WALT write numbers as significant figures

Success Criteria I know that all digits that are not a zero, are significant figures. The first significant figure in a number is the first digit that is not a zero(reading from left to right) Zeros at the end of a number may or may not be significant.

Significant figures rules

	ite down the first significant figure in each of thes 3790 b 4.0625	e numbers. c 0.002 86			
	Solve/Think	Apply			
a	The first digit that is not a zero is the 3.	The first significant figure in a number is the first			
b	The first digit that is not a zero is the 4.	non-zero digit.			
с	The first digit that is not a zero is the 2.				

1 Write down the first significant figure in each of the following numbers. **a** 2876 **b** 5 069 836 **c** 1.0035 **d** 0.0791

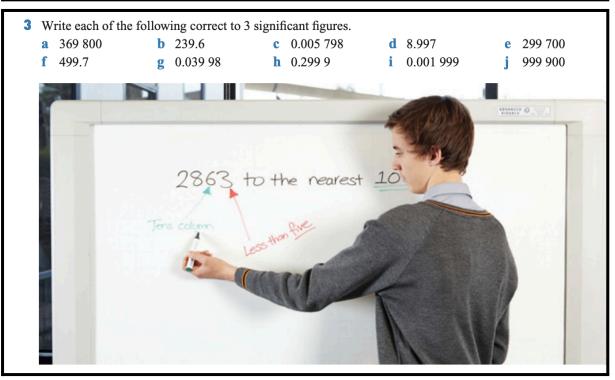
e 0.000 802

Worked example

Ro a		he following number of significant figures. c 3 d 4	e 5		
	Solve	Think	Apply		
a	63.750 91 ≈ 60	The first significant figure is 6, which is in the tens column. So we round to the nearest 10. 63.750 91 \approx 60 correct to 1 significant figure.	If rounding to <i>n</i> significant figures, find the <i>n</i> th significant figure		
b	63.750 91 ≈ 64	The second significant figure is 3, which is in the units column. So we round to the nearest 1 (whole number). $63.750 \ 91 \approx 64$ correct to 2 significant figures.	and determine the place value of the digits in this column (hundreds, tens, 2 decimal places). Round		
с	63.750 91 ≈ 63.8	The third significant figure is 7, which is in the first place after the decimal point. So we round to 1 decimal place. $63.750 \ 91 \approx 63.8$ correct to 3 significant figures.	to this place value. The standard abbreviation for writing significant figures is s.f.		
d	63.750 91 ≈ 63.75	The fourth significant figure is 5, which is in the second place after the decimal point. So we round to 2 decimal places. $63.750\ 91 \approx 63.75$ correct to 4 significant figures.			
e	63.750 91 ≈ 63.751	The fifth significant figure is 0, which is in the third place after the decimal point. So we round to 3 decimal places. $63.750\ 91 \approx 63.751$ correct to 5 significant figures.			

	8.3 b 5 600 g	6238 0.039 26	с	7.819	d	0.5273	٥	52 (00)
f 72	5 600 g	0.020.26				0.0275	C	53 689
		0.039.20	h (0.005 072	i	6103	j	2005
• EXAMPLE 3								

a	249 700 0	629.51 C 0.001 896	a 6.998
	Solve	Think	Apply
a	249 700 ≈ 250 000	The third significant figure is 9 in the 1000s column. So we round to the nearest 1000. $249\ 700 \approx 250\ 000$ correct to 3 s.f.	Find the <i>n</i> th significant figure and determine the place value of the digit in this column
b	629.51 ≈ 630	The third significant figure is 9 in the units column. So we round to the nearest whole number. $629.51 \approx 630$ correct to 3 s.f.	(hundreds, tens, 2 decimal places). Round to this place value.
c	0.001 896 ≈ 0.001 90	The third significant figure is 9 in the fifth place after the decimal point. So we round to 5 decimal places. $0.001 896 \approx 0.001 90$ correct to 3 s.f.	In parts c and d the zeros at the end are there to indicate the level of accuracy of the answer.
d	6.998 ≈ 7.00	The third significant figure is 9 in the second place after the decimal point. So we round to 2 decimal places. $6.998 \approx 7.00$ correct to 3 s.f.	



- EXAMPLE 4

When a number was rounded to 2 significant figures, the answer was: **b** 3.7

a 430

- i What is the smallest the number could have been?
- ii What is the largest the number could have been?
- iii Write a mathematical statement that shows the range of possible numbers.

	Solve	Think	Apply					
a i	425	The second significant figure is in the tens column, hence the number has been rounded to the nearest 10. Although 425 is halfway between 420 and 430, it is rounded up to 430. This is the smallest the number could have been.	Find the place value of the <i>n</i> th significant figure. This indicates how the number has been rounded (to the					
ii	<435	We cannot specify the largest number, but we know that it has to be less than 435, as 435 would be rounded up to 440.	nearest 100, 10,, 2 decimal places). Complete as for Example 7 in					
iii	$425 \leq \text{number} < 435$	$425 \le$ number < 435						
b i	3.65	The second significant figure is in the first column after the decimal point, hence the number has been rounded to 1 decimal place. Although 3.65 is halfway between 3.6 and 3.7, it is rounded to 3.7. This is the smallest the number could have been.						
ii	<3.75	We cannot specify the largest number, but we do know that it has to be less than 3.75, as 3.75 would be rounded up to 3.8.						
iii	$3.65 \leq \text{number} < 3.75$	The number could be equal to 3.65 or between 3.65 and 3.75.						

4	When a num	ber was rounded to	2 significant figur	res the answer was:		
	a 560	b 8.2	c 48	d 0.72	e 37 000	f 0.084
	i What	is the smallest the r	number could have	e been?		
	ii What	is the largest the nu	mber could have l	been?		
	iii Write	a mathematical sta	tement that shows	the range of possib	le numbers.	
5	When a num	ber was rounded to	3 significant figur	es the answer was:		
	a 483	b 3.86	c 14 500	d 0.128	e 56.9	f 3210
	Write a math	nematical statement	that shows the rar	nge of possible num	bers in each case.	
6	Write a math	nematical statement	that shows the rar	nge of possible num	bers if each of the	following number
	was rounded	to the given number	r of significant fig	gures.		
	a 2 s.f. the	answer is 300		b 2 s.f. the an	nswer is 3000	
	\mathbf{c} 3 s.f. the	answer is 6000		\mathbf{d} 3 s.f. the an	nswer is 24 000	
	e 3 s.f. the	answer is 500 000		\mathbf{f} 2 s.f. the an	nswer is 0.80	

a	294	significant figures in each of the following numbers.b0.3c4.20d0.0017	e 56 000		
	Solve	Think	Apply		
ı	3	There are 3 digits in the number 294.	For decimal numbers,		
)	1	The first significant figure in 0.3 is the first non-zero digit. Hence the first zero is not significant.	 zeros in front of the first non-zero digit are not significant, zeros after the first non-zero digit are significant. For integers (whole numbers), zeros on the end of the number may or may not be significant. 		
2	3	The zero on the end of this number indicates it has been rounded to 2 decimal places. Hence the zero in 4.20 is significant.			
1	2	The first significant figure in 0.0017 is the first non-zero digit. Hence the first three zeros are not significant.			
	Cannot tell precisely.	The zeros on the end may or may not be significant. 56 300 rounded to the nearest $1000 \approx 56\ 000$. 55 970 rounded to the nearest $100 \approx 56\ 000$. 56 003 rounded to the nearest $10 \approx 56\ 000$. 55 999.6 rounded to the nearest whole number $\approx 56\ 000$. Hence there could be 2, 3, 4 or 5 significant figures.			

7 How many significant figures are there in each of the following numbers?

a 3	8	b	0.49	c	2896	d	0.075	e	0.40	f	1.800
g 0.	.0053	h	0.060	i	400	j	7000	k	23 000	l	8 000 000

Check your answers

1 :	a 2	b 5		c 1		d 7	e 8
2 :	a i	400	ii	430		iii	428
1	b i	6000	ii	6200		iii	6240
(c i	8	ii	7.8		iii	7.82
(d i	0.5	ii	0.53		iii	0.527
	e i	50 000	ii	54 000)	iii	53 700
1	f i	700 000	ii	730 00	00	iii	726 000
1	g i	0.04	ii	0.039		iii	0.0393
]	h i	0.005	ii	0.0051		iii	0.005 07
i	i i	6000	ii	6100		iii	6100
j	j i	2000	ii	2000		iii	2010
3 :	a 370	0 000 b	240		C	0.005 80	d 9.00
•	e 30	0 000 f	500		g	0.0400	h 0.300
i	0.0	002 00 j	1 000	000 (
4 :	a i	555			ii	<565	
	iii	$555 \leq nur$	nber ·	< 565			
1	b i	8.15			ii	<8.25	
	iii	8.15 ≤ nu	mber	< 8.2	5		
•	c i	47.5			ii	<48.5	
	iii	47.5 ≤ nu	mber	< 48.	5		
	d i	0.715			ii	< 0.725	
	iii	0.715 ≤ n	umbe	r < 0.7	725	5	
•	e i	36 500			ii	<37 500	
	iii	36 500 ≤	numb	er < 3	7 5	500	
t	fi	0.0835			ii	< 0.0845	
	iii	0.0835 ≤	numb	er < 0	0.08	845	
5 :	a 482	$2.5 \leq \text{num}$	ber <	483.5			
1	b 3.8	$355 \leq \text{num}$	ber <	3.865			

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c 14\ 450 \le \text{number} < 14\ 550

d 0.1275 \le \text{number} < 0.1285

e 56.85 \le \text{number} < 56.95

f 3205 \le \text{number} < 3215

6 a 295 \le \text{number} < 3050

b 2950 \le \text{number} < 3050

c 5995 \le \text{number} < 6005

d 23\ 950 \le \text{number} < 24\ 050

e 499\ 500 \le \text{number} < 500\ 500

f 0.795 \le \text{number} < 0.805

7 a 2 b 2 c 4 d 2 e 2

f 4 g 2 h 2 i 1, 2 or 3

j 1, 2, 3 or 4 k 2, 3, 4 or 5 l 1, 2, 3, 4, 5, 6 or 7
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