 32 ÷ 4 = 8

17) 1.2 ÷ 4 0·3 12 ÷ 4 = 3

18) 2.5 ÷ 5 0·5

19) 2.4 ÷ 8 0·3

20) 3.6 ÷ 6 0·6

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Qu. 1

	1000	100	10	1	•	0.1	0.01	0.001
4 x 8			3	2	•			
40 x 8		3	2	0	•			
40 x 80	3	2	0	0	•			
0.4 x 8				3	•	2		

Qu. 2

	1000	100	10	1	•	0.1	0.01	0.001
3 x 7			2	1	•			
3 x70		2	1	0	•			
0.3 x 7				2	•	1		
0.3 x 0.7				0	•	2	1	

Qu. 3

	1000	100	10	1	•	0.1	0.01	0.001
6 x 7			4	2	•			
6 x 70		4	2	0	•			
60 x 70	4	2	0	0	•			
6 x 0.7				4	•	2		

Qu. 4

	1000	100	10	1	•	0.1	0.01	0.001
2 x 9			1	8	•			
0.2 x 9				1	•	8		
2 x 0.9				1	•	8		
0.2 x 0.9				0	•	1	8	

Qu. 5

	1000	100	10	1	•	0.1	0.01	0.001
4 x 6			2	4	•			
0.4 x 6				2	•	4		
4 x 0.6				2	•	4		
0.4 x 0.6				0	•	2	4	

Decimal Multiplication

1) 0.8 x 3 2·4

2) 6 x 0.7 4·2

3) 0.2 x 0.7 0·14

4) 0.04 x 0.6 0·024

5) 60 x 0.04 2·4

6) 700 x 0.008 5·6

7) 2.3 x 8 18·4

23x8 = 184

8) 6.4 x 2.8 17·92

64x28 = 1792

9) 26 x 0.27 7·02

26x27 = 702

10) 0.26 x 0.57 = 0·1482

26x57 = 1482

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

3 x 4 = 12
30 x 4 = 120
30 x 40 = 1200

3 x 4 = 12
0.3 x 4 = 1.2
3 x 0.4 = 1.2
0.3 x 0.4 = 0.12
0.03 x 0.4 = 0.012

3 x 4 = 12
30 x 0.4 = 12
300 x 0.004 = 1·2

23 × 8 = 184

64 × 28 = 1792

27 × 26 = 702

57 × 26 = 1482

Decimal Division

1) 2.4 ÷ 4 = 0·6

2) 3.2 ÷ 8 = 0·4

3) 4.2 ÷ 6 = 0·7

4) 14.1 ÷ 3 = 4·7

$3\overline{)14.1}$ → 4·7

5) 1.25 ÷ 5

$5\overline{)1.25}$ → 0·25

6) 7.2 ÷ 6

$6\overline{)7.2}$ → 1·2

7) 9.6 ÷ 6

$6\overline{)9.6}$ → 1·6

8) 23.8 ÷ 4

$4\overline{)23.8}$ → 05·95

9) 0.135 ÷ 5

$5\overline{)0.135}$ → 0·027

10) 0.054 ÷ 3

$3\overline{)0.054}$ → 0·018

Decimals

1) Add on 0.4 0.3, 0·7, 1·1, 1·5, 1·9

2) Add on 0.6 0.7, 1·3, 2·0, 2·7, 3·4

3) Add on 0.8 0.5, 1·3, 2·1, 2·9, 3·7

4) Take off 0.3 2.2, 1·9, 1·6, 1·3, 1

5) Take off 0.6 3.1, 2·5, 1·9, 1·3, 0·7

6) Take off 0.7 4.4, 3·7, 3, 2·3, 1·6

Work out the answers to

7) 4.8 + 3.1 = 7·9

8) 4.0 + 1.8 = 5·8

9) 3.4 + 1.9 = 5·3

10) 7.6 + 7.5 = 15·1

11) 5.4 - 2.3 = 3·1

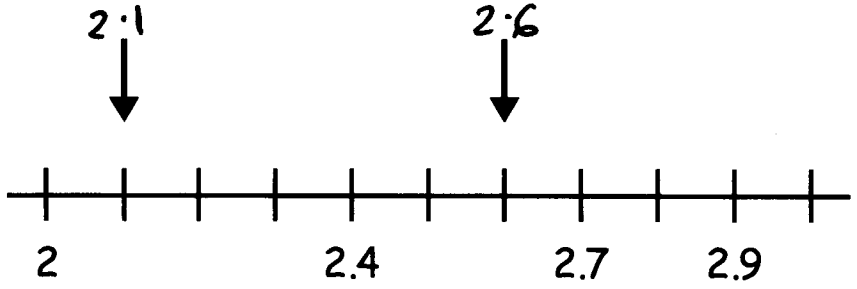
12) 4.2 - 1.5 = 2·7

13) 5.0 - 2.7 = 2·3

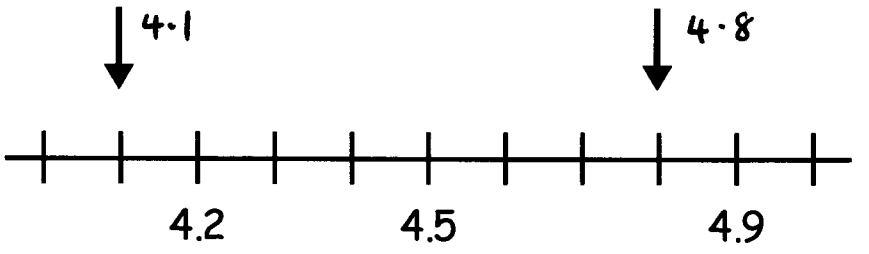
14) 3.0 - 1.6 = 1·4

Write down the number the arrows are pointing to

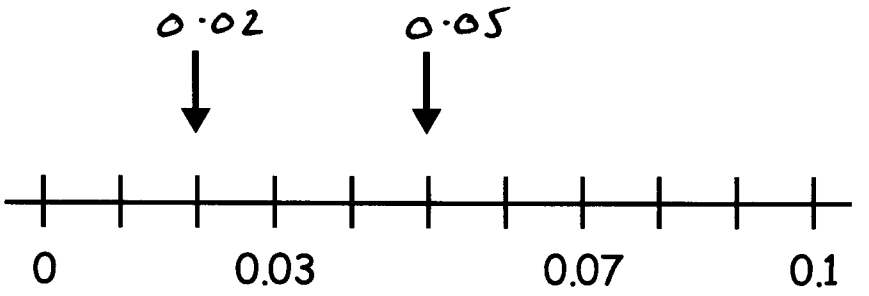
15)



16)



17)



18) Work out the answer to 8 + 1.6 + 0.9 = 10·5

8
1·6
+ 0·9
10·5
1

19) Write down the 0.3 times table.

1 x 0.3 = 0·3
2 x 0.3 = 0·6
3 x 0.3 = 0·9
4 x 0.3 = 1·2
5 x 0.3 = 1·5
6 x 0.3 = 1·8
7 x 0.3 = 2·1
8 x 0.3 = 2·4
9 x 0.3 = 2·7
10 x 0.3 = 3

20) 6 x 0.3 1·8

21) 7 x 0.3 2·1

22) 0.3 x 8 2·4

23) 9 x 0.3 2·7

24) 1.2 ÷ 0.3 4

25) 1.5 ÷ 0.3 5

26) 2.4 ÷ 0.3 8

27) 0.9 ÷ 0.3 3

28) 0.8 x 4 3·2

29) 1.2 x 3 3·6

30) 2.4 ÷ 6 0·4

Decimals

Put either > or < between these decimals

1) 0.23 > 0.02

2) 0.101 < 0.11

3) 0.202 > 0.022

4) 0.254 < 0.8

5) 0.623 < 0.632

6) -1.01 < 0.101

Addition

7) 2.3 + 0.28

$$\begin{array}{r} 2\cdot3 \\ +\ 0\cdot28 \\ \hline 2\cdot58 \end{array}$$

8) 1.1 + 0.101 + 0.1

$$\begin{array}{r} 1\cdot1 \\ 0\cdot101 \\ +\ 0\cdot1 \\ \hline 1\cdot301 \end{array}$$

9) 99 + 9.9 + 0.99

$$\begin{array}{r} 99 \\ 9\cdot9 \\ +\ 0\cdot99 \\ \hline 109\cdot89 \end{array}$$

10) £5.23 + 68p + 7p

£5.98

or 598p

$$\begin{array}{r} 5\cdot23 \\ 0\cdot68 \\ 0\cdot07 \\ \hline 5\cdot98 \end{array}$$

Subtraction

11) 5.3 – 2.5

$$\begin{array}{r} {}^{4}\not{5}\cdot{}^{1}3 \\ -\ 2\cdot5 \\ \hline 2\cdot8 \end{array}$$

12) 1.4 – 0.8

$$\begin{array}{r} {}^{0}\not{1}\cdot{}^{1}4 \\ -\ 0\cdot8 \\ \hline 0\cdot6 \end{array}$$

13) 2 – 0.58

$$\begin{array}{r} 1\not{2}\cdot{}^{9}\not{0}{}^{1}0 \\ -\ 0\cdot58 \\ \hline 1\cdot42 \end{array}$$

14) 0.1 – 0.01

$$\begin{array}{r} 0\cdot{}^{9}\not{1}{}^{1}0 \\ -\ 0\cdot01 \\ \hline 0\cdot09 \end{array}$$

Multiply and divide by powers of 10

15) 0.23 x 10 2.3

16) 50.3 x 100 5030

17) 0.025 x 1000 25

18) 5.3 ÷ 10 0.53

19) 425 ÷ 100 4.25

20) 12.3 ÷ 1000 0.0123

Multiply

21) 0.3 x 7 2.1

22) 4 x 0.8 3.2

23) 0.6 x 0.8 0.48

24) 2.3 x 7 16.1

25) 6.3 x 4 25.2

26) 5.7 x 5 28.5

Division

27) 32.2 ÷ 7 = 4.6

28) 1.482 ÷ 6 = 0.247

29) 0.464 ÷ 8 = 0.058

30) 0.2115 ÷ 9 = 0.0235

To divide by a decimal, multiply BOTH numbers by powers of 10 to remove the decimal from the number you are dividing by.

$4.2 \div 0.06$

x100 ↓ ↓ x100

$420 \div 6$

$= 70$ Note : you don't undo the x100

1) $0.008 \div 0.04$

x100 ↓ ↓ x100

$0.8 \div 4$

$$4\overline{)0.8} \quad 0.2$$

2) $0.024 \div 0.4$

x10 ↓ ↓ x10

$0.24 \div 4$

$$4\overline{)0.24} \quad 0.06$$

3) $3.2 \div 0.08$

x100 ↓ ↓ x100

$320 \div 8$

$$8\overline{)320} \quad 40$$

4) $0.42 \div 0.006$

x1000 ↓ ↓ x1000

$420 \div 6$

$$6\overline{)420} \quad 070$$

5) $56 \div 0.08$

x100 ↓ ↓ x100

$5600 \div 8$

$$8\overline{)5600} \quad 0700$$

6) $54 \div 0.12$

x100 ↓ 5400 ↓ x100

12

$$12\overline{)5400} \quad 0450$$

7) $8.58 \div 1.1$

x10 ↓ ↓ x10

$85.8 \div 11$

$$11\overline{)85.8} \quad 07.8$$

8) $80.4 \div 0.012$

x1000 ↓ ↓ x1000

$80400 \div 12$

$$12\overline{)80400} \quad 06700$$

9) $0.391 \div 1.7$

↓ x10 ↓ x10

$3.91 \quad 17$

$$17\overline{)3.91} \quad 0.23$$

10) $95.2 \div 0.17$

x100 ↓ ↓ x100

$9520 \div 17$

$$17\overline{)9520} \quad 0560$$

Writing decimals as fractions

For terminating decimals, remember the column headings after the decimal point: tenths, hundredths, thousandths etc.

$0.3=\frac{3}{10}$ $0.47=\frac{47}{100}$ $0.367=\frac{367}{1000}$

For recurring decimals use the following rules

If the recurring part is a single digit e.g. $0.222222....=0.\dot{2}$, the fraction is over 9. $0.\dot{2}=\frac{2}{9}$

If the recurring part has two digits e.g. $0.292929....=0.\dot{2}\dot{9}$, the fraction is over 99. $0.\dot{2}\dot{9}=\frac{29}{99}$

If the recurring part has three digits e.g. $0.234234234...=0.\dot{2}3\dot{4}$, the fraction is over 999. $0.\dot{2}3\dot{4}=\frac{234}{999}$

And so on.

Exercise 1

Write these decimals as fractions, cancel where possible

1) 0.2 $\frac{2}{10}=\frac{1}{5}$

2) 0.24 $=\frac{24}{100}=\frac{6}{25}$

3) 0.74 $=\frac{74}{100}=\frac{37}{50}$

4) 0.325 $=\frac{325}{1000}=\frac{13}{40}$

5) 1.24 $=1\frac{24}{100}=1\frac{6}{25}$ or $\frac{31}{25}$

6) $0.\dot{4}$ $4/9$

7) $0.\dot{2}\dot{6}$ $\frac{26}{99}$

8) $0.\dot{3}9\dot{6}$ $\frac{396}{999}=\frac{44}{111}$

9) $0.\dot{3}=3/9=1/3$

10) $0.\dot{2}\dot{7}$ $=\frac{27}{99}=\frac{3}{11}$

When a recurring decimal is not of one of these forms you have to use a different method.

$0.2\dot{1}\dot{3} = 0.21313131313.....$

Let X = 0.21313131313.....

Set up a subtraction involving multiples of 10 of X such that the recurring part of the numbers are line up

$$\begin{aligned} X &= 0\cdot 2\,1\,3\,1\,3\,1\,3\,1\,3\,1\,3\ \ldots\ldots \\ 10X &= 2\cdot 1\,3\,1\,3\,1\,3\,1\,3\,1\,3\,1\ \ldots\ldots \\ 100X &= 21\cdot 3\,1\,3\,1\,3\,1\,3\,1\,3\,1\,3\ \ldots\ldots \\ 1000X &= 213\cdot 1\,3\,1\,3\,1\,3\,1\,3\,1\,3\,1\ \ldots\ldots \end{aligned}$$

You can see that for 10X and 1000X the recurring part of the decimals (after the decimal point) are lined up

Subtract these two

$$\begin{aligned} 1000X &= 213\cdot 1\,3\,1\,3\,1\,3\,1\,3\,1\,3\,1\ \ldots\ldots \\ 10X &= \quad 2\cdot 1\,3\,1\,3\,1\,3\,1\,3\,1\,3\,1\ \ldots\ldots \\ \hline 990X &= 211 \end{aligned}$$

the recurring digits after the decimal point all cancel

$X = \frac{211}{990}$ this is the answer (cancel if possibel)

Exercise 2

Write these decimals as fractions, cancel where possible

1) $0.1\dot{4}$

2) $0.3\dot{2}\dot{6}$

3) $0.12\dot{6}$

4) $0.5\dot{3}$

5) $0.5\dot{2}4\dot{7}$

① $X = 0\cdot 14444\ldots$

$$\begin{aligned} 100X &= 14\cdot 444\ldots \\ -\ 10X &= 1\cdot 444\ldots \\ \hline 90X &= 13 \end{aligned}$$

$X = \frac{13}{90}$

② $X = 0\cdot 326262626\ldots$

$$\begin{aligned} 1000X &= 326\cdot 2626\ldots \\ -\ 10X &= 3\cdot 2626\ldots \\ \hline 990X &= 323 \end{aligned}$$

$X = \frac{323}{990}$

③ $X = 0\cdot 12666\ldots$

$$\begin{aligned} 1000X &= 126\cdot 66\ldots \\ -\ 100X &= 12\cdot 66\ldots \\ \hline 900X &= 114 \end{aligned}$$

$X = \frac{114}{900} = \frac{19}{150}$

④ $X = 0\cdot 5333\ldots$

$$\begin{aligned} 100X &= 53\cdot 33\ldots \\ -\ 10X &= 5\cdot 33\ldots \\ \hline 90X &= 48 \end{aligned}$$

$X = \frac{48}{90} = \frac{8}{15}$

⑤ $X = 0\cdot 5247247247\ldots$

$$\begin{aligned} 10000X &= 5247\cdot 247247\ldots \\ -\ 10X &\quad\ 5\cdot 247247\ldots \\ \hline 9990X &= 5242 \end{aligned}$$

$X = \frac{5242}{9990} = \frac{2621}{4995}$

Decimals

1) Give that 23 x 37 = 851, write the answers to the following

a) 2.3 x 3.7 = 8·51 b) 0.23 x 370 = 85·1 c) 0.23 x 0.37 = 0·0851

d) 851 ÷ 23 = 37 e) 8.51 ÷ 2.3 = 3·7 f) 8510 ÷ 0.37 = 23000

2) a) 9 + 0.04 + 0.87 + 0.3 = 10·21 b) 4 - 1.47 = 2·53

c) 0.6 x 0.3 = 0·18 d) 3.4 x 0.7 = 2·38

e) 2.4 ÷ 0.04 = 60 f) 9.3 - 1.8 ÷ 0.3
= 9·3 - 6
= 3·3

3) Write the following fractions as decimals

a) $\frac{2}{5} = 0.4$ b) $\frac{5}{8}$ c) $\frac{5}{6} = 0.8\dot{3}$ d) $\frac{2}{11} = 0.\dot{1}\dot{8}$

$5\overline{)2.^{2}0}$ $8\overline{)5.^{5}0^{2}0^{4}0}$ $6\overline{)5.^{5}0^{2}0^{4}0}$ $11\overline{)2.^{2}0^{9}0^{2}0^{8}0}$

0·4 0·625 0·8333 0·1818...

4) Write the following decimals as fractions, cancel if possible.

a) 0.8 b) 0.36 c) $0.\dot{2}\dot{5}$ d) $0.6\dot{5}$

$\frac{8}{10} = \frac{4}{5}$ $\frac{36}{100} = \frac{9}{25}$ $\frac{25}{99}$

$x = 0.655...$
$100x = 65.55...$
$10x = 6.55...$
$90x = 59$
$x = \frac{59}{90}$

5) a) One metre of cable weighs 2.8 kg. How much does 3.5 metres of cable weigh?
2·8 x 3·5 = 9·8 kg

b) Henry pays £1.88 for 0.4 kg of beef. Calculate the cost of 1 kg of beef.
1·88 ÷ 0·4 = 4·7 £4·70

6) Paul had a £30 voucher to spend at a Garden Centre. He bought 6 rose trees costing £2.85 each. He spent the rest on bulbs costing 30p each. How many bulbs did he buy?
6 x 2·85 = £17·10 30 - 17·10 = £12·90 12·90 ÷ 0·30 = 43 bulbs

7) Sally spent £24.18 at the DIY shop. She bought 0.6 litres of paint at £3.20 per litre, 5 coat hooks at £3.67 each at some screws. The screws were 17p each. How many screws did she buy?

Paint 0·6 x 3·20 = £1·92
Hooks 5 x 3·67 = £18·35
Screws x 0·17 = 24·18

24·18 - 1·92 - 18·35 = 3·91
£3·91 ÷ 0·17 = 23
23 screws

8) A can weighs 0.08kg, holds 0.6 litres of drink and costs £0.45.

a) How much will 28 cans weigh? 28 x 0·08 = 2·24 kg

b) How many cans are needed to provide 14.4 litres of drink?
14·4 ÷ 0·6 = 24 cans