Planner

Powers of 10

- Working with positive powers of 10
- Multiplying and dividing by powers of 10
- Ordering numbers less than 1 using inequality signs

Keywords

You should know

explanation 1

1 Copy and complete each of these. The first one has been done for you.

a $10^3 = 10 \times 10 \times 10 = 1000$

b $10^2 = \square \times \square = \square$

c $10^0 = \square$

d $10^5 = \_\_\_\_\_ = \square$

e $10^7 = \_\_\_\_\_ = \square$

f $10^9 = \_\_\_\_\_ = \square$

2 Write these numbers without using powers.

a 3×10^4 **b** 7×10^6 **c** 4×10^1 **d** 5×10^4

e 3×10^8 **f** 2.7×10^4 **g** 9.2×10^8 **h** 1.8×10^9

3 Write these numbers using powers of 10.

a 1 **b** 1 000 000 **c** 100 000 **d** 1 000 000 000

e 5000 **f** 9 000 000 **g** 400 000 **h** 800 000 000

explanation 2a explanation 2b online

4 Work out these multiplications without using a calculator.

a 8.23×100 **b** 26×1000 **c** $7952 \times 10\,000$

d 5.8×0.1 **e** 3.724×0.01 **f** $56\,766 \times 0.001$

g 0.641×0.1 **h** 9061×0.001 **i** 98.702×0.001

j 0.098×0.01 **k** 459.87×0.1 **l** $45\,689.02 \times 0.001$

5 Work these out without using a calculator.

a $28.7 \div 10$ **b** $358 \div 100$ **c** $928 \div 1000$

d $54.2 \div 100$ **e** $86.5 \div 1000$ **f** $2.147 \div 100$

g $0.435 \div 10\,000$ **h** $1634.7 \div 1\,000\,000$ **i** $4.06 \div 10\,000$

6 Work these out without using a calculator.

a $0.09 \div 0.001$ **b** $78.45 \div 0.01$ **c** $78\,987.4 \div 0.001$

d $8.007 \div 0.001$ **e** $72.1 \div 0.1$ **f** $982 \div 0.01$

g $1042 \div 0.001$ **h** $0.473 \div 0.1$ **i** $0.62 \div 0.01$

j $0.85 \div 0.001$ **k** $25.9 \div 0.01$ **l** $3.14 \div 0.001$

7 State whether each of these calculations is true or false.
If false, write a correct calculation to give the answer shown.

a $0.74 \times 0.001 = 0.0074$ **b** $430 \div 1000 = 0.430$

c $0.265 \times 0.0001 = 0.000\,026\,5$ **d** $0.265 \div 10\,000 = 0.000\,002\,65$

8 Fill in the blanks without using a calculator.

a $67.2 \times \square = 0.672$ **b** $\square \div 0.01 = 67.2$

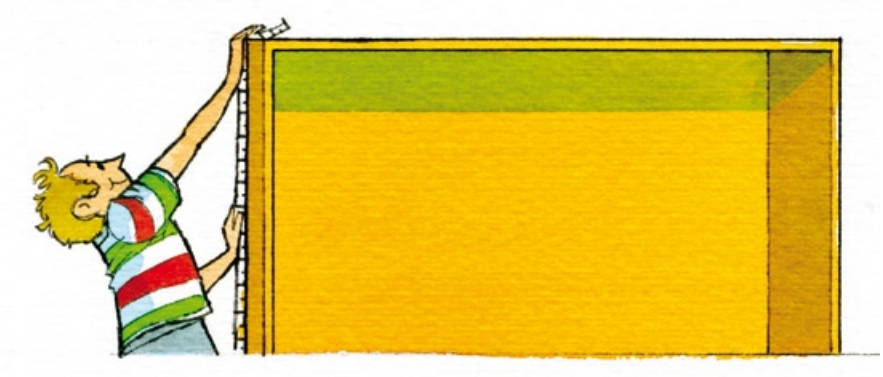
c $824 \div 1000 = \square$ **d** $0.824 \times 1000 = \square$

e $101\,010 \div 0.001 = \square$ **f** $0.215 \times \square = 21\,500$

g $0.009 \times \square = 0.0009$ **h** $0.05 \div \square = 50$

9 Nathan measured the height of a cupboard as 2.1 m.

How many 0.1 m high boxes can he stack, one on top of the other, in the cupboard?



10 William filled six test tubes with 0.01 litres of liquid in each.
How much liquid did he use altogether?

11 How many litres would be needed to fill these?

a 5 bottles with 0.1 litres in each
b 6 cups with 0.01 litres in each
c 8 test tubes with 0.001 litres each
d 14 cups with 0.01 litres in each

explanation 3a | explanation 3b | online

12 Work these out without using a calculator.

a 6×0.9
b 30×0.07
c 700×0.4
d 0.7×5000
e 0.85×200
f 20×0.034
g 0.06×60
h 0.004×80
i 4000×0.12
j 0.32×300
k 5000×0.011
l $0.25 \times 40\,000$

13 Work these out without using a calculator.

a 0.06×0.05
b 0.007×0.08
c 0.32×0.04
d 0.0005×0.7
e 0.7×0.006
f 0.008×0.09
g 0.0001×0.02
h 0.0003×0.0009
i 0.008×0.0008
j $0.0007 \times 0.000\,03$
k 0.009^2
l 0.0007^2

14 Copy and complete these.

a $63 \div 0.09 = \dfrac{63}{0.09} = \dfrac{\square}{9} = \dfrac{\square}{3} = \square$ (× 100, ÷ 3; × 100, ÷ 3)

b $0.9 \div 0.015 = \dfrac{0.9}{0.015} = \dfrac{\square}{15} = \dfrac{\square}{5} = \square$ (× 1000, ÷ 3; × 1000, ÷ 3)

15 Work these out without using a calculator.

a 8 ÷ 0.2 **b** 70 ÷ 0.5 **c** 300 ÷ 0.6

d 40 ÷ 0.08 **e** 540 ÷ 0.09 **f** 8100 ÷ 0.81

g 930 ÷ 0.003 **h** 4900 ÷ 0.7 **i** 81 ÷ 0.009

j 2100 ÷ 0.03 **k** 360 ÷ 0.06 **l** 40 000 ÷ 0.008

16 Work these out without using a calculator.

a 3.5 ÷ 0.5 **b** 2.1 ÷ 0.07 **c** 6.4 ÷ 0.008

d 0.72 ÷ 0.8 **e** 0.054 ÷ 0.6 **f** 0.0093 ÷ 0.03

g 0.081 ÷ 0.09 **h** 0.0077 ÷ 0.011 **i** 0.305 ÷ 0.05

17 Write two possible questions using multiplication and division by decimals (as in questions **4** to **16**) which would give you each answer.

a 9.6 **b** 150 **c** 0.56 **d** 3200 **e** 0.000 63

explanation 4 online

The next few questions use the following conversions:

1 kg = 1000 g, 1 g = 1000 mg, 1 litre = 1000 ml, 1 km = 1000 m, 1 m = 1000 mm.

18 Convert these measurements.

a 0.32 m into km **b** 93 mm into m **c** 42.57 km into m

d 305 m into mm **e** 4820 mm into m **f** 397 cm into m

g 5680 m into km **h** 89.76 km into m **i** 3 mm to m

19 Convert these.

a 64 g into mg **b** 7924 mg into g **c** 4.389 kg into g

d 567.9 g into kg **e** 0.0754 kg into g **f** 54 g into kg

20 Convert these.

a 945 ml into litres **b** 0.734 litres into ml **c** 457 ml into litres

d 0.009 litres into ml **e** 0.4 ml into litres **f** 3.7 ml into litres

21 Five gigabytes could be written as 5×10^9 bytes.

Write each of these measurements using powers of 10.

a 2 gigabytes = _____ bytes

b 2 megabytes = _____ bytes

c 2 kilobytes = _____ bytes

d 7.4 megabytes = _____ bytes

explanation 5a explanation 5b

22 Place one of =, > and < between each of these pairs.

a 120 cm ☐ 1.2 m

b 8.75 litres ☐ 8750 ml

c 6 km ☐ 600 000 mm

d 920 m ☐ 0.92 km

e 0.57 g ☐ 0.0057 kg

f 25 kg ☐ 25 000 g

g 0.333 m ☐ 333 mm

h 0.75 m ☐ 75 mm

23 Draw number lines going from −5 to 4 and use one to illustrate each of these inequalities.

a $x \leq 3$

b $x \leq -2$

c $x \geq 1$

d $x \geq -3$

e $x < 3$

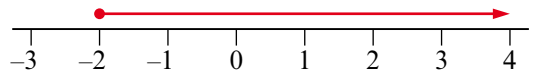
f $x < -4$

g $x > -1$

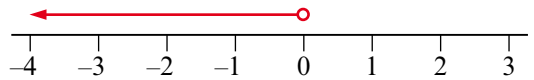
h $x > 0$

24 Write down the inequality show by each number line.

a



b



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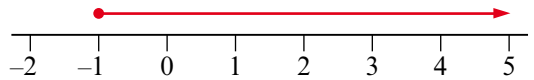
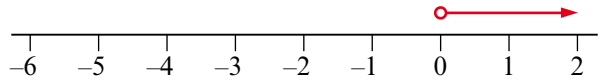


d



e