Westminster Kingsway
central London's College

INTEGERS, RECIPROCALS, FACTORS, MULTIPLES AND PRIME NUMBERS

GCSE MATHS

Name: _____
Teacher: _____

Learning objectives

By the end this pack you will be able to:

1. **Apply the rules of BIDMAS**
2. **Identify prime numbers up to 100**
3. **Find the lowest common multiples and highest common factors of 2 numbers**
4. **Multiply/Divide decimal numbers**

Make 100

1	66 + ____ = 100	**2**	41 + ____ = 100	**3**	39 + ____ = 100
4	19 + ____ = 100	**5**	96 + ____ = 100	**6**	10 + ____ = 100
7	78 + ____ = 100	**8**	8 + ____ = 100	**9**	44 + ____ = 100
10	54 + ____ = 100	**11**	13 + ____ = 100	**12**	7 + ____ = 100
13	83 + ____ = 100	**14**	4 + ____ = 100	**15**	82 + ____ = 100

Times tables

1	2 × 9 = ____	**2**	2 × 8 = ____	**3**	6 × 3 = ____
4	10 × 4 = ____	**5**	3 × 5 = ____	**6**	5 × 4 = ____
7	2 × 5 = ____	**8**	7 × 3 = ____	**9**	7 × 4 = ____
10	9 × 8 = ____	**11**	10 × 6 = ____	**12**	3 × 3 = ____
13	4 × ___ = 12	**14**	5 × ___ = 25	**3**	8 × ___ = 8

Division

1	63 ÷ 9 = ____	**2**	24 ÷ 3 = ____	**3**	10 ÷ 5 = ____
4	32 ÷ 8 = ____	**5**	24 ÷ 6 = ____	**6**	21 ÷ 3 = ____
7	30 ÷ 6 = ____	**8**	6 ÷ 1 = ____	**9**	18 ÷ 3 = ____
10	5 ÷ 5 = ____	**11**	9 ÷ 9 = ____	**12**	10 ÷ 2 = ____
13	12 ÷ ___ = 4	**14**	56 ÷ ___ = 8	**3**	64 ÷ ___ = 8

EXAM QUESTION

Here is a list of numbers: 17 28 36 45 57 68 72 86

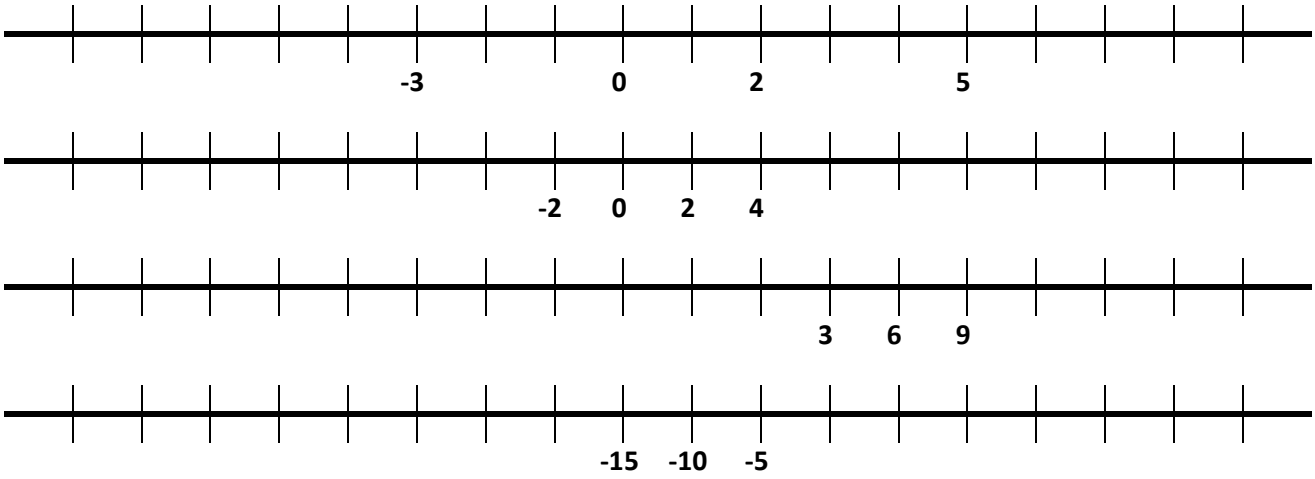
From this list, write down

(a) two numbers which have a total of 100 *(1 mark)*

(b) two numbers which have a difference of 50, *(1 mark)*

(c) the number which is the product of 5 and 9. *(1 mark)*

NEGATIVE NUMBERS - Complete the number lines:



ORDERING INTEGERS – Put each list in order, smallest to biggest.

1	2	10	-12	-3	-1	-11	4	1
2	-10	12	10	-5	5	6	3	1
3	-3	0	-8	6	5	8	1	3
4	12	-11	-6	-4	10	-1	-12	-2
5	-8	23	1	-25	19	-15	-9	2
6	1	-2	22	-20	21	25	17	18
7	-25	-21	11	20	-5	5	24	-22
8	-17	-21	-10	-5	-11	-7	20	11

EXAM QUESTION

The temperature, in °C, at midday at the theme park on 6 winter days was recorded.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Temperature	–3	–2	0	–4	–1	1

(i) Which day was the warmest at midday?

Answer ..... *(1 mark)*

(ii) Which day was the coldest at midday?

Answer ..... *(1 mark)*

Addition and Subtraction with negative numbers

1	3 + -1 = _____	**2**	6 + -4 = _____	**3**	4 + -1 = _____
4	9 + -5 = _____	**5**	5 + -1 = _____	**6**	1 + -4 = _____
7	2 + -4 = _____	**8**	6 + -2 = _____	**9**	2 + -5 = _____
10	2 - 9 = _____	**11**	5 - 1 = _____	**12**	2 - 7 = _____
13	5 - 10 = _____	**14**	3 - 3 = _____	**15**	4 - 6 = _____
16	2 - 5 = _____	**17**	4 - 5 = _____	**18**	5 - 9 = _____
17	-6 + 5 = _____	**20**	-5 + 1 = _____	**21**	-4 + 2 = _____
20	-6 + 3 = _____	**23**	-5 + -5 = _____	**24**	-9 + 3 = _____
23	-7 + 3 = _____	**26**	-3 + 4 = _____	**27**	-8 + 2 = _____

Multiplication and Division with negative numbers

1	7 × -2 = _____	**2**	2 × -2 = _____	**3**	8 × -1 = _____
4	4 × -2 = _____	**5**	1 × -3 = _____	**6**	7 × -4 = _____
7	8 × -1 = _____	**8**	2 × -3 = _____	**9**	1 × -4 = _____
10	-1 × 8 = _____	**11**	-5 × 7 = _____	**12**	-5 × 7 = _____
13	-21 ÷ -3 = _____	**14**	-8 ÷ -1 = _____	**15**	-80 ÷ -10 = _____
16	-10 ÷ -5 = _____	**17**	-10 ÷ -2 = _____	**18**	-5 ÷ -5 = _____
17	-30 ÷ 10 = _____	**20**	-14 ÷ 2 = _____	**21**	-36 ÷ 4 = _____
20	-4 ÷ 2 = _____	**23**	-63 ÷ 7 = _____	**24**	-27 ÷ 9 = _____

BIDMAS

Follow the correct order of operations to calculate the following:

1. 5 + 2 x 3 = ___
2. 10 ÷ 2 + 7 = ___
3. 7 + 9 ÷ 3 = ___
4. 2 x 3 + 7 x 2 = ___
5. 8 ÷ 4 – 2 x 1 = ___
6. 5 x 10 + 9 ÷ 1 = ___
7. 2 + 4 x 4 + 1 = ___
8. (2 + 4) x 8 = ___
9. (3 – 1) x (9 – 4) = ___
10. 30 – (7 + 6) = ___
11. 20 – (4 + 10) = ___
12. (5 + 9) ÷ (2 x 1) = ___

BRACKETS

Put brackets into the questions to make them correct.

1. 2 + 2 x 3 = 12
2. 4 – 1 x 7 = 21
3. 2 + 1 x 1 + 2 = 9
4. 9 ÷ 3 x 2 + 1 = 9
5. 50 ÷ 7 + 3 = 10
6. 6 + 2 x 4 + 3 = 51

1234

Use the digits 1, 2, 3, and 4 to make correct calculations. Use brackets where appropriate.

1 = _____ 2 = _____

3 = _____ 4 = _____

5 = _____ 6 = _____

7 = _____ 8 = _____

9 = _____ 10 = _____

EXAM QUESTION

(a) Work out $12 - (3 + 7)$

(b) Put brackets in each of these calculations to make them correct.

(i) $18 - 4 - 2 = 16$

(ii) $3 + 4 \times 5 = 35$

(iii) $20 \div 5 - 3 = 10$

PRIME NUMBERS

Answer TRUE or FALSE:

1. 2 is a prime number
2. 9 is a prime number
3. 15 is a prime number
4. 7 is a prime number
5. 19 is a prime number
6. 23 is a prime number
7. 3 is the smallest prime number
8. There are four prime numbers between 1 and 10
9. 99 is a prime number
10. There are three primes between 20 and 30

PRIME FACTORS

Write each number as a product of its' prime factors:

1. 21
2. 12
3. 36
4. 50
5. 150
6. 54
7. 49
8. 84

RECIPROCALS

Write down the reciprocal of each number

1. 3
2. 2
3. 5
4. $\frac{1}{4}$
5. $\frac{1}{2}$
6. $\frac{1}{8}$
7. $\frac{2}{3}$
8. $\frac{3}{4}$

EXAM QUESTIONS

1. The letters a and b represent prime numbers.
   Give an example to show that $a + b$ is **not** always an even number.
2. Write 28 as the product of its prime factors.
3. Write 18 as the product of its prime factors.

FACTORS - Write down all the factors of each number:

1.	8	2.	12	3.	9	4.	16	5.	20
6.	15	7.	7	8.	14	9.	30	10.	36

EXAM QUESTIONS

1. Here is a list of numbers

6 8 11 15 25 28 30 33

From this list, write down

(a) a multiple of 7,

(b) the two factors of 24,

(c) a square number,

(d) a prime number.

2. Tick a box to say if each of the following statements is true or false.

	True	False
7 and 23 are both odd numbers	☐	☐
The sum of 7 and 23 is an odd number	☐	☐
7 is a factor of 23	☐	☐
23 minus 7 is a square number	☐	☐

Multiples

Write down the first six multiples of each number:

1. 4 2. 3 3. 7 4. 9

Highest Common Factor

Find the Highest Common Factor (HCF) for each pair of numbers.

1. 36 and 10 2. 50 and 30 3. 45 and 27

4. 100 and 36 5. 88 and 56 6. 36 and 32

Lowest Common Multiple

Find the Lowest Common Multiple (LCM) for each pair of numbers.

1. 6 and 9 2. 5 and 15

3. 2 and 11 4. 12 and 8

EXAM QUESTIONS

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

Answer ..... and ..... *(1 mark)*

(b) Write down two multiples of 7.

Answer ..... and ..... *(1 mark)*

(c) Write down a number which is a multiple of both 4 and 7.

Answer ..... *(1 mark)*

2. Find the least common multiple (LCM) of 28 and 42.

3. What is the least common multiple (LCM) of 12 and 18?

DECIMAL PLACE VALUE

1. Write down the value of the underlined digits:

a) 6.2<u>4</u> b) 7.<u>1</u>32 c) 19.45<u>6</u> d) 3.<u>2</u>0 e) 7.0<u>9</u>1

ORDERING DECIMALS

Put each list of numbers in order from smallest to biggest.

1	6.8	6.83	6.1	6.55	6.9	6.7	6.5	6.26
2	4.28	4.8	4.66	4.4	4.57	4.7	4.77	4.9
3	1.3	1.6	1.6	1.55	1.84	1.1	1.62	1.22
4	2.61	2.1	2.83	2.45	2.35	2.31	2.11	2.9
5	9.61	9.4	9.21	9.83	9.3	9.8	9.34	9.4
6	8.7	8.82	8.77	8.86	8.27	8.45	8.3	8.5
7	7.4	7.8	7.9	7.56	7.11	7.67	7.38	7.29
8	1.41	1.3	1.39	1.8	1.6	1.96	1.11	1.71
9	2.53	2.6	2.45	2.21	2.6	2.7	2.35	2.19
10	9.77	9.19	9.81	9.39	9.5	9.19	9.3	9.1

EXAM QUESTIONS

1. Write down a decimal number that is between 1.5 and 1.6

2. Place the following numbers in order of size, starting with the smallest.

$2\frac{3}{5}$ 2.08 1.5^2 2.237 2.64

ADDITION (WHOLE NUMBERS)

1)
$$\begin{array}{r} 56 \\ +\,35 \\ \hline \end{array}$$

2)
$$\begin{array}{r} 47 \\ +\,29 \\ \hline \end{array}$$

3)
$$\begin{array}{r} 68 \\ +\,38 \\ \hline \end{array}$$

4)
$$\begin{array}{r} 412 \\ +\,379 \\ \hline \end{array}$$

5)
$$\begin{array}{r} 638 \\ +\,263 \\ \hline \end{array}$$

6)
$$\begin{array}{r} 593 \\ +\,323 \\ \hline \end{array}$$

7)
$$\begin{array}{r} 711 \\ +\,299 \\ \hline \end{array}$$

8)
$$\begin{array}{r} 838 \\ +\,272 \\ \hline \end{array}$$

9)
$$\begin{array}{r} 539 \\ +\,492 \\ \hline \end{array}$$

SUBTRACTION (WHOLE NUMBERS)

1)
$$\begin{array}{r} 56 \\ -\,35 \\ \hline \end{array}$$

2)
$$\begin{array}{r} 47 \\ -\,26 \\ \hline \end{array}$$

3)
$$\begin{array}{r} 68 \\ -\,39 \\ \hline \end{array}$$

4)
$$\begin{array}{r} 484 \\ -\,372 \\ \hline \end{array}$$

5)
$$\begin{array}{r} 638 \\ -\,223 \\ \hline \end{array}$$

6)
$$\begin{array}{r} 592 \\ -\,323 \\ \hline \end{array}$$

7)
$$\begin{array}{r} 799 \\ -\,299 \\ \hline \end{array}$$

8)
$$\begin{array}{r} 858 \\ -\,272 \\ \hline \end{array}$$

9)
$$\begin{array}{r} 521 \\ -\,432 \\ \hline \end{array}$$

EXAM QUESTIONS

1. Work out

   (a) 426 + 37 + 384

   (b) 800 – 472

2. A youth club hires a disco for £70.
Tickets for the disco cost 80p each.
They sell 140 tickets.

How much profit does the youth club make?

ADDITION (DECIMALS)

For each question, use a written method to calculate the answer.

1	29.7 + 24.9	**2**	25 + 45.7	**3**	36.1 + 12.7
4	20.6 + 7.7	**5**	35.7 + 2.5	**6**	18.2 + 30.9
7	20.78 + 39.2	**8**	31.3 + 4.1	**9**	8.63 + 33.9
10	8.96 + 33.6	**11**	48.5 + 38.98	**12**	22.8 + 19.4
13	21.62 + 46.9	**14**	11.5 + 14.94	**15**	40.3 + 30.39

SUBTRACTION (DECIMALS)

For each question, use a written method to calculate the answer.

1	66.7 - 44.4	**2**	75.3 - 6	**3**	59.7 - 18.1
4	68.8 - 30	**5**	60.6 - 38.6	**6**	68.5 - 8.3
7	75.95 - 16.9	**8**	61.7 - 33.3	**9**	73.3 - 26.8
10	61.14 - 8.6	**11**	69.2 - 38.36	**12**	89 - 18.4
13	65.07 - 23.5	**14**	50.9 - 32.27	**15**	73.1 - 8.65

EXAM QUESTIONS

1. Work out

   (a) 5.4 – 1.28

2. 

   (a) (i) Arnie orders a burger and fries.
   How much does this cost?

MULTIPLICATION AND DIVISION (WHOLE NUMBERS)

1	14 x 8	**2**	24 x 3	**3**	31 x 5
4	62 x 9	**5**	39 x 7	**6**	66 x 4
7	26 x 15	**8**	26 x 16	**9**	63 x 22
10	21 ÷ 7	**11**	50 ÷ 5	**12**	30 ÷ 6
13	115 ÷ 5	**14**	128 ÷ 8	**15**	126 ÷ 6
16	234 ÷ 18	**17**	396 ÷ 18	**18**	285 ÷ 19

MULTIPLYING DECIMALS

1	1.5 x 6	**2**	7.5 x 4	**3**	2.8 x 5
4	4 x 0.6	**5**	4.3 x 3.7	**6**	7.7 x 1.5

DIVIDING WITH DECIMALS

1	2.7 ÷ 3	**2**	5.4 ÷ 6	**3**	3.5 ÷ 5
4	24 ÷ 0.8	**5**	54 ÷ 0.6	**6**	15 ÷ 0.5

EXAM QUESTION

1. 132×8

2. 0.2×0.4

3. Cans of cola are sold in packs of six.
Each pack costs £2.18
Sam buys eight packs of cola.

   (a) How many cans does he buy altogether?

   (b) How much does Sam pay for the eight packs?

   (c) Sam pays for the packs with a £20 note.
   How much change is he given?

4. Pens are sold in boxes of 12.
Mr Hebson requires 250 pens.
How many boxes does he need to order?

5. A box of pencils costs £2.50
Mr Hebson orders 48 boxes for the Mathematics Department.
Find the total cost.

6. $3.64 \times 2 + 13.7$

BEST VALUE - EXAM QUESTIONS

1. The same type of crystal glasses is sold in two different packs.

Small pack	Large pack
Contents 4 glasses	Contents 12 glasses
£3.20	£10.20

Which size is the better value for money?

You **must** show your working.

2. A garden centre has tomato plants for sale.

Tomato plants
40 pence each or £5 for a box of 20

Work out the cheapest price for 24 tomato plants.

3. Two advertisements for the same type of sun oil are shown.
The sun oil is usually sold in 100 ml bottles which cost £4 each.

Which offer gives the better value for money?
You **must** show all your working.

SPEED, DISTANCE AND TIME - EXAM QUESTIONS

1. Alan drove 12 miles.
The journey took 15 minutes.

What was Alan's average speed?

2. Charles drove 132 miles at an average speed of 55 mph.
Calculate the time taken for this journey.

Give your answer in hours and minutes.

3. (a) An athlete runs 15 miles at an average speed of 6 miles per hour.

How long does he take to run the 15 miles?
Give your answer in hours and minutes.

(b) Another athlete runs 18 miles in $2\frac{1}{4}$ hours.

What is her average speed?

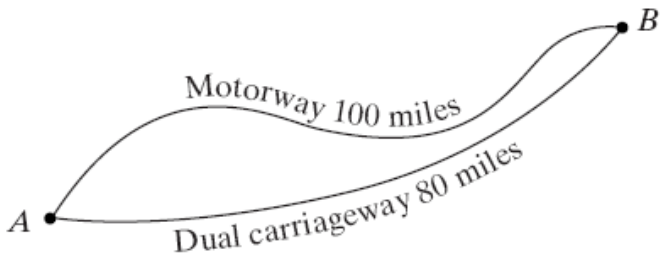
4. Sally drove 120 miles at an average speed of 50 mph.

Calculate the time taken for this journey.
Give your answer in hours and minutes.

5. Kristen drives 252 miles from Redcar to London in 4 hours and 30 minutes.

Calculate her average speed in miles per hour.

6. Two towns, A and B, are connected by a motorway of length 100 miles and a dual carriageway of length 80 miles as shown.



Jack travels from A to B along the motorway at an average speed of 60 mph.
Fred travels from A to B along the dual carriageway at an average speed of 50 mph.
What is the difference in time between the two journeys?
Give your answer in minutes.

WHOLE NUMBER AND DECIMAL CALCULATIONS **GRADES : D**

NUMBER PROBLEMS 1
EXAM QUESTIONS

1. Chris pays €18 for a meal.
The exchange rate is £1 = €1.60

What is the price of the meal in pounds?

2. In the USA, a leather jacket costs $96.
The exchange rate is $1.60 to £1.

Find the cost of the jacket in £.

3. In the Czech Republic, Boris pays 922 korunas for a meal.
The exchange rate is 49.1 korunas to £1.

What is the cost of the meal in pounds?

4. Dave drives 15 miles to work.
The journey takes 20 minutes.

What is Dave's average speed in miles per hour?

5. While in the USA, John pays $30 for a pair of trainers.
The exchange rate is $1.50 to £1.

Calculate the cost of the pair of trainers in £.

6. Apples are sold in a farm shop at £1.76 per kilogram.

Calculate the price of 1 pound of apples.

Use the conversion 1 kilogram = 2.2 pounds

7. In Portugal, Brian spends €2.80 on ice cream.
This price includes VAT which is 12% in Portugal.

Find the amount of VAT which Brian paid.

NUMBER PROBLEMS 2
EXAM QUESTIONS

1. Yasmin worked for $4\frac{1}{2}$ hours each day.
In one week she worked 6 days and was paid £10 per hour.

How much did Yasmin earn in that week?

2. Tom works from 1.45 pm to 5.30 pm every weekday.

(a) How long does Tom work each day?

(b) On Saturday Tom works $6\frac{1}{2}$ hours.
He is paid £5.40 per hour.

How much is Tom paid for Saturday's work?

3. In the summer, Nisha sells ice creams on the beach.
She is paid £3 per hour and 5p for every ice cream which she sells.
On one day, Nisha works 4 hours and sells 200 ice creams.

How much is she paid for that day?

4. (a) Jake earns £4 an hour for a basic 35 hour week.
He earns £6 an hour for overtime.
One week he works the basic 35 hour week and 2 hours overtime.

How much does he earn altogether?

(b) One morning, Jake works from 0815 to 1210.

How long does he work?
Give your answer in hours and minutes.

5. Sara is paid £5.10 per hour.
Each day she works $7\frac{1}{2}$ hours.
Each week she works 5 days.

How much does she earn each week?

NUMBER PROBLEMS 3
EXAM QUESTIONS

1. Rick buys a drink costing £1.35 and some packets of sweets costing 65 pence for each packet.
The total cost is £3.95

How many packets of sweets does Rick buy?

Prime Factors, HCF and LCM

Find the prime factor of the following number. Leave in index notation.

1) 12	2) 18	3) 16
4) 44	5) 66	6) 75
7) 102	8) 90	9) 210
10) 64	11) 52	12) 32
13) 314	14) 464	15) 964

Using prime factor tree and Venn diagrams find both the HCF and LCM for the following pairs of numbers.

1) 12 and 18	2) 32 and 14	3) 24 and 22
4) 52 and 16	5) 9 and 13	6) 37 and 24
7) 45 and 25	8) 78 and 65	9) 98 and 112
10) 116 and 248	11) 52 and 72	12) 484 and 328
13) 212 and 246	14) 98 and 654	15) 784 and 925

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Find the prime factor of the following number. Leave in index notation.

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