

1 Complete the statements.

a)  $30,000 = 3 \times \boxed{\phantom{00000}} = 3 \times 10^4$

b)  $600,000 = 6 \times \boxed{\phantom{000000}} = 6 \times 10^{\boxed{\phantom{000000}}}$

c)  $700 = 7 \times \boxed{\phantom{000}} = \boxed{\phantom{000}} \times 10^{\boxed{\phantom{000}}}$

d)  $8,000,000 = \boxed{\phantom{0000000}} \times \boxed{\phantom{0000000}} = \boxed{\phantom{0000000}} \times 10^{\boxed{\phantom{0000000}}}$

e) three hundred thousand =  $\boxed{\phantom{000000}} \times \boxed{\phantom{000000}} = \boxed{\phantom{000000}} \times 10^{\boxed{\phantom{000000}}}$

f) four billion =  $\boxed{\phantom{0000000000}} \times \boxed{\phantom{0000000000}} = \boxed{\phantom{0000000000}} \times 10^{\boxed{\phantom{0000000000}}}$

g) twenty million =  $\boxed{\phantom{00000000}} \times \boxed{\phantom{00000000}} = \boxed{\phantom{00000000}} \times 10^{\boxed{\phantom{00000000}}}$

2 Which numbers are **not** in standard index form?

$50 \times 10^7$	$5 \times 10^{\frac{3}{4}}$	$0.5 \times 10^3$	$5 \times 10^6$
$\frac{3}{4} \times 10^5$	$6 \times 10^{72}$	$9 \times 10^{1.5}$	$1 \times 10^1$

3 Write  $>$ ,  $<$  or  $=$  to complete the statements.

a)  $10,000 \bigcirc 10^5$

d)  $20,000 \bigcirc 2 \times 10^4$

b)  $400,000 \bigcirc 8 \times 10^4$

e)  $3 \times 10^7 \bigcirc 3,700,000$

c)  $6 \times 10^2 \bigcirc 600$

4 Write the standard form numbers as ordinary numbers.

- a)  $9 \times 10^5$                       c)  $4 \times 10^8$                       e)  $7 \times 10^2$   
 b)  $8 \times 10^7$                       d)  $6 \times 10^3$                       f)  $10^6$

5 Fill in the missing information.

a)  $60,000 = 6 \times 10,000 = 6 \times 10^4$

b)  $70,000 = 7 \times 10,000 = \boxed{\phantom{00000}} \times 10^4$

c)  $65,000 = 6.5 \times 10,000 = \boxed{\phantom{00000}} \times 10^4$

d)  $63,000 = \boxed{\phantom{00000}} \times 10,000 = \boxed{\phantom{00000}} \times 10^4$

e)  $780,000 = \boxed{\phantom{000000}} \times 100,000 = \boxed{\phantom{000000}} \times 10^5$

f)  $9,900 = \boxed{\phantom{00000}} \times \boxed{\phantom{00000}} = \boxed{\phantom{00000}} \times 10^{\boxed{\phantom{00000}}}$

g)  $680,000 = \boxed{\phantom{000000}} \times \boxed{\phantom{000000}} = \boxed{\phantom{000000}} \times 10^{\boxed{\phantom{000000}}}$

h)  $834,000,000 = \boxed{\phantom{000000000}} \times \boxed{\phantom{000000000}} = \boxed{\phantom{000000000}} \times 10^{\boxed{\phantom{000000000}}}$

6 Write the numbers in standard index form.

- a) 50,000                      c) 53,200                      e) 520,000  
 b) 53,000                      d) 500,000                      f) 502,000

7 Write the standard form numbers as ordinary numbers.

- a)  $4 \times 10^5$                       d)  $4.001 \times 10^5$                       g)  $6.1 \times 10^5$   
 b)  $4.1 \times 10^5$                       e)  $6.1 \times 10^3$                       h)  $1.6 \times 10^5$   
 c)  $4.01 \times 10^5$                       f)  $6.1 \times 10^4$



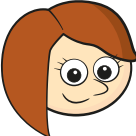
- 4 Write the standard form numbers as ordinary numbers.
- a)  $9 \times 10^5$                       c)  $4 \times 10^8$                       e)  $7 \times 10^2$   
 b)  $8 \times 10^7$                       d)  $6 \times 10^3$                       f)  $10^6$

- 5 Fill in the missing information.
- a)  $60,000 = 6 \times 10,000 = 6 \times 10^4$   
 b)  $70,000 = 7 \times 10,000 = \square \times 10^4$   
 c)  $65,000 = 6.5 \times 10,000 = \square \times 10^4$   
 d)  $63,000 = \square \times 10,000 = \square \times 10^4$   
 e)  $780,000 = \square \times 100,000 = \square \times 10^5$   
 f)  $9,900 = \square \times \square = \square \times 10^{\square}$   
 g)  $680,000 = \square \times \square = \square \times 10^{\square}$   
 h)  $834,000,000 = \square \times \square = \square \times 10^{\square}$


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- 7 Write the standard form numbers as ordinary numbers.
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 b)  $4.1 \times 10^5$                       e)  $6.1 \times 10^3$                       h)  $1.6 \times 10^5$   
 c)  $4.01 \times 10^5$                       f)  $6.1 \times 10^4$

- 8 a) The planet Mercury is on average 58 million km from the Sun.  
Write this distance in standard form.
- b) The planet Neptune is on average  $4.5 \times 10^9$  km from the Sun.  
Write this distance as an ordinary number.
- c) The number of bacteria in the average human body is estimated to be 39,000,000,000,000.  
Write this number in standard form.

9 a)  9 is greater than 2, so  $9 \times 10^5$  is greater than  $2 \times 10^6$  Do you agree with Rosie? Explain why.

- b) Write the numbers in ascending order.
- |                    |                 |             |                   |                 |
|--------------------|-----------------|-------------|-------------------|-----------------|
| 4 billion          | $4 \times 10^7$ | 410,000,000 | $4.2 \times 10^5$ | 401 million     |
| $8 \times 10^{10}$ | 8 billion       | 800 million | $8.8 \times 10^7$ | 800,000,000,000 |

10   $50 \times 10^5$  is not in standard form.  
 $50 \times 10^5 = 5 \times 10^1 \times 10^5 = 5 \times 10^6$   
Now the number is in standard form.

- Use Whitney's reasoning to write the numbers in standard form.
- a)  $30 \times 10^4$                       d)  $10 \times 7 \times 10^4$   
 b)  $200 \times 10^5$                       e)  $8,000 \times 10^1$   
 c)  $230 \times 10^5$                       f)  $91.7 \times 10^4$