





year 7 core curriculum

chapter 1: place value & decimals

[Recommended Time: 11-13 hours]

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reading & writing integers

learn by heart

You should know the names of the columns by heart...

millions	hundred thousands	ten thousands	thousands	hundreds	tens	units
1,000,000	100,000	10,000	1,000	100	10	1

1 million is the 7th column
 1 million has 6 zeroes
 1 million = 1,000,000

10 million = 10,000,000
 100 million = 100,000,000
 1000 million = 1 billion (UK)

example

Write the number 1439580 using commas
 = 1, 439, 580

When writing numbers, starting from the *right*, we place a comma after every 3 digits. On the first comma we say 'thousand', on the second comma we say 'million'

exercise 1a

- Write in digits:
 - Three million and twenty two
 - Five hundred and eighteen thousand
 - Twenty six thousand and four
 - Ninety four million, three thousand and six
 - Four million, two hundred and three thousand
 - Three hundred and six thousand and thirty nine
- Which of these numbers is four hundred and six thousand?
 - 46,000
 - 406,00
 - 400,6000
 - 406,000
- Write the number 902,000 in words.
- Which of these numbers are written incorrectly? Select four answers.
 - 3,005
 - 430,00
 - 9,3400
 - 658,000
 - 24,34
 - 98,400
 - 600,000
 - 903,00

5. Write each of these numbers in words. Be careful - they are all different!

A Four thousand, two hundred <i>4, 200</i>	B Forty thousand, two hundred	C Four hundred and two thousand	D Four hundred thousand and twenty
E Four thousand and twenty	F Forty thousand and twenty	G Four hundred thousand and two	H Four thousand and two
I Forty-two thousand	J Four hundred thousand, two hundred	K Forty thousand and two	L Four hundred and twenty thousand

6. Anna and Dan write the number "twelve thousand and nineteen" in digits.

Anna writes: *12, 000, 19* Dan writes: *12, 019*

Who is right?

What has the other person done wrong?

7. Write each of these numbers in words.

a) 37,405

b) 9,026,030

c) 412,600

8. Which of these numbers is eighteen million, forty five thousand and nine?

a) 18,450,000 b) 18,45,000 c) 18,045,000 d) 18,000,45000

9. Which of the following numbers have the digit 8 in the ten thousands place value? Select all that apply.

a) 809,400 b) 180,013 c) 8,432
d) 8.0041 e) 5,080,190 f) 89,000

10. Which of the following numbers is equal to 6.2 million?

a) 62,000,000 b) 6.2000000 c) 6.200000 d) 6,200,000

11. Which of these numbers is 1 billion?

a) 1,000,000 b) 100,000,000 c) 1,000,000,000

Millions Multiple Choice

In each row, choose the number that matches the question.

1	1 Million	A 1,000	B 10,000	C 100,000	D 1,000,000
2	2 Million and Fifty	A 2,050	B 2,000,50	C 2,000,500	D 2,000,050
3	15 Million and Nine Thousand	A 15,9000	B 15,009,000	C 15,090,000	D 15,000,900
4	Two Hundred Million	A 200,000,000	B 200,0000	C 200,000	D 20,200,000
5	3 Million and Six Thousand	A 3,6000	B 3,600,000	C 3,006,000	D 003,060,000
6	Seventy Two Million and Fifteen	A 072,000,150	B 72,000,15	C 72,000,015	D 72,015
7	Four Hundred and Eight Million	A 400,800,000	B 400,008,000	C 8,000,400	D 408,000,000
8	Seventeen Million and Twenty Thousand	A 17,020,000	B 17,20,000	C 17,200,000	D 170,020,000
9	Five Hundred and Two Thousand	A 502,000,000	B 500,2000	C 500,2,000	D 502,000
10	Nine Hundred and Ninety Million and Nine	A 900,090,009	B 990,000,009	C 990,000,090	D 900,900,09

extension

1. What is the name for a thousand million?
2. How many zeros are there in a million million?
3. How many zeros does a googol have?

reading & writing decimal numbers 1

learn by heart

Integer: a whole number

Mixed Number: an integer + a fraction, e.g. $3\frac{1}{10}$

Decimal: a number including a decimal point, which separates the wholes from the parts.

The decimal point: is **to the right of the units column**

tens	units	tenths	hundredths	thousandths	ten thousandths
10	1	0.1	0.01	0.001	0.0001
10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10,000}$

example

Write as a decimal the number with:

a) Two tens, three units and four hundredths **23.04**

b) Five units, $\frac{3}{10}$ and $\frac{7}{100}$ **5.37**

Use a zero to show an empty column.

exercise 1b

1. Write as a decimal the number with:

a) 3 units and 6 tenths

b) 4 tens and 8 tenths

c) 3 tenths and 5 hundredths

d) 7 hundredths and 1 thousandth

e) 4 tenths and 7 ten thousandths

f) 5 units and 4 thousandths

2. State the value of the digit 6 in each of these numbers. The first is done for you.

a) 38.1**6**5
6 hundredths

b) **6**.01

c) 1.**6**924

d) 309.85**6**

e) 1.**6**93

f) 0.000**6**

3. Write these as decimals:

a) $\frac{1}{10}$

c) $\frac{3}{10}$

e) $1\frac{4}{10}$

g) $2\frac{1}{1000}$

b) $\frac{9}{100}$

d) $\frac{7}{1000}$

f) $5\frac{8}{100}$

h) $\frac{7}{10,000}$

4. 9 tens and 9 tenths make:

a) 0.99

b) 9.9

c) 99

d) 90.9

5. Write the following as decimals. The first one is done for you.

a) $5 + \frac{3}{10} + \frac{4}{100} = 5.34$

b) $1 + \frac{9}{100}$

c) $\frac{3}{10} + \frac{8}{100}$

d) $4 + \frac{2}{10} + \frac{7}{1000}$

e) $\frac{1}{10} + \frac{2}{10,000}$

f) $9 + \frac{9}{10} + \frac{9}{100}$

6. Fill in the blanks with fractions or integers, the first one is done for you:

a) $5.01 = 5 + \frac{1}{100}$

c) $31.7 = \underline{\quad} + \underline{\quad} + \underline{\quad}$

b) $0.719 = \underline{\quad} + \underline{\quad} + \underline{\quad}$

d) $54.39 = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$

7. Which of these is equal to 0.3 ?

a) $\frac{3}{10}$

b) $\frac{3}{100}$

c) 0.03

d) $\frac{10}{3}$

8. Write these decimals as fractions or mixed numbers:

a) 0.6

c) 1.2

e) 0.007

b) 0.09

d) 3.04

f) 5.9

9. Write down the decimal number with exactly 4 tens, 3 tenths and 2 thousandths.

10. True or false?

a) $6 + \frac{3}{10} = 6.3$

c) $20 + \frac{2}{100} = 20.2$

b) $100 + \frac{1}{100} = 200$

d) $\frac{1}{9} = 0.9$

Guess My Number extra challenge

Use the clues to work out my number and record it in the spaces at the bottom

My number has 9 digits and a decimal point

My number contains the digit 4 twice, but no other repeats

My number has the same number of tens and tenths

My number has a 0 in the hundreds column and a 1 in the hundredths column

My number is less than 1 million but more than half a million

My number has a 7 in the thousands column

The digit 3 is next to the decimal point.

8 is next to 9 and 8 is on the left of 9

My number does not contain the digits 2 or 6

reading and writing decimal numbers 2

learn by heart

Decimal numbers are equivalent to fractions with denominators of 10, 100, 1000, ...

$$0.427$$
$$= \frac{4}{10} + \frac{2}{100} + \frac{7}{1000}$$

Tenths

$$\frac{3}{10} = 0.3$$

$$3\frac{4}{10} = 3.4$$

$$\frac{14}{10} = 1.4$$

Hundredths

$$\frac{3}{100} = 0.03$$

$$\frac{24}{100} = 0.24$$

$$\frac{206}{100} = 2.06$$

Thousandths

$$\frac{3}{1000} = 0.003$$

$$\frac{37}{1000} = 0.037$$

$$\frac{409}{1000} = 0.409$$

Mixed Number: *an integer + a fraction, e.g. $3\frac{1}{10}$ means 3 wholes & 1 tenth*

exercise 1c

1. Write as a decimal:

a) $\frac{29}{100}$

b) $\frac{3}{100}$

c) $\frac{42}{1000}$

d) $2\frac{4}{100}$

e) $\frac{9}{10}$

f) $2\frac{3}{100}$

g) $\frac{15}{1000}$

h) $12\frac{9}{100}$

i) $14\frac{1}{100}$

j) $\frac{604}{1000}$

k) $8\frac{5}{1000}$

l) $\frac{3}{10} + \frac{4}{100} + \frac{5}{1000}$

2. Write down the value of the digit '1' in each number:

a) 0.31

b) 2.1

c) 5.441

d) 0.6001

3. Write as a decimal the number with:

a) 3 tens + 4 tenths

b) Twenty five hundredths

4. Write as a fraction or mixed number:

a) 0.1

b) 0.02

c) 1.005

d) 1.3

5. Write down the decimal number that has exactly 7 hundreds, 3 tenths and 2 hundredths.

6. Write as a decimal:

a) $\frac{27}{100}$

c) $\frac{19}{100}$

e) $\frac{3}{10} + \frac{1}{1000}$

b) $\frac{172}{1000}$

d) $2\frac{5}{10}$

f) $4 + \frac{26}{100}$

7. The numbers 54.829 and $\frac{28}{1000}$ have the same digit in which column?

a) units

b) tenths

c) hundredths

d) thousandths

8. Write as a fraction or mixed number, with a denominator of 10, 100 or 1000:

a) 0.7

b) 0.92

c) 3.04

d) 0.609

9. $\frac{23}{1000}$ is the same as:

a) 0.23

b) 0.203

c) 0.023

d) 2.3

10. True or False?

a) $0.64 = \frac{64}{100}$

c) $1.08 = 1\frac{8}{100}$

e) $\frac{1}{10,000} = 0.001$

b) $\frac{91}{1000} = 0.91$

d) $0.7 = \frac{7}{10}$

f) $\frac{4}{100} = 0.4$

11. Write as a decimal

a) $\frac{4}{10} + \frac{3}{100}$

b) $6 + \frac{1}{1000}$

c) $300 + \frac{3}{10} + \frac{3}{1000}$

12. Write 0.0409 as a fraction.

13. The numbers 4.128 and $4\frac{1}{1000}$ have the same digit in which column?

a) units

b) tenths

c) hundredths

d) thousandths

14. 8 tens and 8 hundredths make:

a) 80.08

b) 80.8

c) 8.8

d) 8.08

e) 0.88

15. Fill in the blanks with fractions or integers:

a) $0.402 = \underline{\quad} + \underline{\quad}$

c) $20.64 = \underline{\quad} + \underline{\quad} + \underline{\quad}$

b) $3.99 = \underline{\quad} + \underline{\quad} + \underline{\quad}$

d) $305.106 = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$

16. True or false? $\frac{37}{100}$ has the same value as $\frac{3}{10} + \frac{7}{100}$.
17. True or false? $\frac{403}{1000}$ has the same value as $\frac{4}{100} + \frac{3}{1000}$.
18. How many tenths make 10?
19. How many tenths make 1000?
20. True or False? All decimal numbers are less than 1 whole.
21. True or False? The largest decimal number is 0.99.
22. How many different decimal numbers are there between 0 and 1?

Writing Decimals Match

Match these cards to their decimal equivalents at the bottom.
Record your answers in the table

1 2 hundreds	2 2 hundredths	3 2 tens + 6 units
4 2 thousands + 2 units	5 6 tens + 6 tenths	6 6 tens
7 6 thousandths	8 6 thousands	9 10 tenths
10 2 tenths	11 6 tenths + 2 hundredths	12 2 tenths + 6 hundredths
13 6 tenths	14 2 tenths + 6 thousandths	15 2 tens + 6 tenths
16 6 tenths + 6 hundredths	17 6 hundreds	18 2 tens + 2 tenths

20.2	200	20.6	0.26	1	60	26	0.006	0.02
2002	6000	0.2	0.62	0.66	0.206	600	0.6	60.6

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

types of decimals

learn by heart

There are 3 types of decimal:

Terminating:

Does not continue forever, e.g. 0.25

Recurring:

Continues forever with a repeating pattern

Irrational:

Continues forever with no repeating pattern, e.g. 0.123456...

We often give irrational numbers a symbol, such as π ('pi') or $\sqrt{7}$ because we can't write down all the digits. You will learn more about these symbols later on.

Recurring decimals are written using dot notation:

$$0.\dot{8} = 0.888\dots$$

$$0.\dot{5}8\dot{3} = 0.58358358\dots$$

$$0.2\dot{5}\dot{3} = 0.253535\dots$$

$$5.37\dot{6}9\dot{1} = 5.37691691\dots$$

exercise 1d

- Which of the following equals 0.676767...?
a) $0.6\dot{7}$ b) $\dot{0}.6\dot{7}$ c) $0.\dot{6}7$ d) $0.\dot{6}\dot{7}$
- Which of the following equals 1.588888...?
a) $1.5\dot{8}$ b) $\dot{1}.5\dot{8}$ c) $1.\dot{5}8$ d) $1.\dot{5}\dot{8}$
- Which of the following equals 4.219219...?
a) $4.2\dot{1}9$ b) $4.\dot{2}1\dot{9}$ c) $4.\dot{2}19$ d) $4.\dot{2}1\dot{9}$
- Write each of these recurring decimals using dot notation:
a) 0.7222222... b) 4.3232323...
c) 1.421421421... d) 5.5555555...
e) 6.728282828... f) 3.4151515....
- Which of these are terminating decimals? Select all that apply.
a) 0.26 b) 1.8 c) 0.3131... d) 0.0000004
- The number 4.44444 is:
a) a terminating decimal c) a recurring decimal
b) an irrational number d) an integer

7. Which of the following equals $0.\dot{0}9\dot{7}$?
 a) 0.0979797... b) 0.9797979... c) 0.0977777... d) 0.0970970...
8. True or false? $0.\dot{3} = 0.3\dot{3}$
9. Explain why $0.1\dot{2}5$ is an impossible number.
10. Is there a number between $0.\dot{9}$ and 1?

challenge  extra challenge

example

$$\begin{array}{r}
 0.9\dot{4} - 0.\dot{2} \\
 \underline{0.944444\dots} \\
 \underline{0.222222\dots} \\
 0.722222\dots \\
 = 0.7\dot{2}
 \end{array}$$

11. What is the value of $0.8\dot{5} - 0.8$?
12. What is the value of $0.\dot{3}4 - 0.\dot{3}$?
13. Calculate:
- | | | |
|------------------------------|-----------------------------|------------------------------|
| a) $0.6\dot{3} + 0.2\dot{4}$ | d) $0.\dot{8} - 0.4\dot{2}$ | g) $0.4\dot{7} - 0.4$ |
| b) $0.1 + 0.8\dot{6}$ | e) $1.8\dot{5} - 0.\dot{3}$ | h) $0.8\dot{5} - 0.8$ |
| c) $0.4\dot{1} - 0.3$ | f) $4.\dot{2} - 1.0\dot{2}$ | i) $0.4\dot{3} + 0.2\dot{8}$ |
14. What's missing?
- a) $0.\dot{3} + \underline{\hspace{2cm}} = 0.\dot{7}$ b) $0.2 + \underline{\hspace{2cm}} = 0.2\dot{4}$ c) $0.1 + \underline{\hspace{2cm}} = 0.\dot{2}$

investigate types of decimal 

15. Use your calculator to write each of these as a decimal.
 State whether they are **R**ecurring, **T**erminating or **I**rrational.
- | | | |
|---------------|----------------|------------------|
| a) $1 \div 3$ | g) $1 \div 9$ | m) $1 \div 100$ |
| b) $1 \div 4$ | h) $1 \div 10$ | n) $1 \div 1000$ |
| c) $1 \div 5$ | i) $1 \div 11$ | o) $3 \div 7$ |
| d) $1 \div 6$ | j) $1 \div 12$ | p) $5 \div 9$ |
| e) $1 \div 7$ | k) $1 \div 20$ | q) $4 \div 13$ |
| f) $1 \div 8$ | l) $1 \div 25$ | r) $5 \div 11$ |

Investigating Irrational Numbers



- An irrational number continues forever but with NO REPEATING pattern.
Decide whether these numbers are recurring or irrational decimals:
a) 0.2424242... b) 0.123456789.... c) 0.101101101101101...
- Is 0.45454545.... an irrational number? Explain your answer.
- Is 0.1011121314151617.... an irrational number? Explain your answer.
- Find the π button on your calculator. π is an irrational number.
Write down the first six digits of π .
- Is $\pi + 1$ an irrational number?
- Is $\pi \times 2$ an irrational number?
- Is the number 0.4242424.... an irrational number?
- Is the number 0.12345678910111213... an irrational number?
- Is the number 0.111222333444555666777.... an irrational number?
- Is $0.1 + 0.01 + 0.001 + 0.0001 + 0.00001....$ etc an irrational number?
- Another way to create irrational numbers is using the $\sqrt{\quad}$ button.
Write down the first six digits of $\sqrt{3}$.
- Use your calculator to decide whether each of the following is an integer or a recurring, terminating or irrational decimal number:
a) $\sqrt{9}$ d) $\sqrt{10}$ g) $\sqrt{11}$
b) $\sqrt{0.25}$ e) $\sqrt{1}$ h) $\sqrt{0}$
c) $\sqrt{16}$ f) $\sqrt{100}$ i) $\sqrt{0.\dot{1}}$
- Which of these give an integer answer? Select all that apply.
a) $\pi \div \pi$ b) $\pi \times \pi$ c) $\pi + \pi$ d) $\pi - \pi$
- Which of these will an integer answer? Select all that apply.
a) $\sqrt{3} + \sqrt{3}$ b) $\sqrt{3} \times \sqrt{3}$ c) $\sqrt{3} \div \sqrt{3}$ d) $\sqrt{3} - \sqrt{3}$

inequality symbols

learn by heart

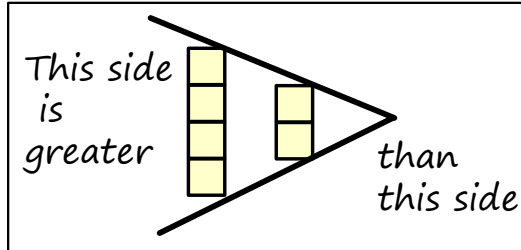
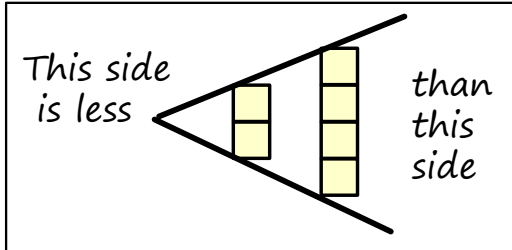
< less than

> greater than

≤ less than or equal

≥ greater than or equal

≠ not equal



exercise 1e

1. Decide whether each of these statements are true or false.

a) $3 > 5$

b) $6 \geq 4$

c) $2 > 2$

d) $1 \leq 0$

e) $3 < 7$

f) $4 < 2$

g) $7 \neq 7$

h) $1999 > 2000$

i) $20394 \neq 9039$

2. Write 'a is greater than or equal to 17' using inequalities.

3. Complete these statements using one of these symbols:



a) $5 \bigcirc 0$

d) $10394 \bigcirc \text{Ten thousand}$

b) $9 \bigcirc 9$

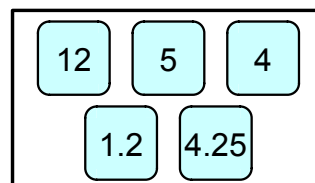
e) $9949480 \bigcirc 1 \text{ million}$

c) $7 \bigcirc 12$

f) $50193 \bigcirc \text{Half a million}$

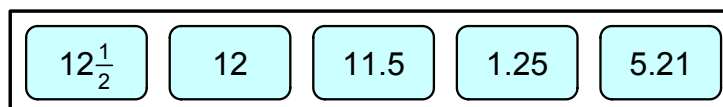
4. Arrange the numbers from the box to fit the chain:

$$\square > \square > \square > \square > \square$$



5. Which of the numbers from the box could complete the statement?

$$12.5 \leq \square$$



comparing decimals

learn by heart

Decimal Places: the number of digits after the decimal point, e.g. 0.405 has 3 decimal places.

Adding zeros to the end of a decimal does not effect its size, so $0.1 = 0.10 = 0.10000000$

examples

Which is larger 0.4 or 0.34?

*0.4 = 0.40,
so 0.4 is larger.*

True or false: $0.30 > 0.3$

*False, these numbers are
equal.*

By adding a zero to 0.4, both numbers have two decimal places and we can easily see that '40 hundredths' is bigger than '34 hundredths'

exercise 1f

- 0.6 is the same as:
a) 0.600 b) 6.0 c) 0.06 d) 0.66
- Which of these numbers is the **largest**?
a) 0.92 b) 0.149 c) 0.840 d) 0.09999
- Select the **larger** number in each pair, or write = if they are the same.
a) 0.412 or 0.48 b) 1.38 or 1.4 c) 0.508 or 0.507
d) 7.05 or 7.005 e) 5.125 or 5.25 f) 0.3 or 0.29
g) 9.49 or 9.491 h) 10.46 or 1.047 i) 0.16 or 0.106
- True or false?
a) $0.4 = 0.400$ c) $0.24 \geq 0.240$ e) $0.99 < 1.0$
b) $0.6 > 0.06$ d) $0.71 < 0.707$ f) $0.647 < 0.7$
- Write down a positive number that is less than 0.01
- Which of these numbers is the **smallest**?
a) 0.02 b) 0.4 c) 0.009 d) 0.013

7. Put these numbers in order of size, from smallest to largest:

i) A 0.401 B 0.4 C 0.42 D 0.414

ii) A 0.27 B 0.7 C 0.207 D 0.2

8. Decide whether each of these statements are true or false:

a) $0.6 \geq 0.60$

e) $0.1 > 0.15$

b) $0.405 > 0.41$

f) $0.1 < 0.10$

c) $1.2 < 1.25$

g) $0.006 \geq 0.06$

d) $0.\dot{6} < 0.67$

h) $0.\dot{3} > 0.3$

i) $12.001 \neq 12.0001$

j) $8.3405 \leq 8.341$

9. Which of the numbers from the box could complete the statement?

$1.02 \leq$

1.21.0201.021.0021.01

Guess My Number

Use the clues to work out which number in the grid is being described:

My number is less than 0.7

My number is more than 0.2

My number has an 8 in the thousandths column

My number is less than 0.42

My number contains the digit 2

The digit in the hundredths column is odd

0.144	0.8	0.248
0.288	0.25	0.825
0.418	0.141	0.118
0.88	0.44	0.114
0.458	0.258	0.552

comparing decimals and fractions (using place value)

example

Which is larger 0.84 or $\frac{9}{10}$?

$\frac{9}{10} = 0.9 = 0.90$, so $\frac{9}{10}$ is larger

exercise 1g

1. Which of these are the same as 0.4? Circle all that apply.

a) 0.40

b) 0.04

c) $\frac{4}{10}$

d) 0.400

e) $\frac{4}{100}$

2. In each pair, select the larger number, or write = if they are the same.

a) 0.7 or $\frac{6}{10}$

d) 0.19 or $\frac{8}{10}$

g) $\frac{73}{1000}$ or 0.72

b) 0.51 or $\frac{5}{100}$

e) 1.07 or $1\frac{6}{100}$

h) 0.402 or $\frac{5}{10}$

c) 1.6 or $1\frac{6}{10}$

f) 0.26 or $\frac{3}{100}$

i) $\frac{3}{10}$ or 0.300

3. Complete these statements using one of these symbols:

$<$ $>$ $=$

a) 0.4 $\frac{7}{100}$

d) 0.019 $\frac{9}{100}$

b) 0.06 $\frac{6}{100}$

e) 3.28 $3\frac{8}{100}$

c) 0.72 $\frac{7}{10}$

f) 1.007 $1\frac{7}{10}$

4. Which of these numbers are **smaller** than 0.05? Choose all that apply.

a) one tenth

b) one hundredth

c) one thousandth

d) six hundredths

e) four tenths

f) nine thousandths

5. Which of these numbers are greater than $\frac{8}{10}$ and less than $\frac{9}{10}$?

a) 0.085

b) 0.82

c) 0.10

d) 0.9

e) 0.802

6. Which of these numbers are greater than $\frac{4}{10}$ and less than 0.41?

a) 0.408

b) 0.45

c) 0.40

d) 0.7

e) 0.39

7. By first writing these numbers as decimals, put each set in order, starting with the smallest.

i)

A	$\frac{1}{10}$
---	----------------

B	0.8
---	-----

C	$\frac{2}{100}$
---	-----------------

D	0.6
---	-----

ii)

A	0.6
---	-----

B	0.66
---	------

C	$\frac{6}{100}$
---	-----------------

D	0.61
---	------

iii)

A	2.45
---	------

B	2.427
---	-------

C	2.4
---	-----

D	2.47
---	------

iv)

A	$\frac{83}{100}$
---	------------------

B	$\frac{83}{1000}$
---	-------------------

C	$\frac{8}{10}$
---	----------------

D	$\frac{85}{100}$
---	------------------

v)

A	$\frac{70}{10}$
---	-----------------

B	7.1
---	-----

C	$7\frac{3}{100}$
---	------------------

D	$\frac{72}{100}$
---	------------------

8. Decide whether each of these statements is true or false.

A $0.3 > 0.5$

B $0.1 < 0.01$

C $\frac{2}{10} > 0.1$

D $0.4 \geq \frac{4}{10}$

E $0.9 \neq \frac{9}{100}$

F $0.12 < \frac{3}{10}$

G $0.6 > 0.45$

H $\frac{14}{10} < 1.5$

I $2.5 \geq 2.50$

J $0.3 + \frac{7}{100} = 0.37$

K $0.1 + \frac{1}{100} = 0.2$

L $\frac{78}{10} \geq \frac{7}{10} + \frac{8}{100}$

Arrange the Digits

0 1 2 3 4 5 6 7 8 9

Using each of these digits just once each, make the following statements true:

· < $6\frac{8}{10}$

· < 3.59

· ≤ $\frac{48}{100}$

· < $1\frac{3}{10}$

extension: can you make up your own puzzle like this?

half way between

example

Write down the number half way between 0.3 and 0.31

$0.3 = 0.300$ and $0.31 = 0.310$
so half way between is 0.305

exercise 1h

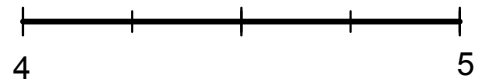
1. Which of these numbers are between 3.4 and 3.7 ? Choose all that apply.

- a) 3.05 b) 3.65 c) 3.518 d) 3.72

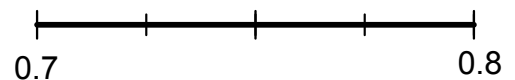
2. Work out the number **halfway between** each of these pairs of numbers.

- a) 0.3 and 0.4 c) 0.235 and 0.236 e) 1.01 and 1.02
b) 0.6 and 0.61 d) 0.07 and 0.071 f) 0.999 and 1

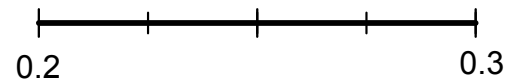
3. On the number line, estimate the position of 4.6



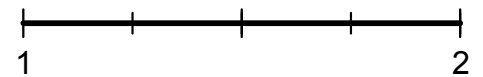
4. On the number line, estimate the position of 0.73



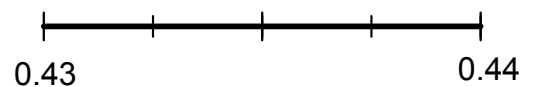
5. On the number line, estimate the position of 0.277



6. On the number line, estimate the position of 1.58



7. On the number line, estimate the position of 0.439



8. Which of these numbers is closest to 7.3 ?

- a) 7.305 b) 7.4 c) 7.2 d) 7.33

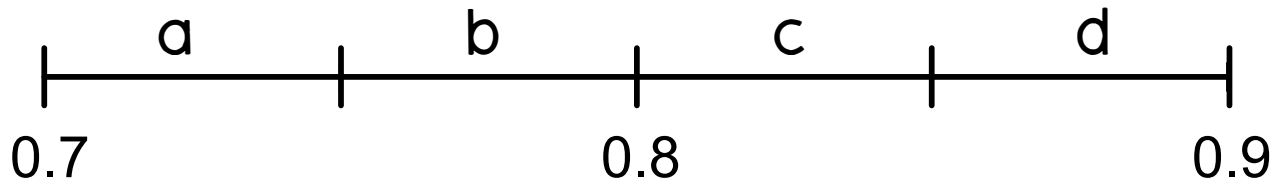
9. Which integer is closest to 3.39?

10. Write down a number between 0.8 and $0.\dot{8}$.

11. How many decimals are there between 2 and 3?

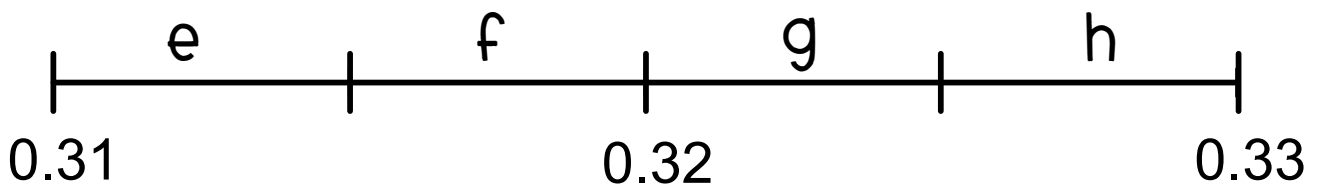
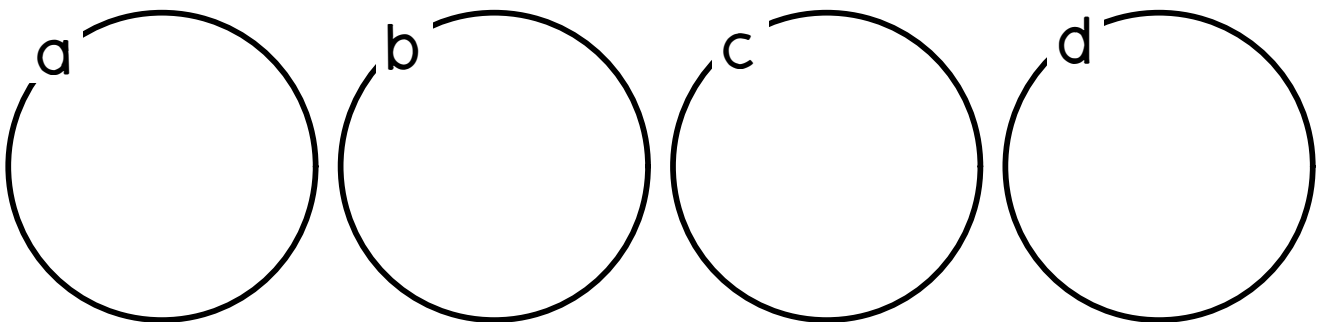
12. How many decimals are there between 2 and 4?

Sort It Out!



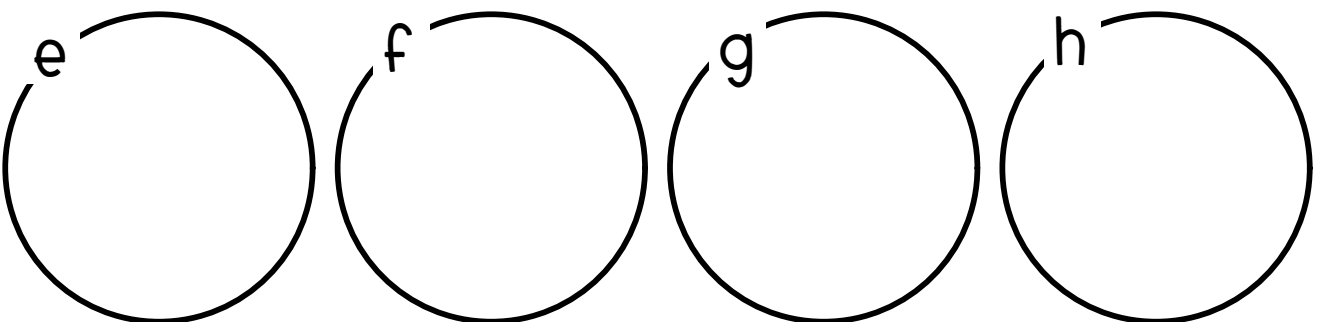
Decide which section of the number line above each of these numbers would go in

0.801	0.72	0.852	0.799	0.7501	0.78	0.74
0.845	0.76	0.709	0.840	0.89	0.7499	0.887
						0.820



Decide which section of the number line above each of these numbers would go in

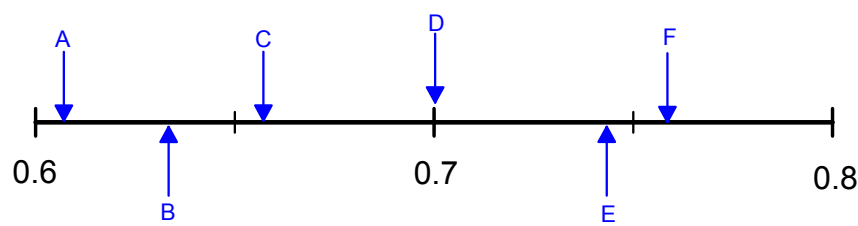
0.329	0.316	$\frac{321}{1000}$	0.328	$\frac{313}{1000}$	0.322	0.314
0.3209	$\frac{317}{1000}$	0.311			0.3255	
0.3199						0.31502



Find It On The Number Line extra challenge

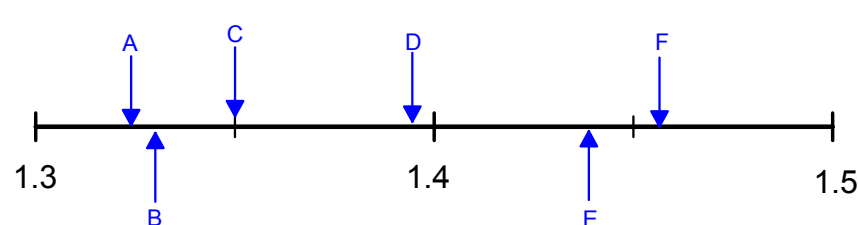
Match the numbers to the positions shown on the number lines with arrows.

1



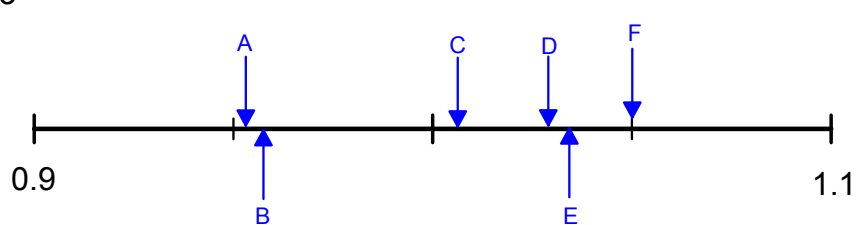
$\frac{7}{10}$ ----	0.76 ----	$\frac{61}{100}$ ----
0.661 ----	$\frac{74}{100}$ ----	0.635 ----

2



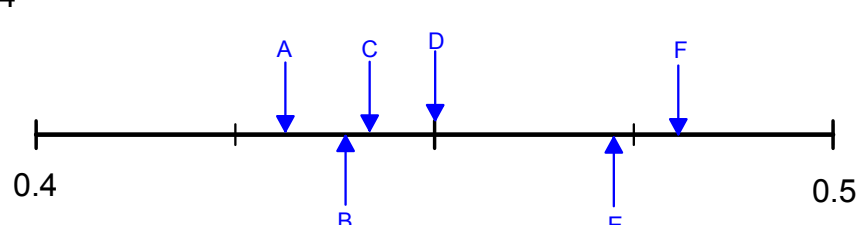
1.392 ----	1.46 ----	$1\frac{33}{100}$ ----
$1\frac{44}{100}$ ----	1.329 ----	1.3500 ----

3



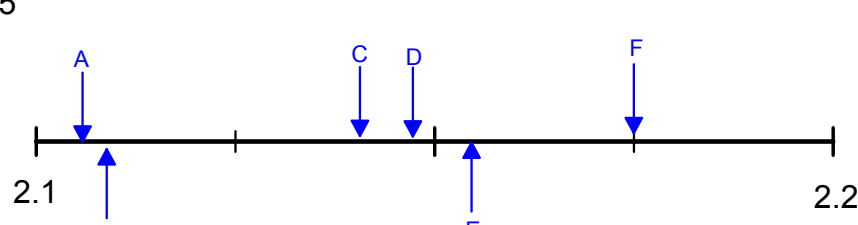
1.04 ----	$1\frac{1}{100}$ ----	1.05 ----
0.96 ----	0.955 ----	1.034 ----

4



$\frac{43}{100}$ ----	0.45 ----	0.472 ----
$\frac{439}{1000}$ ----	0.48 ----	0.441 ----

5



2.16 ----	$\frac{214}{100}$ ----	$2\frac{11}{100}$ ----
2.113 ----	$2\frac{175}{1000}$ ----	2.147 ----

rounding to decimal places

learn by heart

Sometimes we do not want to write all the digits of a decimal down and we can shorten it by rounding.

A number with 1 decimal place has 1 digit after the decimal point, e.g. 3.4

If rounding, to say, 2 decimal places, the value of the digit in the 3rd decimal place tells us whether to round up or down. If the 3rd decimal place is 5 or more, we round UP, which means we increase the value of the last digit by 1.

examples

Round:

- | | | |
|--------------------------------|------------|-------|
| a) 4.327 to 1 decimal place | $4.3 27$ | 4.3 |
| b) 17.0269 to 2 decimal places | $17.02 69$ | 17.03 |
| c) 3.7997 to 3 decimal places | $3.799 7$ | 3.800 |
| d) 1.996 to the nearest 0.1 | $1.9 96$ | 2.0 |

This means 1 decimal place

exercise 1i

- Which of these numbers have 1 decimal place? Select all that apply.
a) 43 b) 4.5 c) 2.75 d) 62.0 e) 200.30
- Round each number to 1 decimal place:
a) 3.62 c) 2.45 e) 4.319 g) 105.1098
b) 1.84 d) 13.19 f) 26.453 h) 459.821
- Round each number to 2 decimal places:
a) 4.085 b) 23.1279 c) 604.30567
- Round each number to 3 decimal places:
a) 4.0858 b) 23.127 c) 604.30567
- Find all the numbers that round to **3.5** to 1 decimal place:

A	3.48	D	3.41	G	3.45	J	3.34	M	3.41
B	3.51	E	3.62	H	3.55	K	3.56	N	3.509
C	3.63	F	3.81	I	3.67	L	3.39	O	3.409

6. Complete the table by rounding each number as shown:

	Number	to 1 d.p.	to 2 d.p.	Nearest Integer
a)	3.7281			
b)	52.5917			
c)	0.1853			
d)	9.6458			
e)	4.0028			

7. Which of these numbers is 24.976 correctly rounded to one decimal place?

- a) 24.9 b) 24.10 c) 25 d) 24.98 e) 25.0

8. Which of these lengths is 32.77m given correct to the nearest 0.1m?

- a) 33m b) 32.7m c) 32.70m d) 32.8m e) 32.80m

9. Show how these cards can be arranged to make a number that rounds to 27.5 to one decimal place.



10. Which of these numbers, when rounded to 2 decimal places, give 17.48 ?
Choose all that apply.

- a) 17.485 b) 17.475 c) 17.4805 d) 17.4705

11. Round:

- a) 132.8427 to the nearest tenth
b) 4.7396 to the nearest hundredth

challenge (rounding recurring decimals)

12. Round each of these recurring decimals as indicated:

- a) $0.\dot{6}$ (1 d.p.) d) $0.\dot{7}0\dot{5}$ (3 d.p.) g) $0.4\dot{8}$ (3 d.p.)
 b) $0.\dot{3}\dot{4}$ (1 d.p.) e) $0.7\dot{0}\dot{5}$ (3 d.p.) h) $0.4\dot{9}$ (3 d.p.)
 c) $0.\dot{5}\dot{7}$ (2 d.p.) f) $0.70\dot{5}$ (3 d.p.) i) $0.\dot{9}$ (1 d.p.)

Rounding Decimals

Code Breaker

Round each number as shown.

Find your answer in the code box and write the letter in the yellow box.

The letters should spell a secret message!

a) 0.34 to 1 d.p. = _____ =

b) 0.483 to 1 d.p. = _____ =

c) 0.51 to 1 d.p. = _____ =

d) 1.05 to 1 d.p. = _____ =

e) 0.94 to 1 d.p. = _____ =

f) 1.22 to 1 d.p. = _____ =

g) 0.784 to 1 d.p. = _____ =

h) 0.784 to **2 d.p.** = _____ =

i) 0.809 to 1 d.p. = _____ =

j) 0.789 to **2 d.p.** = _____ =

k) 0.749 to 1 d.p. = _____ =

l) 1.234 to **2 d.p.** = _____ =

m) 0.781 to **2 d.p.** = _____ =

code box

0.3 = K	0.69 = Q	0.8 = I	1.2 = M
0.4 = X	0.7 = G	0.81 = R	1.21 = F
0.48 = ?	0.71 = V	0.9 = S	1.22 = U
0.5 = E	0.74 = C	0.91 = D	1.23 = A
0.51 = H	0.75 = B	1 = J	1.24 = T
0.6 = O	0.78 = L	1.01 = Z	1.3 = Y
0.65 = U	0.79 = N	1.1 = P	1.31 = K

n) 0.779 to **2 d.p.** = _____ =

o) 0.911 to **2 d.p.** = _____ =

p) 1.225 to **2 d.p.** = _____ =

q) 1.27 to 1 d.p. = _____ =

r) 0.777 to **2 d.p.** = _____ =

s) 0.58 to 1 d.p. = _____ =

t) 0.792 to **2 d.p.** = _____ =

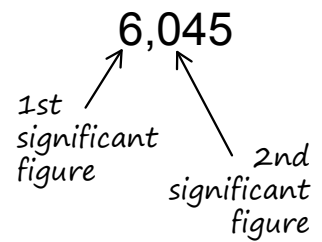
u) 0.699 to 1 d.p. = _____ =

rounding to significant figures (integers)

learn by heart

The **first significant figure** of a number is the first non-zero digit

'Trapped zeros' lie between 2 other digits. They are significant.



examples

Round 348 to 1 significant figure (1.s.f)

(1st significant figure is in the hundreds column, so round to the nearest hundred)

= 300

Round 4,075 to 2 significant figures (2.s.f)

(2nd significant figure is in the hundreds column, so round to the nearest hundred)

= 4,100

exercise 1j

1. Round each of these numbers to 1 significant figure:

a) 53

c) 709

e) 2,409

b) 56

d) 358

f) 15,008

2. Round each of these numbers to 2 significant figures:

a) 956

c) 15,809

e) 194,037

b) 2,085

d) 12,314

f) 280,300

3. The number 6,008 has ____ significant figures.

4. The number 84,001 has ____ significant figures.

5. Round each of these numbers as indicated:

a) 536 (2 s.f.)

d) 8,900 (1 s.f.)

g) 99 (1 s.f.)

b) 804 (2 s.f.)

e) 84 (2 s.f.)

h) 999 (2 s.f.)

c) 12,400 (2 s.f.)

f) 12 (1 s.f.)

i) 9,999 (3 s.f.)

6. Find all the numbers that round to 100, to 1 significant figure:

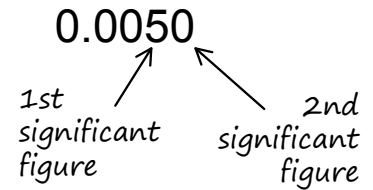
A	105	D	102	G	99	J	95	M	90	P	110
B	92	E	100	H	130	K	107	N	91	Q	96
C	98	F	90	I	170	L	89	O	55	R	140

rounding to significant figures (decimals)

learn by heart

The zeros at the start of a decimal are **not significant**

The zeros at the end of a decimal **ARE** significant



examples

Round 0.0489 to 1 significant figure (1.s.f)

(1st significant figure is in the hundredths column, so round to the nearest tenth)

$$= 0.05$$

Round 0.0899 to 2 significant figures (2.s.f)

(2nd significant figure is in the thousandths column, so round to the nearest thousandth)

$$= 0.090$$

exercise 1k

- Which of these numbers has 3 significant figures?
a) 2.486 b) 2.406 c) 3.490 d) 0.0300
- Round each of these to 1 significant figure:
a) 0.765 c) 0.038 e) 2.845
b) 0.408 d) 0.0193 f) 0.099
- Round each of these to 2 significant figures:
a) 3.867 c) 0.247 e) 0.309
b) 0.608 d) 12.859 f) 0.0049
- The number 0.307 has ____ significant figures.
- The number 4.8050 has ____ significant figures.
- The number 900.009 has ____ significant figures.
- Round each of these as indicated:
a) 0.289 (2 s.f.) d) 8.207 (3 s.f.) g) 0.3007 (3 s.f.)
b) 42.806 (3 s.f.) e) 0.069 (2 s.f.) h) 0.0914 (2 s.f.)
c) 0.0987 (2 s.f.) f) 4.98 (1 s.f.) i) 8.999 (2 s.f.)
- What is the value of $0.\overset{\cdot}{4}\overset{\cdot}{0}\overset{\cdot}{8}$ to 4 significant figures?

rounding to significant figures (mixed practice)

exercise 1

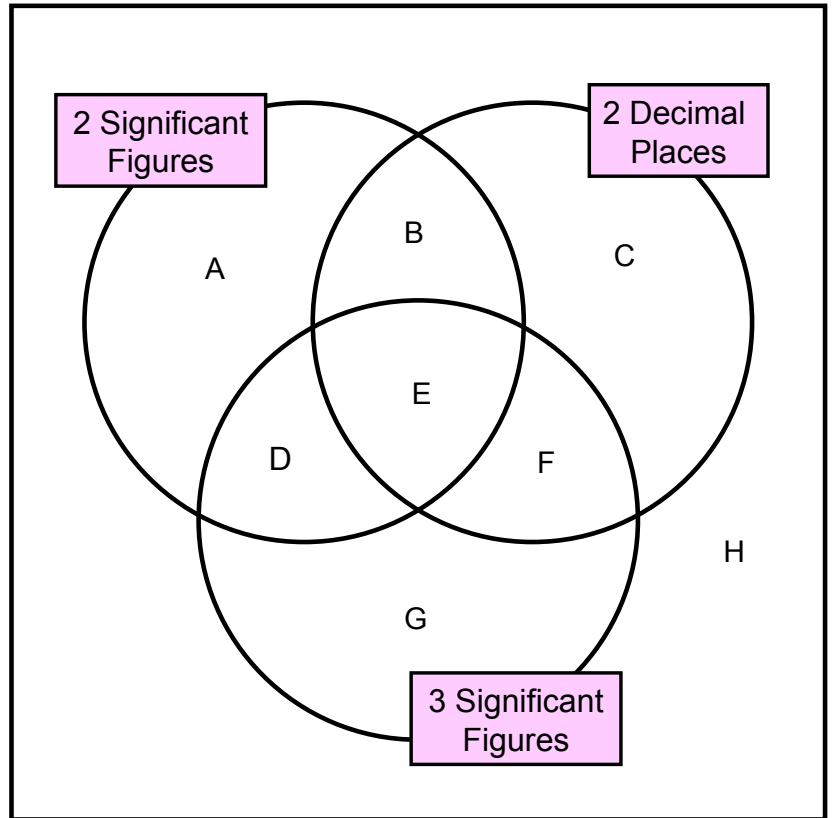
- Circle the first significant figure in each of these numbers.
 - 0.429
 - 9002
 - 45
 - 0.00011
 - 0.704
 - 32,415
- How many significant figures do each of these numbers have?
 - 506
 - 0.03
 - 0.4500
 - 23.605
- Which of these has 2 significant figures? Circle all that apply.
 - 0.08
 - 108
 - 0.080
 - 1.08
- Round each of these numbers to one significant figure:
 - 6.928
 - 0.00438
 - 82.9
 - 417.809
 - 0.089
 - 0.92
- Which of these numbers is 72.46 rounded to one significant figure?
 - 72
 - 72.5
 - 70
 - 7
- Which of these numbers have the digit **3** as the second significant figure? Choose all that apply.
 - 4.312
 - 3.2
 - 403.1
 - 0.329
 - 0.0731
- Round each of these numbers to the number of significant figures shown:
 - 45 (1 s.f.)
 - 0.0507 (2 s.f.)
 - 9607 (2 s.f.)
 - 0.956 (2 s.f.)
 - 503 (1 s.f.)
 - 8.099 (3 s.f.)
 - 3005 (3 s.f.)
 - 900 (2 s.f.)
 - 609 (2 s.f.)
 - 551.8 (2 s.f.)
 - 0.56 (1 s.f.)
 - 800 (3 s.f.)
- Could the most significant figure in a number be a zero?
- Could the second most significant figure in a number be a zero?
- True or false: 42.389 rounded to 3 s.f. > 42.389 rounded to 3 d.p. ?

11. Which section of the diagram should each of the following numbers be in?

Some of the numbers go outside of the circles.

31.5	0.340	3001
43	2.3	0.25
396.41	403	0.9
0.90	3.52	1.01

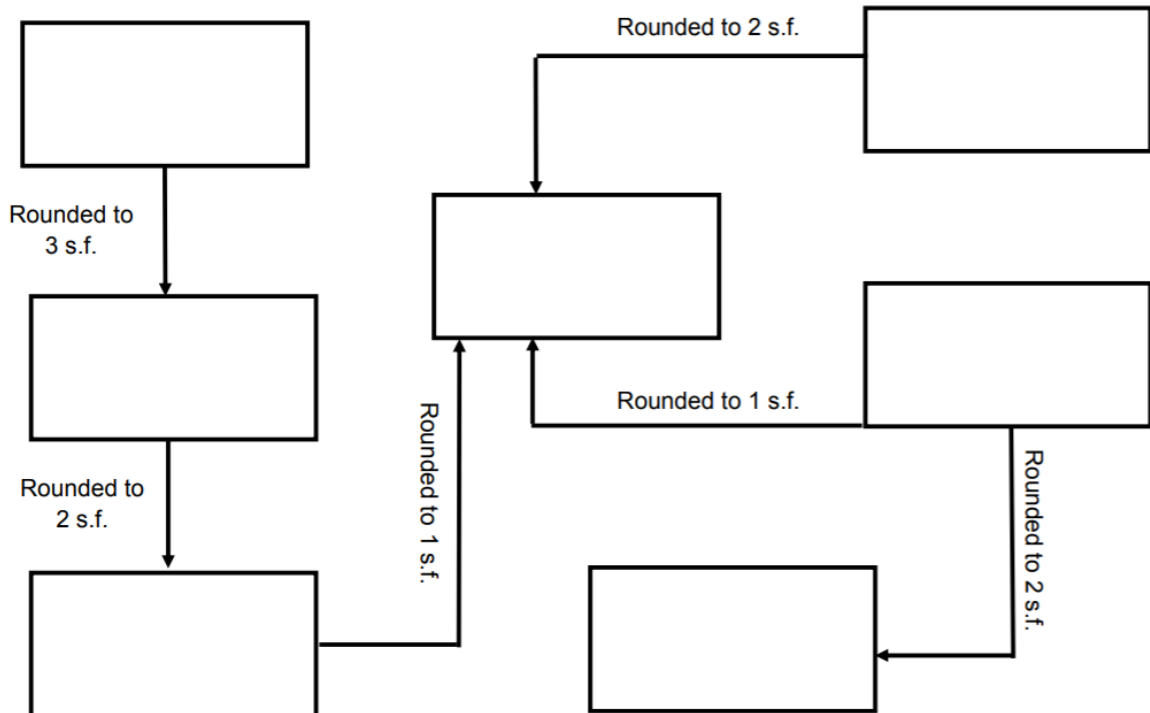
extension: there are two empty sections, can you think of a number that would go in each of these two sections?



Round It! extra challenge

Place the numbers in the boxes so that all arrows indicate a correct rounding

3160	3200	3000	3164
2900	3049	2919	



other number systems: base 5



learn by heart

Base 10: A number system using 10 digits (0,1,2,3,4,5,6,7,8,9)

Base 5: A number system using 5 digits (0,1,2,3,4)

example

Write 39 in base 5

$$\begin{aligned} 39 \text{ is } & 1 \times 25 + \\ & 2 \times 5 + \\ & 4 \times 1 \\ & = 124 \end{aligned}$$

base 5 column names

125s	25s	5s	1s
	1	2	4

exercise 1m

1. Write these numbers in base 5:

a) 12

d) 3

g) 125

j) 11

b) 6

e) 60

h) 255

k) 124

c) 27

f) 37

i) 89

l) 624

2. Explain why 61 cannot be a number written in base 5.

3. These numbers are written in base 5. Convert them to base 10:

a) 14

d) 210

g) 1000

b) 32

e) 331

h) 1202

c) 103

f) 4

i) 44

challenge: Convert 1,000,000 from base 5 to base 10.

3. If these numbers are written in base 5, which is biggest?
A. 44 B. 43 C. 103 D. 101
4. Working in base 5, what is the number after 44?
5. Which of these numbers is definitely not written in base 5?
A. 34 B. 35 C. 1004 D. 1234
6. Working in base 5, what is half of 31?
7. Working in base 5, which number comes before 1000?
8. Working in base 5, which of these numbers are even?
A. 21 B. 14 C. 20 D. 123
9. Working in base 5, which of these numbers are multiples of 5?
A. 40 B. 22 C. 31 D. 100
10. Write down the digits you would use if you were working in base 6.
11. In base 6, what does 10 stand for?
12. In base 6, what does 11 stand for?

true or false

Which of these statements are true?

<p><i>A</i></p> <p>In base 5, $11 + 1 = 12$</p>	<p><i>B</i></p> <p>In base 5, $14 + 1 = 15$</p>	<p><i>C</i></p> <p>In base 5, 12 is an even number</p>	<p><i>D</i></p> <p>In base 5, 10×23 is 230</p>
<p><i>E</i></p> <p>In base 5, $4 \times 4 = 16$</p>	<p><i>F</i></p> <p>In base 5, all multiples of 5 end in a zero</p>	<p><i>G</i></p> <p>In base 5, $12 + 12 = 24$</p>	<p><i>H</i></p> <p>In base 5, $100 + 10 = 110$</p>
<p><i>I</i></p> <p>In base 5, 23 is half of 101</p>	<p><i>J</i></p> <p>In base 5, 14 has exactly two factors</p>	<p><i>K</i></p> <p>In base 5, $100 \div 10 = 10$</p>	<p><i>L</i></p> <p>In base 5, $0.1 = \frac{1}{10}$</p>

chapter review

exercise 1n

1. Write each of these as decimals:

a) 3 tenths

b) $\frac{7}{100}$

c) $\frac{9}{1000}$

d) $1\frac{7}{10}$

2. Write the number *eight hundred and ten thousand* in digits.

3. Write each of these as a fraction or mixed number:

a) 0.07

b) 2.8

c) 0.31

d) 42.009

4. Which of these is largest?

a) $\frac{8}{10}$

b) 0.808

c) 0.80

d) $\frac{81}{100}$

5. Fill in the table to show how to round these numbers:

Number	Nearest Integer	1 d.p.	1 s.f.
23.06			
482.69			
0.055			

4. Which of the following equals 0.232323....?

a) $0.\dot{2}\dot{3}$

b) $0.2\dot{3}2$

c) $0.2\dot{3}$

5. Which of the following equals $0.4\dot{1}\dot{2}$?

a) 0.412412...

b) 0.412222...

c) 0.412121...

6. Write 0.456565... using dot notation.

challenge

Decide whether each of these statements are true or false:

a) $0.\dot{3} > 0.3$

b) $0.\dot{6} > 0.67$

c) $1.2\dot{3} < 1.\dot{2}\dot{3}$

d) $0.\dot{0}\dot{9} = \frac{9}{100}$

e) $0.7\dot{7} = 0.\dot{7}$

f) $8.\dot{8} < 8.819$

g) $1.\dot{2}\dot{9}\dot{5} > 1.2\dot{9}\dot{5}$

h) $0.0\dot{4}\dot{5} < \frac{5}{100}$

chapter review 2

exercise 10

- Round 486 to 1 significant figure.
- Write $\frac{3}{10}$ as a decimal.
- As a fraction, 0.207 is:
a) $\frac{207}{10}$ b) $\frac{207}{100}$ c) $\frac{207}{1,000}$ d) $\frac{207}{10,000}$ e) $\frac{27}{1000}$
- Complete the gaps using $>$, $<$ or $=$
a) $0.\dot{2}$ _____ $\frac{2}{10}$ c) $\frac{41}{1000}$ _____ 0.041 e) 0.1 _____ 0.001
b) $\frac{29}{1000}$ _____ 0.290 d) 8 thousands _____ $\frac{8}{1000}$ f) 0.86 _____ 0.9
- Round each of these to 1 significant figure:
a) 84,026 b) 1.87 c) 0.0308
- True or False: 0.87 and 0.870 have the same value but different accuracies.
- Which of these is largest?
a) $\frac{9}{10}$ b) 0.90 c) 0.809 d) $\frac{909}{1000}$
- Which of these is an irrational number?
a) 0.3333... b) 0.1234 c) $2.\dot{7}$ d) 0.12345678....
- Round 0.999 to 2 decimal places.
- Round 0.999 to 2 significant figures.
- Write as a decimal:
a) $\frac{8}{10}$ c) $3\frac{1}{10}$ e) $\frac{29}{1000}$
b) $\frac{1}{1000}$ d) $\frac{89}{100}$ f) $12\frac{3}{100}$
- Write as a fraction or mixed number:
a) 0.09 b) 0.023 c) 4.87
- How many numbers are there between 4.1 and 4.2 with 2 decimal places?

Place Value Puzzles

In each of these puzzles, work out which number from the grid is being described:

Puzzle 1

- My number is not an integer.
- My number has a 1 in the units column
- My number is greater than thirty
- My number is \neq 31.3
- My number has 1 in the hundredths column

1.01	301	31.1
3.1	3.101	31.3
30.1	31.01	1.03

Puzzle 2

- My number is less than eighteen thousand
- My number is \neq 180
- My number is $>$ 18
- My number has 8 in both the tens and tenths columns

180	18.01	1.81
0.18	1800	188
180.8	18180	18.8

Puzzle 3

- My number is \leq 0.2
- My number is \neq 0.15
- My number is greater than one tenth
- My number has no hundredths

0.24	0.2	0.12
0.02	0.01	0.5
0.15	2.02	0.1

Puzzle 4

- My number is $<$ 44,000
- My number is more than five thousand four hundred and fifty
- My number is \neq 5454
- My number has 5 hundreds
- My number is greater than fifteen thousand

14,500	15,501	45000
5401	5444	5454
14,534	4544	10,500

Puzzle 5

What is the largest number that can be made by rearranging these cards?

1	2	4	.	8
---	---	---	---	---

Puzzle 6

What is the **smallest** number that can be made by rearranging these cards?

5	3	2	.	6
---	---	---	---	---

Puzzle 7

Put these numbers in order of size, from smallest to largest

0.04, 0.4, 4.4, 1.4, 0.104

Puzzle 8

Complete these statements using the symbols

$=$, $>$, $<$





0.40	0.400
0.35	0.300
0.2	0.25
1.5	1.05
1.8	1.80
0.01	0.1
0.99	0.999

year 7 core curriculum

chapter 1: place value & decimals

[Recommended Time: 11-13 hours]

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reading & writing integers

learn by heart

You should know the names of the columns by heart...

millions	hundred thousands	ten thousands	thousands	hundreds	tens	units
1,000,000	100,000	10,000	1,000	100	10	1

1 million is the 7th column
1 million has 6 zeroes
1 million = 1,000,000

10 million = 10,000,000
100 million = 100,000,000
1000 million = 1 billion (UK)

example

Write the number 1439580 using commas
= 1,439,580

When writing numbers, starting *from the right*, we place a comma after every 3 digits. On the first comma we say 'thousand', on the second comma we say 'million'

exercise 1a

1. Write in digits:

- a) Three million and twenty two **3,000,022**
- b) Five hundred and eighteen thousand **518,000**
- c) Twenty six thousand and four **26,004**
- d) Ninety four million, three thousand and six **94,003,006**
- e) Four million, two hundred and three thousand **4,203,000**
- f) Three hundred and six thousand and thirty nine **306,039**

2. Which of these numbers is four hundred and six thousand?

- a) 46,000 b) 406,00 c) 400,6000 **d) 406,000**

3. Write the number 902,000 in words. **Nine hundred and two thousand**

4. Which of these numbers are written incorrectly? Select four answers.

- a) 3,005 **c) 9,3400** **e) 24,34** g) 600,000
- b) 430,00** d) 658,000 f) 98,400 **h) 903,00**

5. Write each of these numbers in words. Be careful - they are all different!

A Four thousand, two hundred <i>4, 200</i>	B Forty thousand, two hundred 40,200	C Four hundred and two thousand 402,000	D Four hundred thousand and twenty 400,020
E Four thousand and twenty 4020	F Forty thousand and twenty 40,020	G Four hundred thousand and two 400,002	H Four thousand and two 4002
I Forty-two thousand 42,000	J Four hundred thousand, two hundred 400,200	K Forty thousand and two 40,002	L Four hundred and twenty thousand 420,000

6. Anna and Dan write the number "twelve thousand and nineteen" in digits.

Anna writes: *12, 000, 19* Dan writes: *12, 019*

Who is right? **Dan is right**

What has the other person done wrong? **Anna has written it as two separate numbers.**

7. Write each of these numbers in words.

- a) 37,405 **Thirty seven thousand, four hundred and five**
.....
- b) 9,026,030 **Nine million, twenty six thousand and thirty**
.....
- c) 412,600 **Four hundred and twelve thousand, six hundred**
.....

8. Which of these numbers is eighteen million, forty five thousand and nine?

- a) 18,450,000 b) 18,45,000 **c) 18,045,000** d) 18,000,45000

9. Which of the following numbers have the digit 8 in the ten thousands place value? Select all that apply.

- a) 809,400 **b) 180,013** c) 8,432
- d) 8.0041 **e) 5,080,190** **f) 89,000**

10. Which of the following numbers is equal to 6.2 million?

- a) 62,000,000 b) 6.2000000 c) 6.200000 **d) 6,200,000**

11. Which of these numbers is 1 billion?

- a) 1,000,000 b) 100,000,000 **c) 1,000,000,000**

Millions Multiple Choice

In each row, choose the number that matches the question.

1	1 Million	A 1,000	B 10,000	C 100,000	D 1,000,000
2	2 Million and Fifty	A 2,050	B 2,000,50	C 2,000,500	D 2,000,050
3	15 Million and Nine Thousand	A 15,9000	B 15,009,000	C 15,090,000	D 15,000,900
4	Two Hundred Million	A 200,000,000	B 200,0000	C 200,000	D 20,200,000
5	3 Million and Six Thousand	A 3,6000	B 3,600,000	C 3,006,000	D 003,060,000
6	Seventy Two Million and Fifteen	A 072,000,150	B 72,000,15	C 72,000,015	D 72,015
7	Four Hundred and Eight Million	A 400,800,000	B 400,008,000	C 8,000,400	D 408,000,000
8	Seventeen Million and Twenty Thousand	A 17,020,000	B 17,20,000	C 17,200,000	D 170,020,000
9	Five Hundred and Two Thousand	A 502,000,000	B 500,2000	C 500,2,000	D 502,000
10	Nine Hundred and Ninety Million and Nine	A 900,090,009	B 990,000,009	C 990,000,090	D 900,900,09

extension

1. What is the name for a thousand million? **1 billion**
2. How many zeros are there in a million million? **1 000 000 000 000 (12)**
3. How many zeros does a googol have? **100**

reading & writing decimal numbers 1

learn by heart

Integer: a whole number

Mixed Number: an integer + a fraction, e.g. $3\frac{1}{10}$

Decimal: a number including a decimal point, which separates the wholes from the parts.

The decimal point: is **to the right of the units column**

tens	units	tenths	hundredths	thousandths	ten thousandths
10	1	0.1	0.01	0.001	0.0001
10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10,000}$

example

Write as a decimal the number with:

a) Two tens, three units and four hundredths **23.04**

b) Five units, $\frac{3}{10}$ and $\frac{7}{100}$ **5.37**

Use a zero to show an empty column.

exercise 1b

1. Write as a decimal the number with:

- a) 3 units and 6 tenths **3.6** b) 4 tens and 8 tenths **40.8**
 c) 3 tenths and 5 hundredths **0.35** d) 7 hundredths and 1 thousandth **0.071**
 e) 4 tenths and 7 ten thousandths **0.4007** f) 5 units and 4 thousandths **5.004**

2. State the value of the digit 6 in each of these numbers. The first is done for you.

- a) 38.1**6**5 b) **6**.01 c) 1.**6**924
 6 hundredths **6 units** **6 tenths**
 d) 309.85**6** e) 1.**6**93 f) 0.000**6**
 6 thousandths **6 tenths** **6 ten thousandths**

3. Write these as decimals:

- a) $\frac{1}{10}$ **0.1** c) $\frac{3}{10}$ **0.3** e) $1\frac{4}{10}$ **1.4** g) $2\frac{1}{1000}$ **2.001**
 b) $\frac{9}{100}$ **0.09** d) $\frac{7}{1000}$ **0.007** f) $5\frac{8}{100}$ **5.08** h) $\frac{7}{10,000}$ **0.0007**

4. 9 tens and 9 tenths make:

- a) 0.99 b) 9.9 c) 99 **d) 90.9**

5. Write the following as decimals. The first one is done for you.

a) $5 + \frac{3}{10} + \frac{4}{100} = 5.34$

b) $1 + \frac{9}{100} = 1.09$

c) $\frac{3}{10} + \frac{8}{100} = 0.38$

d) $4 + \frac{2}{10} + \frac{7}{1000} = 4.207$

e) $\frac{1}{10} + \frac{2}{10,000} = 0.1002$

f) $9 + \frac{9}{10} + \frac{9}{100} = 9.99$

6. Fill in the blanks with fractions or integers, the first one is done for you:

a) $5.01 = 5 + \frac{1}{100}$

c) $31.7 = 30 + 1 + \frac{7}{10}$

b) $0.719 = \frac{7}{10} + \frac{1}{100} + \frac{9}{1000}$

d) $54.39 = 50 + 4 + \frac{3}{10} + \frac{9}{100}$

7. Which of these is equal to 0.3 ?

a) $\frac{3}{10}$

b) $\frac{3}{100}$

c) 0.03

d) $\frac{10}{3}$

8. Write these decimals as fractions or mixed numbers:

a) 0.6 $\frac{6}{10}$

c) 1.2 $1\frac{2}{10}$

e) 0.007 $\frac{7}{1000}$

b) 0.09 $\frac{9}{100}$

d) 3.04 $3\frac{4}{100}$

f) 5.9 $5\frac{9}{10}$

9. Write down the decimal number with exactly 4 tens, 3 tenths and 2 thousandths.

40.302

10. True or false?

a) $6 + \frac{3}{10} = 6.3$ True

c) $20 + \frac{2}{100} = 20.2$ False

b) $100 + \frac{1}{100} = 200$ False

d) $\frac{1}{9} = 0.9$ False

Guess My Number extra challenge

Use the clues to work out my number and record it in the spaces at the bottom

My number has the same number of tens and tenths

My number has a 0 in the hundreds column and a 1 in the hundredths column

My number has 9 digits and a decimal point

My number contains the digit 4 twice, but no other repeats

My number is less than 1 million but more than half a million

My number has a 7 in the thousands column

The digit 3 is next to the decimal point.

Extra hint: start with this clue

My number does not contain the digits 2 or 6

8 is next to 9 and 8 is on the left of 9

8 9 7 0 4 3 . 4 1 5

reading and writing decimal numbers 2

learn by heart

Decimal numbers are equivalent to fractions with denominators of 10, 100, 1000, ...

$$\begin{array}{c} 0.427 \\ \swarrow \quad \downarrow \quad \searrow \\ = \frac{4}{10} + \frac{2}{100} + \frac{7}{1000} \end{array}$$

Tenths

$$\frac{3}{10} = 0.3$$

$$3\frac{4}{10} = 3.4$$

$$\frac{14}{10} = 1.4$$

Hundredths

$$\frac{3}{100} = 0.03$$

$$\frac{24}{100} = 0.24$$

$$\frac{206}{100} = 2.06$$

Thousandths

$$\frac{3}{1000} = 0.003$$

$$\frac{37}{1000} = 0.037$$

$$\frac{409}{1000} = 0.409$$

Mixed Number: *an integer + a fraction, e.g. $3\frac{1}{10}$ means 3 wholes & 1 tenth*

exercise 1c

1. Write as a decimal:

a) $\frac{29}{100}$ **0.29**

b) $\frac{3}{100}$ **0.03**

c) $\frac{42}{1000}$ **0.042**

d) $2\frac{4}{100}$ **2.04**

e) $\frac{9}{10}$ **0.9**

f) $2\frac{3}{100}$ **2.03**

g) $\frac{15}{1000}$ **0.015**

h) $12\frac{9}{100}$ **12.09**

i) $14\frac{1}{100}$ **14.01**

j) $\frac{604}{1000}$ **0.604**

k) $8\frac{5}{1000}$ **8.005**

l) $\frac{3}{10} + \frac{4}{100} + \frac{5}{1000}$
0.345

2. Write down the value of the digit '1' in each number:

a) 0.31 $\frac{1}{100}$

b) 2.1 $\frac{1}{10}$

c) 5.441 $\frac{1}{1000}$

d) 0.6001 $\frac{1}{10,000}$

3. Write as a decimal the number with:

a) 3 tens + 4 tenths **30.04**

b) Twenty five hundredths **0.25**

4. Write as a fraction or mixed number:

a) 0.1 $\frac{1}{10}$

b) 0.02 $\frac{2}{100}$

c) 1.005 $1\frac{5}{1000}$

d) 1.3 $1\frac{3}{10}$

5. Write down the decimal number that has exactly 7 hundreds, 3 tenths and 2 hundredths.

700.32

6. Write as a decimal:

a) $\frac{27}{100}$ 0.27

c) $\frac{19}{100}$ 0.19

e) $\frac{3}{10} + \frac{1}{1000}$ 0.301

b) $\frac{172}{1000}$ 0.172

d) $2\frac{5}{10}$ 2.5

f) $4 + \frac{26}{100}$ 4.26

7. The numbers 54.829 and $\frac{28}{1000}$ have the same digit in which column?

a) units

b) tenths

c) hundredths

d) thousandths

8. Write as a fraction or mixed number, with a denominator of 10, 100 or 1000:

a) 0.7 $\frac{7}{10}$

b) 0.92 $\frac{92}{100}$

c) 3.04 $3\frac{4}{100}$

d) 0.609 $\frac{609}{1000}$

9. $\frac{23}{1000}$ is the same as:

a) 0.23

b) 0.203

c) 0.023

d) 2.3

10. True or False?

a) $0.64 = \frac{64}{100}$ True

c) $1.08 = 1\frac{8}{100}$ True

e) $\frac{1}{10,000} = 0.001$ False

b) $\frac{91}{1000} = 0.91$ False

d) $0.7 = \frac{7}{10}$ True

f) $\frac{4}{100} = 0.4$ False

11. Write as a decimal

a) $\frac{4}{10} + \frac{3}{100}$ 0.43

b) $6 + \frac{1}{1000}$ 6.001

c) $300 + \frac{3}{10} + \frac{3}{1000}$ 300.303

12. Write 0.0409 as a fraction. $\frac{409}{10,000}$

13. The numbers 4.128 and $4\frac{1}{1000}$ have the same digit in which column?

a) units

b) tenths

c) hundredths

d) thousandths

14. 8 tens and 8 hundredths make:

a) 80.08

b) 80.8

c) 8.8

d) 8.08

e) 0.88

15. Fill in the blanks with fractions or integers:

a) $0.402 = \frac{4}{10} + \frac{2}{1000}$

c) $20.64 = 20 + \frac{6}{10} + \frac{4}{100}$

b) $3.99 = 3 + \frac{9}{10} + \frac{9}{100}$

d) $305.106 = 300 + 5 + \frac{1}{10} + \frac{6}{1000}$

16. True or false? $\frac{37}{100}$ has the same value as $\frac{3}{10} + \frac{7}{100}$. **True**
17. True or false? $\frac{403}{1000}$ has the same value as $\frac{4}{100} + \frac{3}{1000}$. **False**
18. How many tenths make 10? **100**
19. How many tenths make 1000? **10,000**
20. True or False? All decimal numbers are less than 1 whole. **False**
21. True or False? The largest decimal number is 0.99. **False**
22. How many different decimal numbers are there between 0 and 1? **Infinite**

Writing Decimals Match

Match these cards to their decimal equivalents at the bottom.
Record your answers in the table

1 2 hundreds	2 2 hundredths	3 2 tens + 6 units
4 2 thousands + 2 units	5 6 tens + 6 tenths	6 6 tens
7 6 thousandths	8 6 thousands	9 10 tenths
10 2 tenths	11 6 tenths + 2 hundredths	12 2 tenths + 6 hundredths
13 6 tenths	14 2 tenths + 6 thousandths	15 2 tens + 6 tenths
16 6 tenths + 6 hundredths	17 6 hundreds	18 2 tens + 2 tenths

20.2	200	20.6	0.26	1	60	26	0.006	0.02
2002	6000	0.2	0.62	0.66	0.206	600	0.6	60.6

1	200
2	0.02
3	26
4	2002
5	60.6
6	60
7	0.006
8	6000
9	1
10	0.2
11	0.62
12	0.26
13	0.6
14	0.206
15	20.6
16	0.66
17	600
18	20.2

types of decimals

learn by heart

There are 3 types of decimal:

Terminating:

Does not continue forever, e.g. 0.25

Recurring:

Continues forever with a repeating pattern

Irrational:

Continues forever with no repeating pattern, e.g. 0.123456...

We often give irrational numbers a symbol, such as π ('pi') or $\sqrt{7}$ because we can't write down all the digits. You will learn more about these symbols later on.

Recurring decimals are written using dot notation:

$$0.\dot{8} = 0.888\dots$$

$$0.\dot{5}8\dot{3} = 0.58358358\dots$$

$$0.2\dot{5}\dot{3} = 0.253535\dots$$

$$5.37\dot{6}9\dot{1} = 5.37691691\dots$$

exercise 1d

- Which of the following equals 0.676767...?
a) $0.6\dot{7}$ b) $\dot{0}.6\dot{7}$ c) $0.\dot{6}7$ **d) $0.\dot{6}\dot{7}$**
- Which of the following equals 1.588888...?
a) $1.5\dot{8}$ b) $\dot{1}.5\dot{8}$ c) $1.\dot{5}8$ d) $1.5\dot{8}$
- Which of the following equals 4.219219...?
a) $4.2\dot{1}9$ b) $4.2\dot{1}\dot{9}$ **c) $4.\dot{2}1\dot{9}$** d) $4.\dot{2}19$
- Write each of these recurring decimals using dot notation:
a) $0.722222\dots$ **$0.7\dot{2}$** b) $4.323232\dots$ **$4.\dot{3}\dot{2}$**
c) $1.421421421\dots$ **$1.\dot{4}2\dot{1}$** d) $5.555555\dots$ **$5.\dot{5}$**
e) $6.728282828\dots$ **$6.7\dot{2}\dot{8}$** f) $3.4151515\dots$ **$3.4\dot{1}\dot{5}$**
- Which of these are terminating decimals? Select all that apply.
a) 0.26 **b) 1.8** c) 0.3131... **d) 0.0000004**
- The number 4.44444 is:
a) a terminating decimal c) a recurring decimal
b) an irrational number d) an integer

7. Which of the following equals $0.\dot{0}9\dot{7}$?

a) 0.0979797...

b) 0.9797979...

c) 0.0977777...

d) 0.0970970...

8. True or false? $0.\dot{3} = 0.3\dot{3}$ **True**

9. Explain why $0.1\dot{2}5$ is an impossible number. **There cannot be a 5 after an infinite number of 2s.**

10. Is there a number between $0.\dot{9}$ and 1? **No**

example

$$\begin{array}{r} 0.9\dot{4} - 0.\dot{2} \\ 0.9444444\dots \\ 0.2222222\dots \\ \hline 0.7222222\dots \\ \hline = 0.7\dot{2} \end{array}$$

challenge  extra challenge

11. What is the value of $0.8\dot{5} - 0.8$? **$0.0\dot{5}$**

12. What is the value of $0.\dot{3}4 - 0.\dot{3}$? **$0.34343434\dots$
 $0.3333333\dots$**

13. Calculate: **$0.010101\dots = 0.0\dot{1}$**

a) $0.6\dot{3} + 0.2\dot{4}$ **$0.8\dot{7}$**

d) $0.\dot{8} - 0.4\dot{2}$ **$0.4\dot{6}$**

g) $0.4\dot{7} - 0.4$ **$0.0\dot{3}$**

b) $0.1 + 0.8\dot{6}$ **$0.9\dot{6}$**

e) $1.8\dot{5} - 0.\dot{3}$ **$1.5\dot{2}$**

h) $0.8\dot{5} - 0.8$ **$0.0\dot{5}$**

c) $0.4\dot{1} - 0.3$ **$0.\dot{1}$**

f) $4.\dot{2} - 1.0\dot{2}$ **3.2**

i) $0.4\dot{3} + 0.2\dot{8}$ **$0.7\dot{2}$**

14. What's missing?

a) $0.\dot{3} + \underline{0.\dot{4}} = 0.\dot{7}$

b) $0.2 + \underline{0.0\dot{4}} = 0.2\dot{4}$

c) $0.1 + \underline{0.1\dot{2}} = 0.\dot{2}$

investigate types of decimal 

15. Use your calculator to write each of these as a decimal. State whether they are **R**ecurring, **T**erminating or **I**rrational.

a) $1 \div 3$ **$0.\dot{3}$ (R)**

g) $1 \div 9$ **$0.\dot{1}$ (R)**

m) $1 \div 100$ **0.01 (T)**

b) $1 \div 4$ **0.25 (T)**

h) $1 \div 10$ **0.1 (T)**

n) $1 \div 1000$ **0.001 (T)**

c) $1 \div 5$ **0.2 (T)**

i) $1 \div 11$ **$0.\dot{0}\dot{9}$ (R)**

o) $3 \div 7$ **$0.\dot{4}2857\dot{1}$ (R)**

d) $1 \div 6$ **$0.1\dot{6}$ (R)**

j) $1 \div 12$ **$0.8\dot{3}$ (R)**

p) $5 \div 9$ **$0.\dot{5}$ (R)**

e) $1 \div 7$ **$0.\dot{1}4285\dot{7}$ (R)**

k) $1 \div 20$ **0.05 (T)**

q) $4 \div 13$ **$0.\dot{3}0769\dot{2}$ (R)**

f) $1 \div 8$ **0.125 (T)**

l) $1 \div 25$ **0.04 (T)**

r) $5 \div 11$ **$0.4\dot{5}$ (R)**

Investigating Irrational Numbers



- An irrational number continues forever but with NO REPEATING pattern.
Decide whether these numbers are recurring or irrational decimals:
 a) 0.2424242... **Recurring** b) 0.123456789.... **Irrational** c) 0.101101101101101101... **Recurring**
- Is 0.45454545.... an irrational number? Explain your answer. **No it has a repeating pattern.**
- Is 0.1011121314151617.... an irrational number? Explain your answer. **Yes, the pattern will not repeat.**
- Find the π button on your calculator. π is an irrational number.
Write down the first six digits of π . **3.14159**
- Is $\pi + 1$ an irrational number? **Yes - there will still be no repeating pattern.**
- Is $\pi \times 2$ an irrational number? **Yes, the digits will change, but still no pattern.**
- Is the number 0.4242424.... an irrational number? **No it has a repeating pattern.**
- Is the number 0.12345678910111213... an irrational number? **Yes.**
- Is the number 0.111222333444555666777.... an irrational number? **Yes.**
- Is $0.1 + 0.01 + 0.001 + 0.0001 + 0.00001....$ etc an irrational number?
 - Is $0.1 + 0.01 + 0.001 + 0.0001 + 0.00001....$ etc an irrational number? **No. It equals $0.\dot{1}$**
- Another way to create irrational numbers is using the $\sqrt{\quad}$ button.
Write down the first six digits of $\sqrt{3}$. **1.73205**
- Use your calculator to decide whether each of the following is an integer or a recurring, terminating or irrational decimal number:

a) $\sqrt{9}$ Integer	d) $\sqrt{10}$ Irrational	g) $\sqrt{11}$ Irrational
b) $\sqrt{0.25}$ Terminating decimal	e) $\sqrt{1}$ Integer	h) $\sqrt{0}$ Integer
c) $\sqrt{16}$ Integer	f) $\sqrt{100}$ Integer	i) $\sqrt{0.\dot{1}}$ Recurring decimal
- Which of these give an integer answer? Select all that apply.

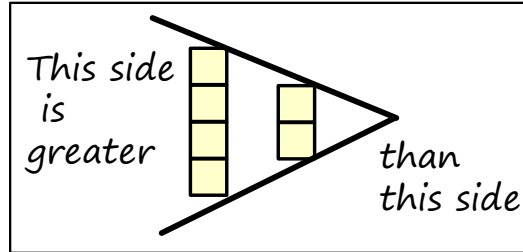
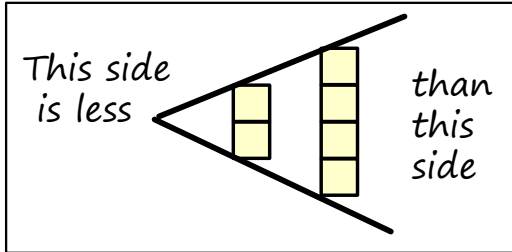
<input checked="" type="radio"/> a) $\pi \div \pi$	<input type="radio"/> b) $\pi \times \pi$	<input type="radio"/> c) $\pi + \pi$	<input checked="" type="radio"/> d) $\pi - \pi$
--	---	--------------------------------------	---
- Which of these will an integer answer? Select all that apply.

<input type="radio"/> a) $\sqrt{3} + \sqrt{3}$	<input checked="" type="radio"/> b) $\sqrt{3} \times \sqrt{3}$	<input checked="" type="radio"/> c) $\sqrt{3} \div \sqrt{3}$	<input checked="" type="radio"/> d) $\sqrt{3} - \sqrt{3}$
--	--	--	---

inequality symbols

learn by heart

$<$ less than	$>$ greater than	\leq less than or equal	\geq greater than or equal	\neq not equal
---------------	------------------	---------------------------	------------------------------	------------------



exercise 1e

- Decide whether each of these statements are true or false.

a) $3 > 5$ False	b) $6 \geq 4$ True	c) $2 > 2$ False
d) $1 \leq 0$ False	e) $3 < 7$ True	f) $4 < 2$ False
g) $7 \neq 7$ False	h) $1999 > 2000$ False	i) $20394 \neq 9039$ True

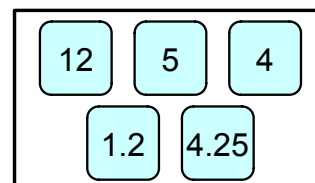
2. Write 'a is greater than or equal to 17' using inequalities. $a \geq 17$

3. Complete these statements using one of these symbols: $<$ $>$ $=$

- | | |
|-----------------|-------------------------------|
| a) 5 $>$ 0 | d) 10394 $>$ Ten thousand |
| b) 9 $=$ 9 | e) 9949480 $>$ 1 million |
| c) 7 $<$ 12 | f) 50193 $<$ Half a million |

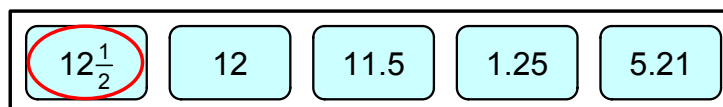
4. Arrange the numbers from the box to fit the chain:

$$\boxed{12} > \boxed{5} > \boxed{4.25} > \boxed{4} > \boxed{1.2}$$



5. Which of the numbers from the box could complete the statement?

$$12.5 \leq \boxed{}$$



comparing decimals

learn by heart

Decimal Places: the number of digits after the decimal point, e.g. 0.405 has 3 decimal places.

Adding zeros to the end of a decimal does not effect its size, so $0.1 = 0.10 = 0.10000000$

examples

Which is larger 0.4 or 0.34?

$0.4 = 0.40$,
so 0.4 is larger.

True or false: $0.30 > 0.3$

False, these numbers are
equal.

By adding a zero to 0.4, both numbers have two decimal places and we can easily see that '40 hundredths' is bigger than '34 hundredths'

exercise 1f

1. 0.6 is the same as:

a) 0.600

b) 6.0

c) 0.06

d) 0.66

2. Which of these numbers is the **largest**?

a) 0.92

b) 0.149

c) 0.840

d) 0.09999

3. Select the **larger** number in each pair, or write = if they are the same.

a) 0.412 or 0.48

b) 1.38 or 1.4

c) 0.508 or 0.507

d) 7.05 or 7.005

e) 5.125 or 5.25

f) 0.3 or 0.29

g) 9.49 or 9.491

h) 10.46 or 1.047

i) 0.16 or 0.106

4. True or false?

a) $0.4 = 0.400$ True

c) $0.24 \geq 0.240$ True

e) $0.99 < 1.0$ True

b) $0.6 > 0.06$ True

d) $0.71 < 0.707$ False

f) $0.647 < 0.7$ True

5. Write down a positive number that is less than 0.01 *Any number beginning 0.00...*

6. Which of these numbers is the **smallest**?

a) 0.02

b) 0.4

c) 0.009

d) 0.013

7. Put these numbers in order of size, from smallest to largest:

i) ^A 0.401 ^B 0.4 ^C 0.42 ^D 0.414 B, A, D, C

ii) ^A 0.27 ^B 0.7 ^C 0.207 ^D 0.2 D,C,A,B

8. Decide whether each of these statements are true or false:

- | | |
|--|--|
| a) $0.6 \geq 0.60$ True | e) $0.1 > 0.15$ False |
| b) $0.405 > 0.41$ False | f) $0.1 < 0.10$ False |
| c) $1.2 < 1.25$ True | g) $0.006 \geq 0.06$ False |
| d) $0.\dot{6} < 0.67$ True | h) $0.\dot{3} > 0.3$ True |
| i) $12.001 \neq 12.0001$ True | j) $8.3405 \leq 8.341$ True |

9. Which of the numbers from the box could complete the statement?

$1.02 \leq$
1.2
1.020
1.02
1.002
1.01

Guess My Number

Use the clues to work out which number in the grid is being described:

My number is less than 0.7

My number is more than 0.2

My number has an 8 in the thousandths column

My number is less than 0.42

My number contains the digit 2

The digit in the hundredths column is odd

0.144	0.8	0.248
0.288	0.25	0.825
0.418	0.141	0.118
0.88	0.44	0.114
0.458	0.258	0.552

comparing decimals and fractions (using place value)

example

Which is larger 0.84 or $\frac{9}{10}$?

$\frac{9}{10} = 0.9 = 0.90$, so $\frac{9}{10}$ is larger

exercise 1g

1. Which of these are the same as 0.4? Circle all that apply.

a) 0.40

b) 0.04

c) $\frac{4}{10}$

d) 0.400

e) $\frac{4}{100}$

2. In each pair, select the larger number, or write = if they are the same.

a) 0.7 or $\frac{6}{10}$

d) 0.19 or $\frac{8}{10}$

g) $\frac{73}{1000}$ or 0.72

b) 0.51 or $\frac{5}{100}$

e) 1.07 or $1\frac{6}{100}$

h) 0.402 or $\frac{5}{10}$

c) 1.6 or $1\frac{6}{10} =$

f) 0.26 or $\frac{3}{100}$

i) $\frac{3}{10}$ or 0.300 =

3. Complete these statements using one of these symbols:

< > =

a) 0.4 > $\frac{7}{100}$

d) 0.019 < $\frac{9}{100}$

b) 0.06 = $\frac{6}{100}$

e) 3.28 > $3\frac{8}{100}$

c) 0.72 > $\frac{7}{10}$

f) 1.007 < $1\frac{7}{10}$

4. Which of these numbers are **smaller** than 0.05? Choose all that apply.

a) one tenth

b) one hundredth

c) one thousandth

d) six hundredths

e) four tenths

f) nine thousandths

5. Which of these numbers are greater than $\frac{8}{10}$ and less than $\frac{9}{10}$?

a) 0.085

b) 0.82

c) 0.10

d) 0.9

e) 0.802

6. Which of these numbers are greater than $\frac{4}{10}$ and less than 0.41?

a) 0.408

b) 0.45

c) 0.40

d) 0.7

e) 0.39

7. By first writing these numbers as decimals, put each set in order, starting with the smallest.

i)

A	$\frac{1}{10}$
---	----------------

B	0.8
---	-----

C	$\frac{2}{100}$
---	-----------------

D	0.6
---	-----

 $\frac{2}{100}$ $\frac{1}{10}$ 0.6 0.8 C,A,D,B

ii)

A	0.6
---	-----

B	0.66
---	------

C	$\frac{6}{100}$
---	-----------------

D	0.61
---	------

 $\frac{6}{100}$ 0.6 0.61 0.66 C,A,D,B

iii)

A	2.45
---	------

B	2.427
---	-------

C	2.4
---	-----

D	2.47
---	------

 2.4 2.427 2.45 2.47 C,B,A,D

iv)

A	$\frac{83}{100}$
---	------------------

B	$\frac{83}{1000}$
---	-------------------

C	$\frac{8}{10}$
---	----------------

D	$\frac{85}{100}$
---	------------------

 $\frac{83}{1000}$ $\frac{8}{10}$ $\frac{83}{100}$ $\frac{85}{100}$ B,C,A,D

v)

A	$\frac{70}{10}$
---	-----------------

B	7.1
---	-----

C	$7\frac{3}{100}$
---	------------------

D	$\frac{72}{100}$
---	------------------

 $\frac{72}{100}$ $\frac{70}{10}$ $7\frac{3}{100}$ 7.1 D,A,C,B

8. Decide whether each of these statements is true or false.

A $0.3 > 0.5$ False B $0.1 < 0.01$ False C $\frac{2}{10} > 0.1$ True D $0.4 \geq \frac{4}{10}$ True

E $0.9 \neq \frac{9}{100}$ True F $0.12 < \frac{3}{10}$ True G $0.6 > 0.45$ True H $\frac{14}{10} < 1.5$ True

I $2.5 \geq 2.50$ True J $0.3 + \frac{7}{100} = 0.37$ True K $0.1 + \frac{1}{100} = 0.2$ False L $\frac{78}{10} \geq \frac{7}{10} + \frac{8}{100}$ True

Arrange the Digits

0 1 2 3 4 5 6 7 8 9

Using each of these digits just once each, make the following statements true:

$6 \cdot 79 < 6\frac{8}{10}$

$3 \cdot 58 < 3.59$

$0 \cdot 4 \leq \frac{48}{100}$

$1 \cdot 2 < 1\frac{3}{10}$

extension: can you make up your own puzzle like this?

half way between

example

Write down the number half way between 0.3 and 0.31

$0.3 = 0.300$ and $0.31 = 0.310$
so half way between is 0.305

exercise 1h

1. Which of these numbers are between 3.4 and 3.7 ? Choose all that apply.

a) 3.05

b) 3.65

c) 3.518

d) 3.72

2. Work out the number **halfway between** each of these pairs of numbers.

a) 0.3 and 0.4

0.35

c) 0.235 and 0.236

0.2355

e) 1.01 and 1.02

1.015

b) 0.6 and 0.61

0.605

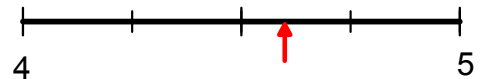
d) 0.07 and 0.071

0.0705

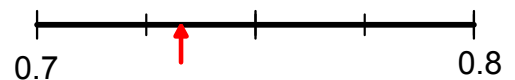
f) 0.999 and 1

0.9995

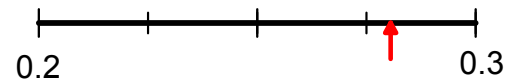
3. On the number line, estimate the position of 4.6



4. On the number line, estimate the position of 0.73



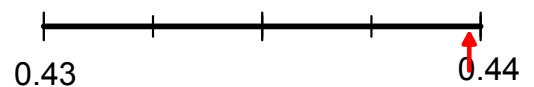
5. On the number line, estimate the position of 0.277



6. On the number line, estimate the position of 1.58



7. On the number line, estimate the position of 0.439



8. Which of these numbers is closest to 7.3 ?

a) 7.305

b) 7.4

c) 7.2

d) 7.33

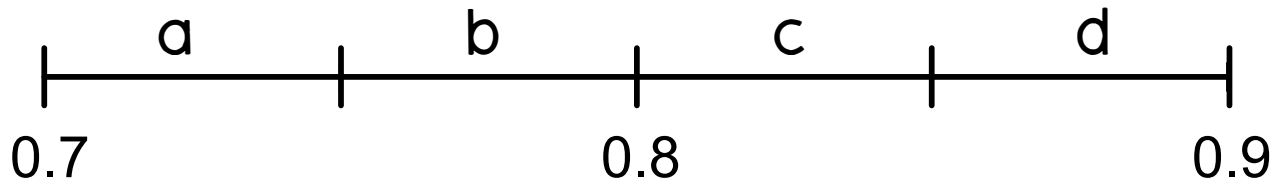
9. Which integer is closest to 3.39? 3

10. Write down a number between 0.8 and $0.\dot{8}$. e.g. $0.81, 0.88$

11. How many decimals are there between 2 and 3? *infinite*

12. How many decimals are there between 2 and 4? *infinite*

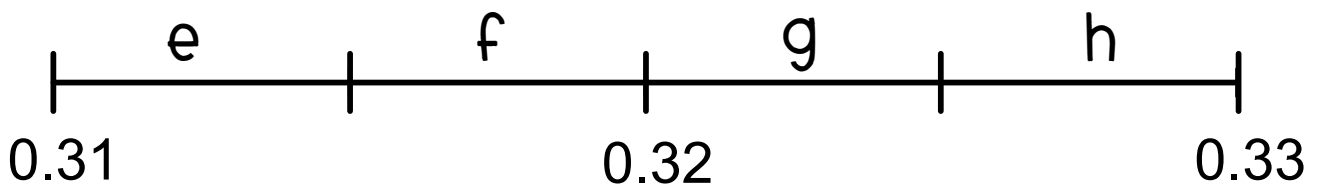
Sort It Out!



Decide which section of the number line above each of these numbers would go in

0.801	0.72	0.852	0.799	0.7501	0.78	0.74
0.845	0.76	0.709	0.840	0.89	0.7499	0.887
						0.820

<p>a</p> <p>0.74</p> <p>0.72</p> <p>0.709</p> <p>0.7499</p>	<p>b</p> <p>0.78</p> <p>0.799</p> <p>0.7501</p> <p>0.76</p>	<p>c</p> <p>0.801</p> <p>0.820</p> <p>0.845</p> <p>0.840</p>	<p>d</p> <p>0.89</p> <p>0.852</p> <p>0.887</p>
---	---	--	--



Decide which section of the number line above each of these numbers would go in

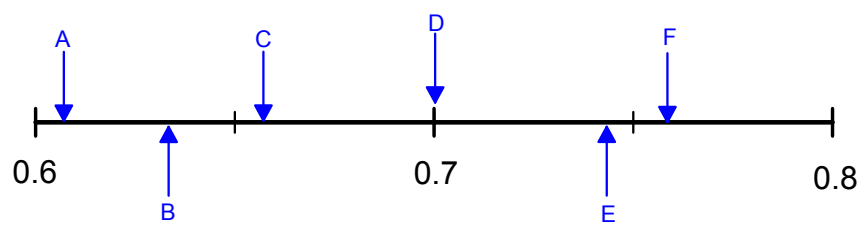
0.329	0.316	$\frac{321}{1000}$	0.328	$\frac{313}{1000}$	0.322	0.314
0.3209	$\frac{317}{1000}$	0.311			0.3255	
0.3199						0.31502

<p>e</p> <p>0.311</p> <p>$\frac{313}{1000}$</p> <p>0.314</p>	<p>f</p> <p>$\frac{317}{1000}$</p> <p>0.3199</p> <p>0.316</p> <p>0.31502</p>	<p>g</p> <p>0.3209</p> <p>$\frac{321}{1000}$</p> <p>0.322</p>	<p>h</p> <p>0.329</p> <p>0.328</p> <p>0.3255</p>
---	---	--	--

Find It On The Number Line extra challenge

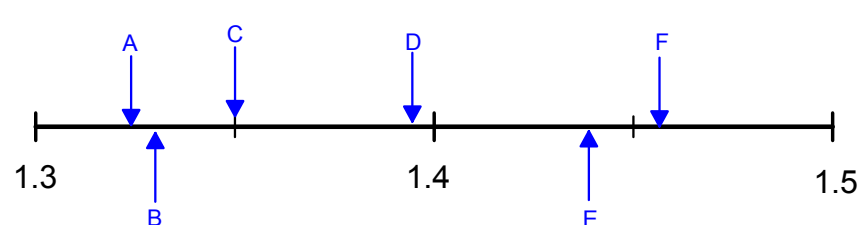
Match the numbers to the positions shown on the number lines with arrows.

1



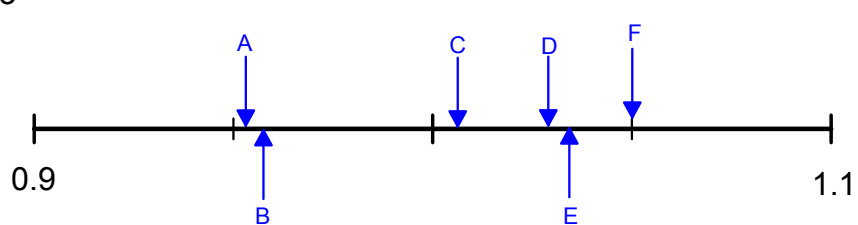
$\frac{7}{10}$ ---D	0.76 ---F	$\frac{61}{100}$ ---A
0.661 ---C	$\frac{74}{100}$ ---E	0.635 ---B

2



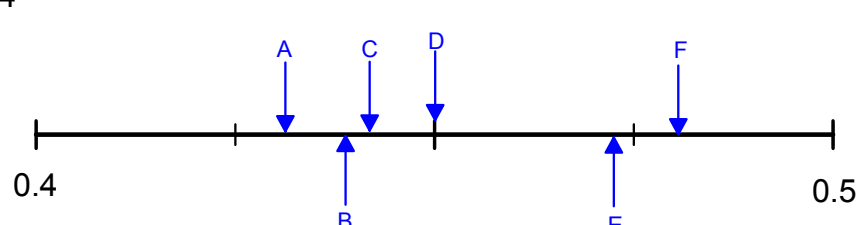
1.392 ---D	1.46 ---F	$1\frac{33}{100}$ ---B
$1\frac{44}{100}$ ---E	1.329 ---A	1.3500 ---C

3



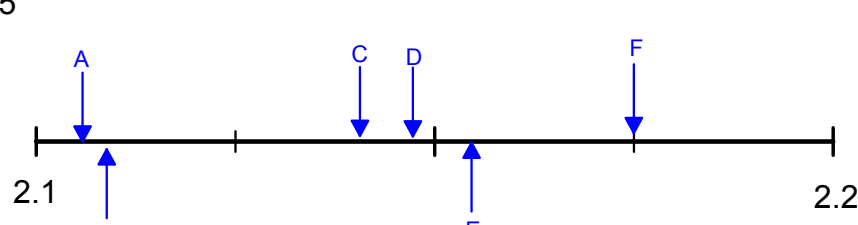
1.04 ---E	$1\frac{1}{100}$ ---C	1.05 ---F
0.96 ---B	0.955 ---A	1.034 ---D

4



$\frac{43}{100}$ ---A	0.45 ---D	0.472 ---E
$\frac{439}{1000}$ ---B	0.48 ---F	0.441 ---C

5



2.16 ---E	$\frac{214}{100}$ ---C	$2\frac{11}{100}$ ---A
2.113 ---B	$2\frac{175}{1000}$ ---F	2.147 ---D

rounding to decimal places

learn by heart

Sometimes we do not want to write all the digits of a decimal down and we can shorten it by rounding.

A number with 1 decimal place has 1 digit after the decimal point, e.g. 3.4

If rounding, to say, 2 decimal places, the value of the digit in the 3rd decimal place tells us whether to round up or down. If the 3rd decimal place is 5 or more, we round UP, which means we increase the value of the last digit by 1.

examples

Round:

- | | | |
|--------------------------------|------------|-------|
| a) 4.327 to 1 decimal place | $4.3 27$ | 4.3 |
| b) 17.0269 to 2 decimal places | $17.02 69$ | 17.03 |
| c) 3.7997 to 3 decimal places | $3.799 7$ | 3.800 |
| d) 1.996 to the nearest 0.1 | $1.9 96$ | 2.0 |

This means 1 decimal place

exercise 1i

- Which of these numbers have 1 decimal place? Select all that apply.
a) 43 b) 4.5 c) 2.75 d) 62.0 e) 200.30
- Round each number to 1 decimal place:
a) 3.62 3.6 c) 2.45 2.5 e) 4.319 4.3 g) 105.1098 105.1
b) 1.84 1.8 d) 13.19 13.2 f) 26.453 26.5 h) 459.821 459.8
- Round each number to 2 decimal places:
a) 4.085 4.09 b) 23.1279 23.13 c) 604.30567 604.31
- Round each number to 3 decimal places:
a) 4.0858 4.086 b) 23.127 23.127 c) 604.30567 604.306
- Find all the numbers that round to 3.5 to 1 decimal place:

A	3.48	D	3.41	G	3.45	J	3.34	M	3.41
B	3.51	E	3.62	H	3.55	K	3.56	N	3.509
C	3.63	F	3.81	I	3.67	L	3.39	O	3.409

6. Complete the table by rounding each number as shown:

	Number	to 1 d.p.	to 2 d.p.	Nearest Integer
a)	3.7281	3.7	3.73	4
b)	52.5917	52.6	52.59	53
c)	0.1853	0.2	0.19	0
d)	9.6458	9.6	9.65	10
e)	4.0028	4.0	4.00	4

7. Which of these numbers is 24.976 correctly rounded to one decimal place?

- a) 24.9 b) 24.10 c) 25 d) 24.98 e) 25.0

8. Which of these lengths is 32.77m given correct to the nearest 0.1m?

- a) 33m b) 32.7m c) 32.70m d) 32.8m e) 32.80m

9. Show how these cards can be arranged to make a number that rounds to 27.5 to one decimal place. **27.48**



10. Which of these numbers, when rounded to 2 decimal places, give 17.48 ? Choose all that apply.

- a) 17.485 b) 17.475 c) 17.4805 d) 17.4705

11. Round:

- a) 132.8427 to the nearest tenth **132.8**
 b) 4.7396 to the nearest hundredth **4.74**

challenge (rounding recurring decimals)

12. Round each of these recurring decimals as indicated:

- a) $0.\dot{6}$ (1 d.p.) **0.7** d) $0.\dot{7}0\dot{5}$ (3 d.p.) **0.706** g) $0.4\dot{8}$ (3 d.p.) **0.489**
 b) $0.\dot{3}\dot{4}$ (1 d.p.) **0.3** e) $0.7\dot{0}\dot{5}$ (3 d.p.) **0.705** h) $0.4\dot{9}$ (3 d.p.) **0.495**
 c) $0.\dot{5}\dot{7}$ (2 d.p.) **0.58** f) $0.70\dot{5}$ (3 d.p.) **0.706** i) $0.\dot{9}$ (1 d.p.) **1.0**

Rounding Decimals

Code Breaker

Round each number as shown.

Find your answer in the code box and write the letter in the yellow box.

The letters should spell a secret message!

a) 0.34 to 1 d.p. = 0.3 = **K**

b) 0.483 to 1 d.p. = 0.5 = **E**

c) 0.51 to 1 d.p. = 0.5 = **E**

d) 1.05 to 1 d.p. = 1.1 = **P**

e) 0.94 to 1 d.p. = 0.9 = **S**

f) 1.22 to 1 d.p. = 1.2 = **M**

g) 0.784 to 1 d.p. = 0.8 = **I**

h) 0.784 to 2 d.p. = 0.78 = **L**

i) 0.809 to 1 d.p. = 0.8 = **I**

j) 0.789 to 2 d.p. = 0.79 = **N**

k) 0.749 to 1 d.p. = 0.7 = **G**

l) 1.234 to 2 d.p. = 1.23 = **A**

m) 0.781 to 2 d.p. = 0.78 = **L**

code box

0.3 = K	0.69 = Q	0.8 = I	1.2 = M
0.4 = X	0.7 = G	0.81 = R	1.21 = F
0.48 = ?	0.71 = V	0.9 = S	1.22 = U
0.5 = E	0.74 = C	0.91 = D	1.23 = A
0.51 = H	0.75 = B	1 = J	1.24 = T
0.6 = O	0.78 = L	1.01 = Z	1.3 = Y
0.65 = U	0.79 = N	1.1 = P	1.31 = K

n) 0.779 to 2 d.p. = 0.78 = **L**

o) 0.911 to 2 d.p. = 0.91 = **D**

p) 1.225 to 2 d.p. = 1.23 = **A**

q) 1.27 to 1 d.p. = 1.3 = **Y**

r) 0.777 to 2 d.p. = 0.78 = **L**

s) 0.58 to 1 d.p. = 0.6 = **O**

t) 0.792 to 2 d.p. = 0.79 = **N**

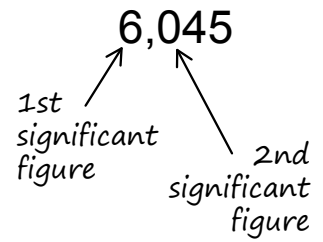
u) 0.699 to 1 d.p. = 0.7 = **G**

rounding to significant figures (integers)

learn by heart

The **first significant figure** of a number is the first non-zero digit

'Trapped zeros' lie between 2 other digits. They are significant.



examples

Round 348 to 1 significant figure (1.s.f)

(1st significant figure is in the hundreds column, so round to the nearest hundred)

= 300

Round 4,075 to 2 significant figures (2.s.f)

(2nd significant figure is in the hundreds column, so round to the nearest hundred)

= 4,100

exercise 1j

1. Round each of these numbers to 1 significant figure:

a) 53 **50**

c) 709 **700**

e) 2,409 **2,000**

b) 56 **60**

d) 358 **400**

f) 15,008 **20,000**

2. Round each of these numbers to 2 significant figures:

a) 956 **960**

c) 15,809 **16,000**

e) 194,037 **190,000**

b) 2,085 **2,100**

d) 12,314 **12,000**

f) 280,300 **280,000**

3. The number 6,008 has 4 significant figures.

4. The number 84,001 has 5 significant figures.

5. Round each of these numbers as indicated:

a) 536 (2 s.f.) **540**

d) 8,900 (1 s.f.) **9,000**

g) 99 (1 s.f.) **100**

b) 804 (2 s.f.) **800**

e) 84 (2 s.f.) **84**

h) 999 (2 s.f.) **1,000**

c) 12,400 (2 s.f.) **12,000**

f) 12 (1 s.f.) **10**

i) 9,999 (3 s.f.) **10,000**

6. Find all the numbers that round to 100, to 1 significant figure:

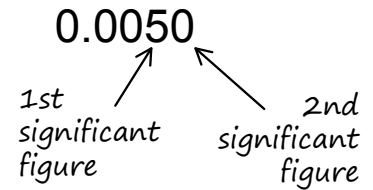
A	105	D	102	G	99	J	95	M	90	P	110
B	92	E	100	H	130	K	107	N	91	Q	96
C	98	F	90	I	170	L	89	O	55	R	140

rounding to significant figures (decimals)

learn by heart

The zeros at the start of a decimal are **not significant**

The zeros at the end of a decimal **ARE** significant



examples

Round 0.0489 to 1 significant figure (1.s.f)

(1st significant figure is in the hundredths column, so round to the nearest tenth)

$$= 0.05$$

Round 0.0899 to 2 significant figures (2.s.f)

(2nd significant figure is in the thousandths column, so round to the nearest thousandth)

$$= 0.090$$

exercise 1k

1. Which of these numbers has 3 significant figures?

a) 2.486

b) 2.406

c) 3.490

d) 0.0300

2. Round each of these to 1 significant figure:

a) 0.765 0.8

c) 0.038 0.04

e) 2.845 3

b) 0.408 0.4

d) 0.0193 0.02

f) 0.099 0.1

3. Round each of these to 2 significant figures:

a) 3.867 3.9

c) 0.247 0.25

e) 0.309 0.31

b) 0.608 0.61

d) 12.859 13

f) 0.0049 0.0049

4. The number 0.307 has 3 significant figures.

5. The number 4.8050 has 5 significant figures.

6. The number 900.009 has 6 significant figures.

7. Round each of these as indicated:

a) 0.289 (2 s.f.) 0.29

d) 8.207 (3 s.f.) 8.21

g) 0.3007 (3 s.f.) 0.301

b) 42.806 (3 s.f.) 42.8

e) 0.069 (2 s.f.) 0.069

h) 0.0914 (2 s.f.) 0.091

c) 0.0987 (2 s.f.) 0.099

f) 4.98 (1 s.f.) 5

i) 8.999 (2 s.f.) 9.0

8. What is the value of $0.\overset{\cdot}{4}\overset{\cdot}{0}\overset{\cdot}{8}$ to 4 significant figures?

0.4084

rounding to significant figures (mixed practice)

exercise 1

1. Circle the first significant figure in each of these numbers.

a) 0.429

b) 9002

c) 45

d) 0.00011

e) 0.704

f) 32,415

2. How many significant figures do each of these numbers have?

a) 506 3

b) 0.03 1

c) 0.4500 4

d) 23.605 5

3. Which of these has 2 significant figures? Circle all that apply.

a) 0.08

b) 108

c) 0.080

d) 1.08

4. Round each of these numbers to one significant figure:

a) 6.928 7

b) 0.00438 0.004

c) 82.9 80

d) 417.809 400

e) 0.089 0.09

f) 0.92 0.9

5. Which of these numbers is 72.46 rounded to one significant figure?

a) 72

b) 72.5

c) 70

d) 7

6. Which of these numbers have the digit 3 as the second significant figure?
Choose all that apply.

a) 4.312

b) 3.2

c) 403.1

d) 0.329

e) 0.0731

7. Round each of these numbers to the number of significant figures shown:

a) 45 (1 s.f.) 50

e) 0.0507 (2 s.f.) 0.051

i) 9607 (2 s.f.) 9600

b) 0.956 (2 s.f.) 0.96

f) 503 (1 s.f.) 500

j) 8.099 (3 s.f.) 8.10

c) 3005 (3 s.f.) 3010

g) 900 (2 s.f.) 900

k) 609 (2 s.f.) 610

d) 551.8 (2 s.f.) 550

h) 0.56 (1 s.f.) 0.6

l) 800 (3 s.f.) 800

8. Could the most significant figure in a number be a zero? No

9. Could the second most significant figure in a number be a zero? Yes

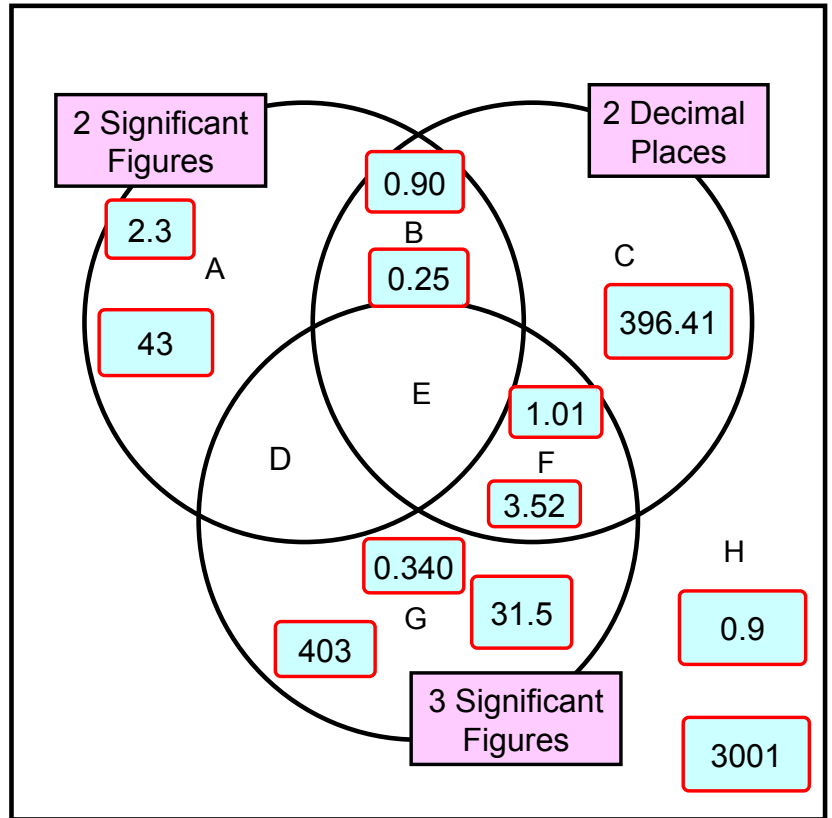
10. True or false: 42.389 rounded to 3 s.f. > 42.389 rounded to 3 d.p. ? True, 42.4 > 42.39

11. Which section of the diagram should each of the following numbers be in?

Some of the numbers go outside of the circles.

31.5	0.340	3001
43	2.3	0.25
396.41	403	0.9
0.90	3.52	1.01

extension: there are two empty sections, can you think of a number that would go in each of these two sections?

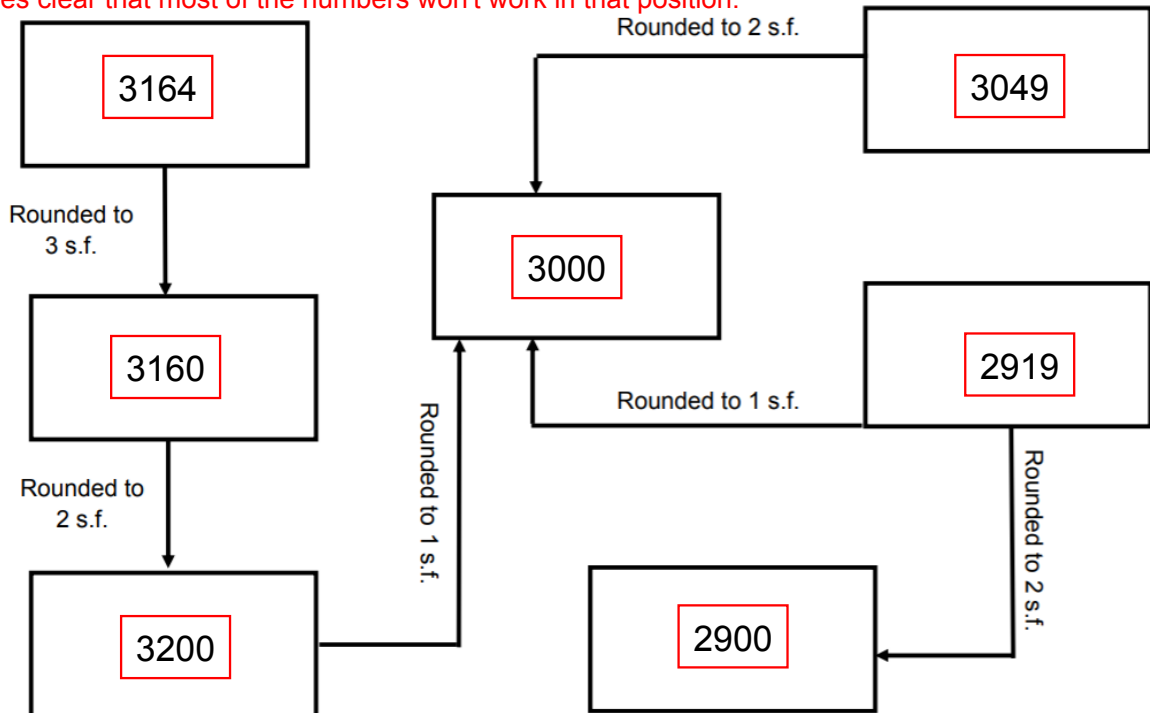


Round It! extra challenge

Place the numbers in the boxes so that all arrows indicate a correct rounding

3160	3200	3000	3164
2900	3049	2919	

Hint for getting started: try putting any number in the top left and see what happens... it quickly becomes clear that most of the numbers won't work in that position.



other number systems: base 5



learn by heart

Base 10: A number system using 10 digits (0,1,2,3,4,5,6,7,8,9)

Base 5: A number system using 5 digits (0,1,2,3,4)

example

Write 39 in base 5

$$\begin{aligned} 39 \text{ is } & 1 \times 25 + \\ & 2 \times 5 + \\ & 4 \times 1 \\ & = 124 \end{aligned}$$

base 5 column names

125s	25s	5s	1s
	1	2	4

exercise 1m

1. Write these numbers in base 5:

a) 12 **22**

d) 3 **3**

g) 125 **1000**

j) 11 **21**

b) 6 **11**

e) 60 **220**

h) 255 **2010**

k) 124 **444**

c) 27 **102**

f) 37 **122**

i) 89 **324**

l) 624 **4,444**

2. Explain why 61 cannot be a number written in base 5. **base 5 doesn't use digit 6.**

3. These numbers are written in base 5. Convert them to base 10:

a) 14 **9**

d) 210 **55**

g) 1000 **125**

b) 32 **17**

e) 331 **91**

h) 1202 **177**

c) 103 **28**

f) 4 **4**

i) 44 **24**

challenge: Convert 1,000,000 from base 5 to base 10.

15625

3. If these numbers are written in base 5, which is biggest?
A. 44 B. 43 C. 103 D. 101
4. Working in base 5, what is the number after 44? 100
5. Which of these numbers is definitely not written in base 5?
A. 34 B. 35 C. 1004 D. 1234
6. Working in base 5, what is half of 31? 13
7. Working in base 5, which number comes before 1000? 444
8. Working in base 5, which of these numbers are even?
A. 21 B. 14 C. 20 D. 123
9. Working in base 5, which of these numbers are multiples of 5?
A. 40 B. 22 C. 31 D. 100
10. Write down the digits you would use if you were working in base 6. 0,1,2,3,4,5
11. In base 6, what does 10 stand for? 6
12. In base 6, what does 11 stand for? 7

true or false

Which of these statements are true?

A In base 5, $11 + 1 = 12$	B In base 5, $14 + 1 = 15$	C In base 5, 12 is an even number	D In base 5, 10×23 is 230
E In base 5, $4 \times 4 = 16$	F In base 5, all multiples of 5 end in a zero	G In base 5, $12 + 12 = 24$	H In base 5, $100 + 10 = 110$
I In base 5, 23 is half of 101	J In base 5, 14 has exactly two factors	K In base 5, $100 \div 10 = 10$	L In base 5, $0.1 = \frac{1}{10}$

chapter review

exercise 1n

1. Write each of these as decimals:

a) 3 tenths **0.3**

b) $\frac{7}{100}$ **0.07**

c) $\frac{9}{1000}$ **0.009**

d) $1\frac{7}{10}$ **1.7**

2. Write the number *eight hundred and ten thousand* in digits. **810,000**

3. Write each of these as a fraction or mixed number:

a) 0.07 $\frac{7}{100}$

b) 2.8 $2\frac{8}{10}$

c) 0.31 $\frac{31}{100}$

d) 42.009 $42\frac{9}{1000}$

4. Which of these is largest?

a) $\frac{8}{10}$

b) 0.808

c) 0.80

d) $\frac{81}{100}$

5. Fill in the table to show how to round these numbers:

Number	Nearest Integer	1 d.p.	1 s.f.
23.06	23	23.1	20
482.69	483	482.7	500
0.055	0	0.1	0.06

4. Which of the following equals 0.232323....?

a) $0.\dot{2}\dot{3}$

b) $0.2\dot{3}2$

c) $0.2\dot{3}$

5. Which of the following equals $0.4\dot{1}\dot{2}$?

a) 0.412412...

b) 0.412222...

c) 0.412121...

6. Write 0.456565... using dot notation. **$0.4\dot{5}\dot{6}$**

challenge

Decide whether each of these statements are true or false:

a) $0.\dot{3} > 0.3$

True

b) $0.\dot{6} > 0.67$

False

c) $1.2\dot{3} < 1.\dot{2}\dot{3}$

False

d) $0.\dot{0}\dot{9} = \frac{9}{100}$

False

e) $0.7\dot{7} = 0.\dot{7}$

True

f) $8.\dot{8} < 8.819$

False

g) $1.\dot{2}\dot{9}\dot{5} > 1.2\dot{9}\dot{5}$

False

h) $0.0\dot{4}\dot{5} < \frac{5}{100}$

True

chapter review 2

exercise 1a

- Round 486 to 1 significant figure. **500**
- Write $\frac{3}{10}$ as a decimal. **0.3**
- As a fraction, 0.207 is:
a) $\frac{207}{10}$ b) $\frac{207}{100}$ c) $\frac{207}{1,000}$ d) $\frac{207}{10,000}$ e) $\frac{27}{1000}$
- Complete the gaps using $>$, $<$ or $=$
a) $0.\dot{2}$ $>$ $\frac{2}{10}$ c) $\frac{41}{1000}$ $=$ 0.041 e) 0.1 $>$ 0.001
b) $\frac{29}{1000}$ $<$ 0.290 d) 8 thousands $>$ $\frac{8}{1000}$ f) 0.86 $<$ 0.9
- Round each of these to 1 significant figure:
a) 84,026 **80,000** b) 1.87 **2** c) 0.0308 **0.03**
- True or False: 0.87 and 0.870 have the same value but different accuracies. **True**
- Which of these is largest?
a) $\frac{9}{10}$ b) 0.90 c) 0.809 d) $\frac{909}{1000}$
- Which of these is an irrational number?
a) 0.3333... b) 0.1234 c) $2.\dot{7}$ d) 0.12345678....
- Round 0.999 to 2 decimal places. **1.00**
- Round 0.999 to 2 significant figures. **1.0**
- Write as a decimal:
a) $\frac{8}{10}$ **0.8** c) $3\frac{1}{10}$ **3.1** e) $\frac{29}{1000}$ **0.029**
b) $\frac{1}{1000}$ **0.001** d) $\frac{89}{100}$ **0.89** f) $12\frac{3}{100}$ **12.03**
- Write as a fraction or mixed number:
a) 0.09 $\frac{9}{100}$ b) 0.023 $\frac{23}{1,000}$ c) 4.87 $4\frac{87}{100}$
- How many numbers are there between 4.1 and 4.2 with 2 decimal places?
4.11, 4.12, 4.13.... (10)

Place Value Puzzles

In each of these puzzles, work out which number from the grid is being described:

Puzzle 1

- My number is not an integer.
- My number has a 1 in the units column
- My number is greater than thirty
- My number is \neq 31.3
- My number has 1 in the hundredths column

1.01	301	31.1
3.1	3.101	31.3
30.1	31.01	1.03

Puzzle 2

- My number is less than eighteen thousand
- My number is \neq 180
- My number is $>$ 18
- My number has 8 in both the tens and tenths columns

180	18.01	1.81
0.18	1800	188
180.8	18180	18.8

Puzzle 3

- My number is \leq 0.2
- My number is \neq 0.15
- My number is greater than one tenth
- My number has no hundredths

0.24	0.2	0.12
0.02	0.01	0.5
0.15	2.02	0.1

Puzzle 4

- My number is $<$ 44,000
- My number is more than five thousand four hundred and fifty
- My number is \neq 5454
- My number has 5 hundreds
- My number is greater than fifteen thousand

14,500	15,501	45000
5401	5444	5454
14,534	4544	10,500

Puzzle 5

What is the largest number that can be made by rearranging these cards?

1	2	4	.	8
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842.1

Puzzle 6

What is the **smallest** number that can be made by rearranging these cards?

5	3	2	.	6
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2.356

Puzzle 7

Put these numbers in order of size, from smallest to largest

0.04, 0.4, 4.4, 1.4, 0.104
 0.04, 0.104, 0.4, 1.4, 4.4

Puzzle 8

Complete these statements using the symbols =, >, <

=, >, <

0.40	=	0.400
0.35	>	0.300
0.2	<	0.25
1.5	>	1.05
1.8	=	1.80
0.01	<	0.1
0.99	<	0.999