

# 1. Estimating & HCF/LCM Answers

1. Write down the first **five** multiples of 3.

3 6 9 12 15  
(1)

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2. From the list of numbers

7    9    12    21    23    30    36    45

(a) write down the multiples of 7.

7, 21  
(2)

(b) write down the multiples of 5.

30, 45  
(2)

(c) write down the multiples of 12.

12, 36  
(2)

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3. (a) Write down two multiples of 4.

4 and 8  
(1)

(b) Write down two multiples of 9.

9 and 18  
(1)

(c) Write down a number which is a multiple of both 4 and 9.

36  
(1)

4. Write down all the factors of 16.

1, 2, 4, 8, 16  
.....  
(2)

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5. Write down all the factors of 26.

1, 2, 13, 26  
.....  
(2)

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6. From the list of numbers

3    5    7    9    11    15    24

(a) Write down a factor of 12

3  
.....  
(1)

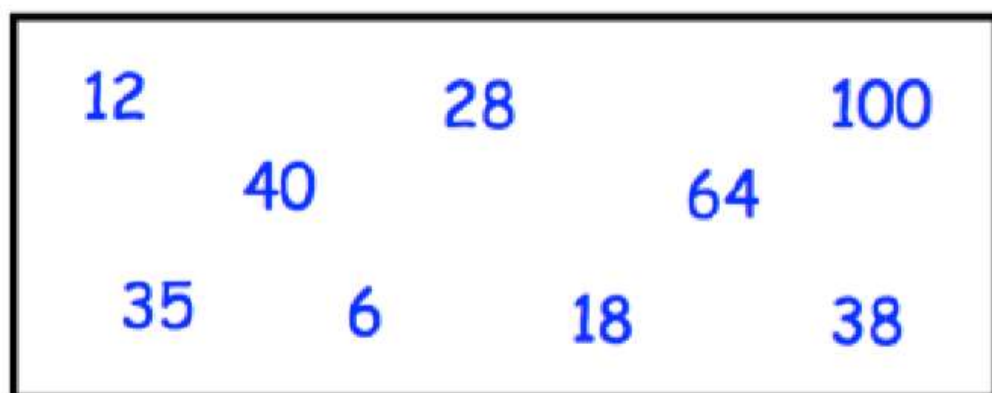
(b) Write down a factor of 28

7  
.....  
(1)

(c) Write down a factor of 81

9  
.....  
(1)

1.



From the box above, choose two numbers that:

(a) have a common factor of 10

40 ..... and ..... 100  
(1)

(b) have a common multiple of 24

6 ..... and ..... 12  
(1)

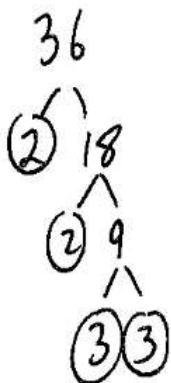
(c) have a common factor of 7

35 ..... and ..... 28  
(1)

(d) have a common multiple of 200

40 ..... and ..... 100  
(1)

1. Express 36 as a product of its prime factors.

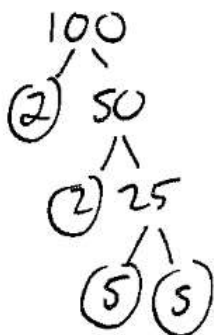


$$2 \times 2 \times 3 \times 3$$

$$2^2 \times 3^2$$

(2)

- 
2. Express 100 as a product of its prime factors.

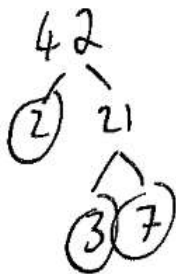


$$2 \times 2 \times 5 \times 5$$

$$2^2 \times 5^2$$

(2)

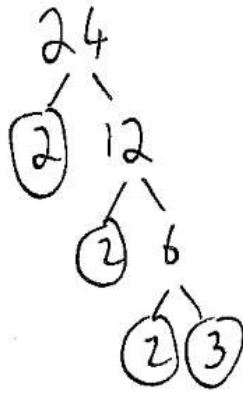
- 
3. Write 42 as a product of its prime factors.



$$2 \times 3 \times 7$$

(2)

4. Write 24 as the product of its prime factors.  
Give your answer in index form.

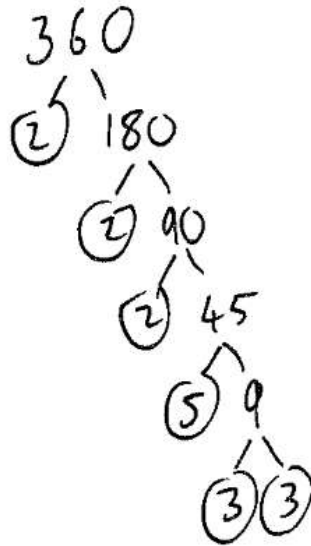


$$2 \times 2 \times 2 \times 3$$

$$= 2^3 \times 3$$

.....  
(3)

5. Write 360 as a product of its prime factors.



$$2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$2^3 \times 3^2 \times 5$$

.....  
(2)

6. A number is written as a product of its prime factors as  $2 \times 3^2 \times 5$

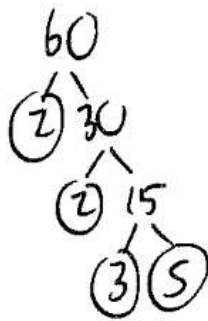
Work out the number.

$$2 \times 9 \times 5$$

$$90$$

.....  
(2)

11. (a) Write 60 as a product of its prime factors.

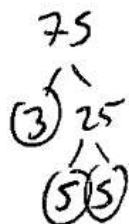


$$2 \times 2 \times 3 \times 5$$

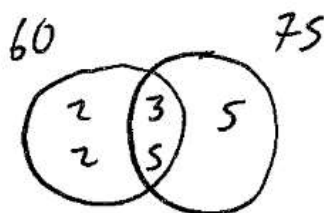
$$2^2 \times 3 \times 5$$

(2)

(b) Find the Lowest Common Multiple (LCM) of 60 and 75.



$$75 = 3 \times 5 \times 5$$

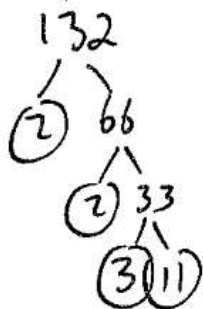


$$\text{LCM} = 2 \times 2 \times 3 \times 5 \times 5$$

$$300$$

(2)

12. (a) Write 132 as a product of its prime factors.

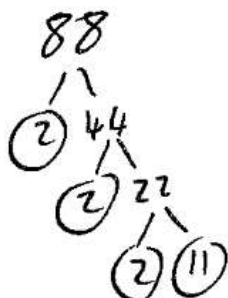


$$2 \times 2 \times 3 \times 11$$

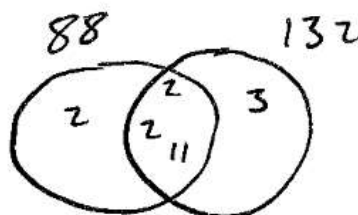
$$2^2 \times 3 \times 11$$

(2)

(b) Find the Highest Common Factor (HCF) of 88 and 132.



$$2 \times 2 \times 2 \times 11$$



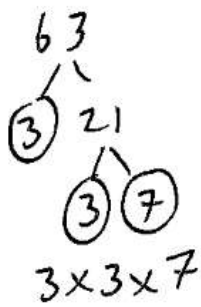
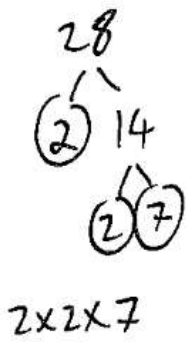
$$\text{HCF} = 2 \times 2 \times 11$$

$$= 44$$

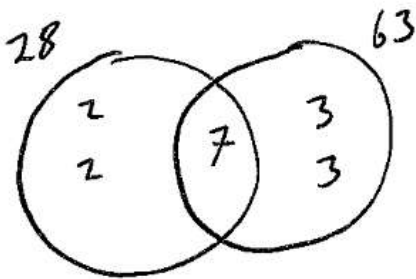
$$44$$

(2)

13. Find the least common multiple (LCM) of 28 and 63.



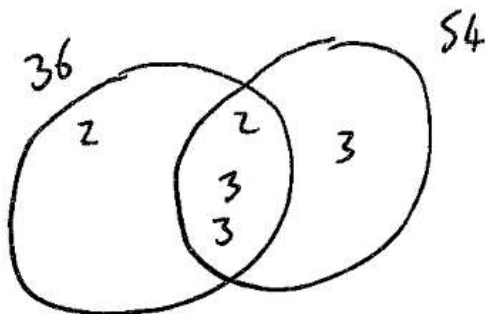
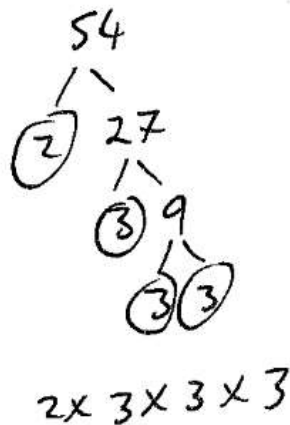
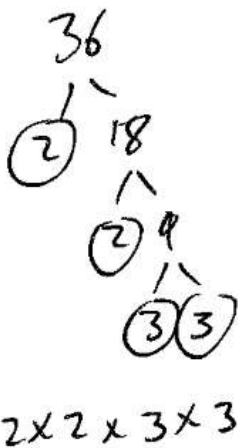
$$\begin{aligned} \text{LCM} &= 2 \times 2 \times 7 \times 3 \times 3 \\ &= 252 \end{aligned}$$



.....  
252

(2)

14. Find the least common multiple (LCM) of 36 and 54.



.....  
108

$$\text{LCM} = 2 \times 2 \times 3 \times 3 \times 3 = 108$$

(2)



15. You are given that  $45 = 3^2 \times 5$

(a) Write each of the following as the product of prime factors in index form.

(i) 90

$$45 \times 2 = 90$$
$$(3^2 \times 5) \times 2$$

$$\frac{2 \times 3^2 \times 5}{\dots\dots\dots}$$

(1)

(ii) 135

$$45 \times 3 = 135$$
$$(3^2 \times 5) \times 3$$

$$\frac{3^3 \times 5}{\dots\dots\dots}$$

(1)

(iii) 450

$$45 \times 10 = 450$$
$$(3^2 \times 5) \times (2 \times 5)$$

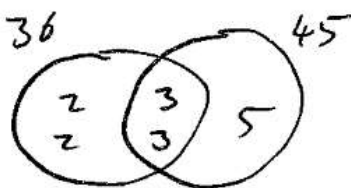
$$\frac{2 \times 3^2 \times 5^2}{\dots\dots\dots}$$

(1)

(b) What is the least common multiple (LCM) of 36 and 45.



$$45 = 3 \times 3 \times 5$$



$$\text{LCM} = 2 \times 2 \times 3 \times 3 \times 5$$

$$\frac{180}{\dots\dots\dots}$$

(2)

(c) What is the highest common factor (HCF) of 36 and 45.

$$\text{HCF} = 3 \times 3$$

$$\frac{9}{\dots\dots\dots}$$

(2)

## HCF and LCM

### Things to remember:

- A factor is a whole number that divides exactly into another number.
- A multiple is a number that may be divided by another a certain number of times without a remainder.
- A prime number only has 2 factors – 1 and itself.
- HCF is an abbreviation of Highest Common Factor and LCM of Lowest Common Multiple.

### Questions:

1. Tom and Amy set the alarms on their phones to sound at 6.45 am. Both alarms sound together at 6.45 am. Tom's alarm then sounds every 9 minutes. Amy's alarm then sounds every 12 minutes. At what time will both alarms next sound together?

9 18 27 (36) 45 54...

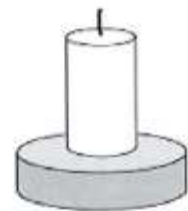
12 24 (36) 48...

6:45 + 36 mins

7:21 am

(Total for question = 3 marks)

2. Caroline is making some table decorations. Each decoration is made from a candle and a holder. Caroline buys some candles and some holders each in packs. There are 30 candles in a pack of candles. There are 18 holders in a pack of holders. Caroline buys exactly the same number of candles and holders.
- (i) How many packs of candles and how many packs of holders does Caroline buy?



candle and holder

30 60 (90) 120 150...

18 36 54 72 (90)...

$$90 \div 30 = 3$$

$$90 \div 18 = 5$$

..... 3 ..... packs of candles

..... 5 ..... packs of holders

- Caroline uses all her candles and all her holders.
- (ii) How many table decorations does Caroline make?

..... 90 ..... table decorations  
(Total for question = 5 marks)

3. Buses to Acton leave a bus station every 24 minutes.  
 Buses to Barton leave the same bus station every 20 minutes.  
 A bus to Acton and a bus to Barton both leave the bus station at 9 00 am.  
 When will a bus to Acton and a bus to Barton next leave the bus station at the same time?

24 48 72 96 (120) ...  
 20 40 60 80 100 (120) ...  
 9:00 + 120 mins

..... 11:00am  
 (Total for Question is 3 marks)

4. Rita is going to make some cheeseburgers for a party.  
 She buys some packets of cheese slices and some boxes of burgers.  
 There are 20 cheese slices in each packet.  
 There are 12 burgers in each box.  
 Rita buys exactly the same number of cheese slices and burgers.  
 (i) How many packets of cheese slices and how many boxes of burgers does she buy?

20 40 (60) 80 100 ...  
 12 24 36 48 (60) ...  
 $60 \div 20 = 3$   
 $60 \div 12 = 5$

..... 3 ..... packets of cheese slices  
 ..... 5 ..... boxes of burgers

Rita wants to put one cheese slice and one burger into each bread roll.  
 She wants to use all the cheese slices and all the burgers.

- (ii) How many bread rolls does Rita need?

..... 60 ..... bread rolls  
 (Total for Question is 4 marks)

5. Veena bought some food for a barbecue.  
 She is going to make some hot dogs.  
 She needs a bread roll and a sausage for each hot dog.  
 There are 40 bread rolls in a pack.  
 There are 24 sausages in a pack.  
 Veena bought exactly the same number of bread rolls and sausages.  
 (i) How many packs of bread rolls and packs of sausages did she buy?

40 80 (120) 160 200 ...  
 24 48 72 96 (120) ...

$$120 \div 40 = 3$$

$$120 \div 24 = 5$$

..... 3 ..... packs of bread rolls  
 ..... 5 ..... packs of sausages.

- (ii) How many hot dogs can she make?

..... 120 .....  
 (Total for Question is 5 marks)

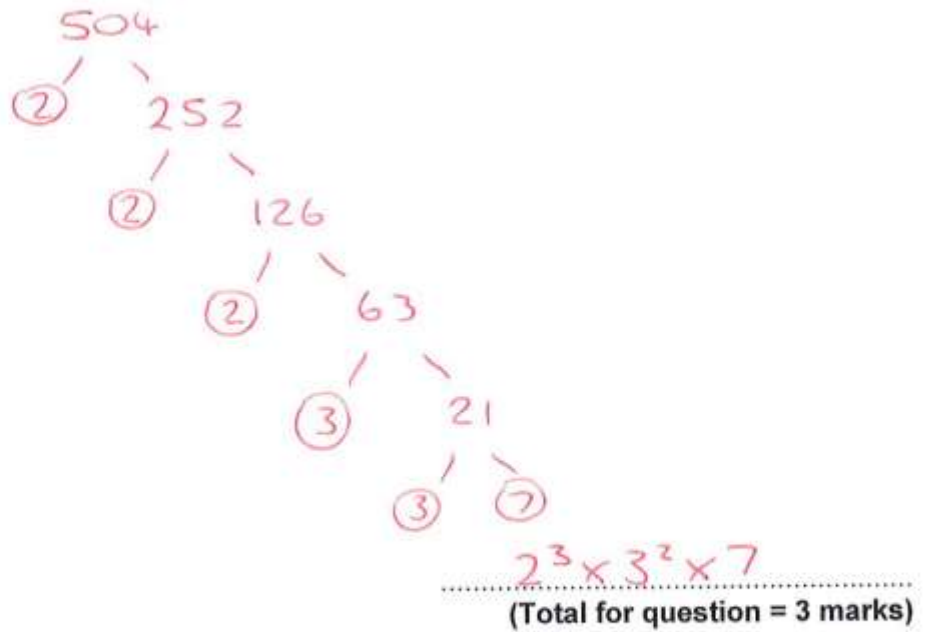
6. Find the highest common factor (HCF) of 32, 48 and 72

	32	48	72
(2)	16	24	36
(2)	8	12	18
(2)	4	6	9

$$2 \times 2 \times 2 = 8$$

..... 8 .....  
 (Total for question = 2 marks)

7. Write 504 as a product of powers of its prime factors.



8. John buys some boxes of pencils and some packets of pens for people to use at a conference.  
 There are 40 pencils in a box.  
 There are 15 pens in a packet.  
 John gives one pencil and one pen to each person at the conference.  
 He has no pencils left.  
 He has no pens left.  
 How many boxes of pencils and how many packets of pens did John buy?

40 80 (120) 160 200...  
 15 30 45 60 75 90 105 (120)...  
 $120 \div 40 = 3$   
 $120 \div 15 = 8$

..... 3 ..... boxes of pencils  
 ..... 8 ..... packets of pens  
 (Total for question = 3 marks)

1. (a) Round 3925 to the nearest thousand.

$$\begin{array}{r} 4000 \\ \hline \end{array} \quad (1)$$

(b) Round 3925 to the nearest hundred.

$$\begin{array}{r} 3900 \\ \hline \end{array} \quad (1)$$

(c) Round 3925 to the nearest ten.

$$\begin{array}{r} 3930 \\ \hline \end{array} \quad (1)$$

(d) Round 17.89 to the nearest whole number.

$$\begin{array}{r} 18 \\ \hline \end{array} \quad (1)$$

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2. (a) Round the number 7.819 to one decimal place.

$$\begin{array}{r} 7.8 \\ \hline \end{array} \quad (1)$$

(b) Round the number 7.819 to two decimal places.

$$\begin{array}{r} 7.82 \\ \hline \end{array} \quad (1)$$

7.



Holly works out the answer to  $135.66 + 193.88$  on a calculator.

Her answer is shown on the calculator.

(a) Round her answer to the nearest 10.

330  
.....  
(1)

(b) Round her answer to the nearest 100.

300  
.....  
(1)

(c) Round her answer to the nearest integer.

330  
.....  
(1)

(d) Round her answer to one decimal place.

329.5  
.....  
(1)

8. (a) Write 5725 to the nearest 100.

5700  
.....  
(1)

(b) Write 83.07718 correct to two decimal places.

83.08  
.....  
(1)

(c) Write 6.35 correct to 1 decimal place.

6.4  
.....  
(1)

(d) Write 129.34952 correct to 1 decimal place.

129.3  
.....  
(1)

(e) Write 65.047 correct to 1 decimal place.

65.0 or 65  
.....  
(1)

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1. (a) Round 41982 to one significant figure



$$\begin{array}{r} 40000 \\ \hline \end{array} \quad (1)$$

- (b) Round 8812 to one significant figure

$$\begin{array}{r} 9000 \\ \hline \end{array} \quad (1)$$

- (c) Round 0.0761 to one significant figure

$$\begin{array}{r} 0.08 \\ \hline \end{array} \quad (1)$$

- (d) Round 9.99 to one significant figure

$$\begin{array}{r} 10 \\ \hline \end{array} \quad (1)$$

- 
2. (a) Round 254 to two significant figures



$$\begin{array}{r} 250 \\ \hline \end{array} \quad (1)$$

- (b) Round 75301 to two significant figures

$$\begin{array}{r} 75000 \\ \hline \end{array} \quad (1)$$

- (c) Round 0.0001921 to two significant figures

$$\begin{array}{r} 0.00019 \\ \hline \end{array} \quad (1)$$

3. (a) Round 0.709 to one significant figure



$$\begin{array}{r} 0.7 \\ \hline \end{array} \quad (1)$$

(b) Round 84472 to three significant figures

$$\begin{array}{r} 84500 \\ \hline \end{array} \quad (1)$$

(c) Round 12490 to two significant figures

$$\begin{array}{r} 12000 \\ \hline \end{array} \quad (1)$$

(d) Round 5607012 to three significant figures

$$\begin{array}{r} 5610000 \\ \hline \end{array} \quad (1)$$

(e) Round 0.123456 to four significant figures

$$\begin{array}{r} 0.1235 \\ \hline \end{array} \quad (1)$$

(f) Round 0.961 to one significant figure

$$\begin{array}{r} 1 \\ \hline \end{array} \quad (1)$$

(g) Round 1782739 to four significant figures

$$\begin{array}{r} 1783000 \\ \hline \end{array} \quad (1)$$

9. Calculate



$$\frac{7.2}{9.1 \times 2.8}$$

(a) Write down your full calculator display.

.....0.2825745683  
(1)

(b) Write your answer to 1 significant figure.

.....0.3  
(1)

10. Calculate



$$\frac{13.2 + 8.9}{2.3^2}$$

(a) Write down your full calculator display.

.....4.177693762  
(1)

(b) Write your answer to 2 significant figures.

.....4.2  
(1)

## Estimating Calculations

### Things to remember:

- Round each number to one significant figure first (e.g. nearest whole number, nearest ten, nearest one decimal place) – this earns you one mark.
- Don't forget to use the correct order of operations.

### Questions:

1. Work out an estimate for  $\frac{3.1 \times 9.87}{0.509}$

$$\frac{3 \times 10}{0.5} = 30 \times 2$$

.....60  
(Total for Question is 3 marks)

2. Margaret has some goats.  
The goats produce an average total of 21.7 litres of milk per day for 280 days.  
Margaret sells the milk in  $\frac{1}{2}$  litre bottles.  
Work out an estimate for the total number of bottles that Margaret will be able to fill with the milk.  
You must show clearly how you got your estimate.

$$\frac{20 \times 300}{0.5} = 6000 \times 2$$

.....12000  
(Total for Question is 3 marks)

3. Work out an estimate for the value of  $\frac{89.3 \times 0.51}{4.8}$

$$\frac{90 \times 0.5}{5} = \frac{45}{5}$$

.....9  
(Total for Question is 2 marks)

4. Work out an estimate for  $\sqrt{1.98 + 2.16 \times 7.35}$

$$\sqrt{2 + 2 \times 7} = \sqrt{2 + 14} = \sqrt{16}$$

4  
.....  
(Total for question = 3 marks)

5. A ticket for a seat at a school play costs £2.95  
There are 21 rows of seats.  
There are 39 seats in each row.  
The school will sell all the tickets.  
Work out an estimate for the total money the school will get.

$$3 \times 20 \times 40$$

£ 2400  
.....  
(Total for Question is 3 marks)

6. Jayne writes down the following

$$3.4 \times 5.3 = 180.2$$

Without doing the exact calculation, explain why Jayne's answer cannot be correct.

3 × 5 = 15  
.....  
180.2 isn't remotely close to the estimate  
.....  
of 15; 18.02 would be more likely.  
.....

(Total for question is 1 mark)