

Decimals, estimates, primes and factors



Hints online, answers free with an account:
mathswariz.uk/worksheets/basic-number/

Grades 4–9 About 80 minutes No calculator 89 marks

Name _____

Class _____

Date _____

A Before you start

Grades 4–5

You will need these in every question below.

A1 Work out 0.6×0.3 .

[1 mark]

Answer

A2 Round 3846 to 1 significant figure.

[1 mark]

Answer

A3 Write down all the factors of 36.

[2 marks]

Answer

A4 Work out $-3 \times (-8)$ and $-56 \div 7$.

[2 marks]

Answer and

A5 Write down the first prime number greater than 50.

[1 mark]

Answer

Your teacher works through each example with you. Then try the one beside it on your own.

EXAMPLE 1

Work out 3.6×0.24 .

Hint Multiply 36 by 24 with no decimal points. The answer has as many decimal places as the two numbers in the question have between them.

B1 Work out 4.8×0.35 .

[2 marks]

Answer

EXAMPLE 2

Work out $2.88 \div 0.12$.

Hint Multiply both numbers by 100 so that you divide by a whole number. This does not change the answer.

B2 Work out $3.15 \div 0.07$.

[2 marks]

Answer

EXAMPLE 3

Use approximations to estimate the value of 48.3×6.12 .

0.198.

Hint Round every number to 1 significant figure first. Dividing by a number less than 1 makes the answer bigger.

B3 Use approximations to estimate the value of $\frac{612 \times 3.87}{0.52}$. [3 marks]

Answer

EXAMPLE 4

Find the highest common factor (HCF) and the lowest common multiple (LCM) of 90 and 126.

Hint Write each number as a product of primes. The HCF uses the primes they share. The LCM uses every prime, as many times as it appears in either number.

B4 Find the highest common factor (HCF) and the lowest common multiple (LCM) of 72 and 120. [4 marks]

Answer HCF = LCM =

C Practice

Grades 5–7

Each question asks for something different. Show your working.

C1 Write 504 as a product of its prime factors. Give your answer in index form. [2 marks]

Answer

C2 You are told that $37 \times 64 = 2368$. Use this fact to write down the answers to these. You do not need to do any long multiplication.

(a) 3.7×6.4 [1 mark]

Answer

(b) $2368 \div 0.64$ [1 mark]

Answer

(c) 0.37×640 [1 mark]

Answer

(d) $236.8 \div 6.4$

[1 mark]

Answer

Total for C2: 4 marks

C3 Work out $(-4)^2 - 3 \times (-5)$.

[2 marks]

Answer

C4 Use approximations to estimate the value of $\sqrt{48.6} \times 3.08^2$.

[2 marks]

Answer

C5 One lighthouse flashes every 20 seconds. Another lighthouse flashes every 28 seconds. [2 marks]
They flash together at midnight. How many seconds later do they next flash together?

Answer

C6 Pencils cost 34p each. Ellie has £5. She buys as many pencils as she can. How much [3 marks]
change does she get?

Answer

C7 Work out the value of $\sqrt[3]{216} + 2^5$.

[2 marks]

Answer

- C8** At 6 am the temperature was -4°C . By noon it had risen by 9 degrees. By midnight it had fallen by 13 degrees from the noon temperature. What was the temperature at midnight? [2 marks]

Answer

- C9** Round 0.0060472

- (a) to 3 significant figures, [1 mark]

Answer

- (b) to 2 decimal places. [1 mark]

Answer

Total for C9: 2 marks

D Exam-style questions

Grades 6–9

Answer every question in the space given. Show your working: most of the marks are for method.

- D1** $x = 2^3 \times 3 \times 5^2$ and $y = 2^2 \times 3^3 \times 5$.

- (a) Find the highest common factor (HCF) of x and y . Give your answer as an ordinary number. [2 marks]

Answer

- (b) Find the lowest common multiple (LCM) of x and y . Give your answer in index form. [2 marks]

Answer

Total for D1: 4 marks

D2 Ravi uses approximations to estimate the value of $\frac{9.82 \times 38.6}{0.512}$.

(a) Work out an estimate for the value. You must show your working.

[2 marks]

Answer

(b) Is your answer to part (a) an overestimate or an underestimate? Give a reason for your answer.

[1 mark]

Answer

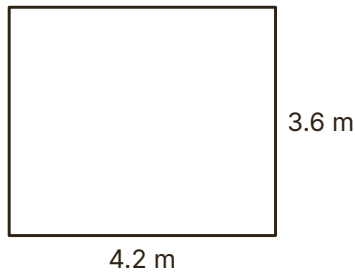
Total for D2: 3 marks

D3 Sam says, "Every whole number has an even number of factors, because factors always come in pairs." [2 marks]

Sam is wrong. Explain why, using an example.

- D4** A rectangular room is 4.2 m long and 3.6 m wide. Carpet costs £18.75 per square metre. [4 marks]
The carpet is only sold in whole square metres.

Work out the cost of the carpet for the room.



Not drawn accurately

Answer

- D5** Bus A leaves a station every 12 minutes. Bus B leaves every 20 minutes and bus C leaves every 30 minutes. All three buses leave together at 7 am. [3 marks]
Show that the next time all three leave together is 8 am.

- D6** Nina makes party bags. She has 84 sweets, 126 stickers and 210 balloons. Every bag must hold the same number of sweets, the same number of stickers and the same number of balloons. Nothing is left over.

- (a) What is the greatest number of bags she can make? You must show your working. [3 marks]

Answer

(b) How many sweets, stickers and balloons are in each bag?

[1 mark]

Answer ... sweets, ... stickers, ... balloons

(c) Nina paid £21.84 for the sweets, stickers and balloons. She sells every bag for 95p. [2 marks]
Work out her profit.

Answer

Total for D6: 6 marks

D7 Work out the value of $\frac{(-3)^3 - 5 \times (-6)}{-2 + (-1)^2}$.

[3 marks]

Answer

D8 Find the smallest positive whole number n such that $756n$ is a square number. You must show your working. [3 marks]

Answer $n = \dots\dots$

D9 A tank holds 3980 litres of water. Water flows out of the tank at 18.7 litres per minute. [3 marks]
Use approximations to estimate how many hours the tank takes to empty.

Answer

- D10** Pens cost £1.35 each. Notebooks cost £2.40 each. Lena spends exactly £21 on pens and notebooks. She buys at least one of each. [4 marks]

Work out how many pens and how many notebooks she buys. Show that there is only one answer.

Answer pens and notebooks

E Extension

Grade 9 and beyond

No route is given. Spend five minutes on a problem before you look at a hint. The hints are on the last page of the worksheet, and you can use one at a time.

- E1** Find the smallest positive whole number that has exactly 12 factors. [4 marks]

Answer

- E2** Two whole numbers have a highest common factor of 6 and a lowest common multiple of 180. Neither number is 6 or 180. [4 marks]

Find every possible pair of numbers.

Answer

E3 Find the smallest positive whole number m such that $1512m$ is a cube number. Then [4 marks]
find the cube root of $1512m$.

Answer $m = \dots\dots$ cube root $= \dots\dots$

E4 The product of three consecutive positive whole numbers is 2730. Find the three [3 marks]
numbers.

Answer

F How did it go?

Colour one circle on each line.

	Not yet	Nearly	Yes
I can multiply and divide decimals, and use approximations to estimate an answer.	☐	☐	☐
I can write a number as a product of primes and use it to find the HCF and LCM of two numbers.	☐	☐	☐
I can calculate with negative numbers, powers and roots in the right order.	☐	☐	☐

Extension hints

Use one hint at a time. Cover the ones below it with a sheet of paper.

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- E1**
- Hint 1** Count factors using the powers in a prime factorisation.
- Hint 2** If $n = 2^a \times 3^b \times 5^c$, then n has $(a + 1)(b + 1)(c + 1)$ factors.
- Hint 3** 12 can be written as 12 , 6×2 , 4×3 or $3 \times 2 \times 2$. The smallest numbers these give are 2^{11} , $2^5 \times 3 = 96$, $2^3 \times 3^2 = 72$ and $2^2 \times 3 \times 5 = 60$. The smallest is 60.
-
- E2**
- Hint 1** Both numbers are multiples of 6. Write them as $6a$ and $6b$.
- Hint 2** a and b share no factor, and $6ab = 180$, so $ab = 30$.
- Hint 3** The pairs with no common factor and a product of 30 are 1 and 30, 2 and 15, 3 and 10, 5 and 6. The first gives 6 and 180, which is not allowed. The others give 12 and 90, 18 and 60, 30 and 36.
-
- E3**
- Hint 1** Write 1512 as a product of primes. In a cube number, every power is a multiple of 3.
- Hint 2** $1512 = 2^3 \times 3^3 \times 7$
- Hint 3** Only the 7 is short. It needs 7^3 , so $m = 7^2 = 49$. Then $1512 \times 49 = 2^3 \times 3^3 \times 7^3 = (2 \times 3 \times 7)^3 = 42^3$.
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- E4**
- Hint 1** Write 2730 as a product of primes.
- Hint 2** $2730 = 2 \times 3 \times 5 \times 7 \times 13$
- Hint 3** One of the numbers must be 13, the largest prime. Then $14 = 2 \times 7$ and $15 = 3 \times 5$ use up the other primes. The numbers are 13, 14 and 15.