

Maths Subject/Topic: Expressions & Formulae

Key ideas:

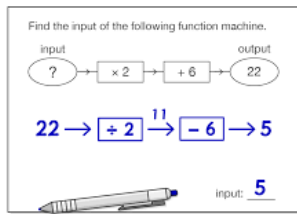
Collect like terms

$$4a + 5 + 2a - 3$$

$$= 6a + 2$$

$$x + \frac{x}{2}$$

$$x = 5 \rightarrow 5 + \frac{5}{2}$$

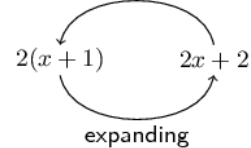


$$(a - 5)(a + 2)$$

$$= a^2 + 2a - 5a - 10$$

$$= a^2 - 3a - 10$$

factorising



Factorising

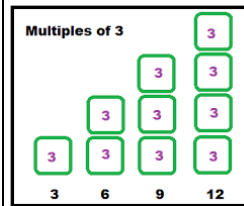
$$= 8n^2 + 20n$$

$$4n(2n + 5)$$

Highest Common Factor

Subject/Topic: Factors & Powers

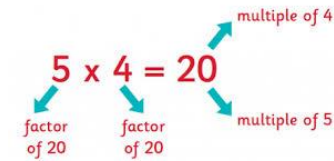
Key ideas:



Multiples of 3:
 3, 6, 9, 12, 15, 18, 21, 24, ...

Multiples of 4:
 4, 8, 12, 16, 20, 24, 28, ...

The LCM of 3 and 4 is 12.



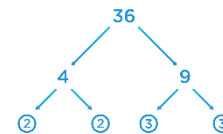
$\frac{45}{5}$
 1x45
 3x15
 5x9

Factors of 45
 1, 3, 5, 9, 15, 45

$\frac{27}{3}$
 1x27
 3x9

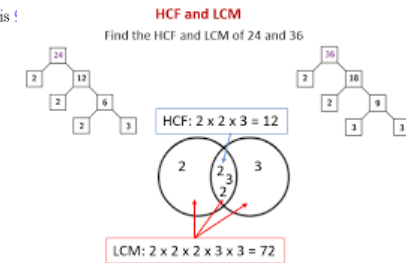
Factors of 27
 1, 3, 9, 27

The HCF of 45 and 27 is 9!



Prime Numbers

2	3	5	7	11	13	17
19	23	29	31	37	41	
43	47	53	59	61	67	
71	73	79	83	89	97	



Keywords /Key Language:

- Expression:** A collection of terms
- Formula:** A mathematical relationship or rule expressed with symbols. It includes an equal sign
- Expand:** To multiply out brackets
- Factorise:** To put brackets back into an expression
- Quadratic:** An expression with the highest power of 2
- Term:** A single number or variable
- Substitution:** To replace an unknown with a given value

Keywords /Key Language:

- Factor:** a number or quantity that when multiplied with another produces a given number or expression
- Multiple:** The times tables of a number
- Prime:** A number that has only two factors, itself and 1.
- HCF:** The highest factor common to two or more numbers.
- LCM:** The lowest multiple common to two or more numbers.
- Index:** The power that a number is raised to.
- Prime Factor Decomposition:** To break a number down into its prime factors

Maths Subject/Topic: Number II

Key ideas:

Significant figures

A significant figure in a number is a digit that carries meaning. The digits 1 to 9 are always significant. Zero is only significant if it is between two significant figures

Example: $2356.285 = 2000$ (1 s.f.)

Estimate by rounding to 1 s.f.

$$123.45 \times 3.79$$

$$= 100 \times 4$$

$$= 400$$

Division

$$186 \div 6 = 031$$

no groups of 6 can be made $3 \times 6 = 18$ $1 \times 6 = 6$

Using a calculator

If you want to see how to use the calculator in real time watch the "Using a scientific calculator" video at the website www.youtube.com/beexceptional.

BODMAS / BIDMAS

Remember, it must be used like this:

First do any: **(B) rackets**

Followed by any: **I**ndices

Left to right do any: **D**ivision & **M**ultiplication

Lastly, left to right: **A**ddition & **S**ubtraction

	H	T	O	
	0	7	2	
9	6	4	9	
	- 0			
	6	4		← Tens
	- 6	3		
	1	9		← Ones
	- 1	8		
	1			← One left

The buttons that are circled in white bubbles are the main buttons you need to be able to use.



Use the cursor to move around the calculator. This is especially helpful when you are typing complicated fractions into the calculator.

Keywords /Key Language:

BIDMAS: The order in which mathematical operations must take place

Inverse Operations: If $3 \times 8 = 24$ then $24 \div 8 = 3$

Estimation: A mathematical method for assessing whether an answer is correct

Maths Subject/Topic: Expressions & Formulae Questions

Subject/Topic: Factors and Multiple / HCF / LCM / PFD Questions

Part 1

- | | |
|------------------------------|-------------------------------|
| 1. $4f + 9f + 9f + 2f + 9f$ | 8. $4c + 6c + 4c$ |
| 2. $4u + 7u + 8u - 8u + 4u$ | 9. $5j + 5j + 6j - 8j + 4j$ |
| 3. $-8i + 7i - 7i + 7i$ | 10. $2b - 10b - 4b + 9b + 2b$ |
| 4. $7l - 3l + 3l$ | 11. $10t - 4t$ |
| 5. $8t + 5t - 7t - 4t - 8t$ | 12. $-5p + 3p$ |
| 6. $-5e + 4e + 9e + 2e - 3e$ | 13. $-9w - 6w$ |
| 7. $-6y - 7y + 9y + 4y$ | 14. $8h + 9h - 10h$ |

Questions On Expanding Brackets 1

- $2(a + 4)$
- $5(b + 7)$
- $3(c - 6)$
- $9(x + 4)$
- $12(y - 5)$
- $3(h + 12)$
- $4(t - 4)$
- $5(8 + b)$
- $12(11 + g)$

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Questions On Factorising 1

- $20x + 8 =$
- $56x - 72 =$
- $30x - 18 =$
- $84 + 24x =$
- $88 - 11x =$
- $24x + 2 =$
- $-12x - 16 =$
- $-90 - 10x =$
- $15x^2 + 6x =$

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Expanding Double Brackets

- | | |
|-----------------------|--------------------------|
| 1. $(x + 3)(x + 4) =$ | 11. $(2x - 7)(x - 6) =$ |
| 2. $(x + 3)(x + 5) =$ | 12. $(2x - 7)(2x - 6) =$ |
| 3. $(x + 5)(x + 5) =$ | 13. $(2x - 6)(2x - 6) =$ |
| 4. $(x + 5)(x - 5) =$ | 14. $(3x - 6)(2x - 6) =$ |
| 5. $(x + 7)(x - 5) =$ | 15. $(3x - 6)(2x + 6) =$ |
| 6. $(x - 7)(x - 5) =$ | 16. $(3x - 6)(2x + 8) =$ |

Number

1) Find all the factors of

- | | |
|-------|-------|
| a) 8 | b) 24 |
| c) 36 | d) 60 |

2) Find the highest common factors of

- | | |
|--------------|--------------|
| a) 8 and 36 | b) 24 and 36 |
| c) 24 and 60 | d) 36 and 60 |

3) Write down the first 7 multiples of the following numbers

- | | |
|-------|-------|
| a) 6 | b) 8 |
| c) 12 | d) 16 |

4) Find the lowest common multiples of

- | | |
|--------------|-------------|
| a) 6 and 8 | b) 8 and 12 |
| c) 12 and 16 | d) 6 and 16 |

5) Write down the first 5

- | | |
|-------------------|------------------|
| a) Square numbers | b) Prime numbers |
|-------------------|------------------|

Prime Factor Decomposition to find Highest Common Factor (HCF) and Lowest Common Multiple (LCM)

Prime Factors

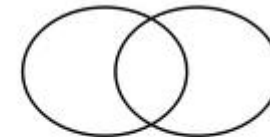
Show these numbers as a product of prime factors

- 12
- 18
- 25
- 42
- 75
- 96

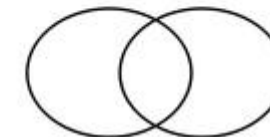
Using Venn Diagrams

Find the Highest Common Factor and Lowest Common Factor of

7) 18 and 42



8) 25 and 75





Answer these questions in your exercise books
Don't trust your calculator!

1. $16 + 8 - 2 \times (9 - 3)$
2. $4 \times (17 - 10 + 2)$
3. $6 + 12 \div 4 - 2$
4. $8 + 2 \times 7 - 5 \times 3$
5. $(8 + 2) \times 3 - (4 + 8)$
6. $(17 - 3 + 4) \times 2$
7. $3 + 9 \times (14 - 5) - 4$
8. $11 \times (2 + 4) - 5 \times (2 + 8)$
9. $15 \times (2 + 11 - 9)$
11. $6 + 4 + 2 + 7$
12. $11 + 9 \div (10 - 9 + 2)$
13. $(6 - 2)2$
14. $(8 \div 4) \times 3 - 22$
15. $36 - 3 \times 3$
16. $(81 \div (16 - 7)) \times 2$
17. $(6 \times 6) \div 9 - 1 + 11$
18. $18 \div 6 + (2 + 3 \times 4) \times 2$
19. $(5 - 4 + 2)2 + (8 - 4)2$
20. $42 - 33$

bidmas: true or false maze

Find your way through the maze by shading all the blocks that are true. You cannot move diagonally.

Start $3 + 2 \times 6 = 15$	$20 \div 18 + 6 = 17$	$10 \cdot 3 \times 4 = 28$	$8 + 6 \times 2 = 28$	$8 + 4^2 + 8 = 3$
$5 \cdot 2 \times 2 = 6$	$4 + 3^2 = 13$	$15 \cdot 10 \div 5 = 1$	$7 \cdot 3^2 = 16$	$5 + (6 \cdot 2) \times 5 = 45$
$(3 + 5) \times 2 = 13$	$12 \div 4 + 2 \times 4 = 11$	$8 \times 3 + 6 \div 3 = 10$	$3 + 2 \times 4 \cdot 5 = 15$	$6 + 3 + 3 = 3$
$(6 \cdot 1) + 3 \times 2 = 16$	$20 \cdot 4 \div 2 = 18$	$10 \cdot 3^2 = 1$	$10 \cdot 2 \times 3 \cdot 4 = 20$	$2 + 1 \times 3 = 9$
$10 \cdot 3^2 = 49$	$10 \div 2 + 3 \times 2 = 16$	$2 \times 4 \cdot 2^2 = 4$	$3 + 9 \div 3 \cdot 2 = 2$	$8 \times 2 \cdot 1 = 8$
$7 \cdot 2 \times 3 = 15$	$8^2 \cdot 6 \div 2 = 29$	$(3 + 4) \div (4 + 3) = 1$	$4 + 12 \div (5 \cdot 1) = 4$	$8 + 4^2 + 8 = 3$
$3 \times 4 + 2 = 18$	$10 + 5^2 + 5 = 7$	$(6 \cdot 3)^2 \cdot 8 = 1$	$7 + 7 \cdot 18 + 3^2 = 12$	Finish $12 \cdot 3 \times 4 = 0$

Calculator Questions

- 1) Find the value of the following:
(write down all the figures on your calculator display)
 - a) $(0.3 + 1.8)^2$
 - b) $2.6^2 + 1.9^2$
 - c) $3.6^2 - \sqrt{53}$

- 2) Find the value of the following:
(write your answers correct to 1 decimal place)
 - a) $2.9^3 + 10.3$
 - b) $84.8 + (\sqrt{36} + 5)$
 - c) $\frac{\sqrt{3412}}{4.3^2}$

- 3) Work out
 $\sqrt{15.78} + 1.6^2$

Estimation Show That

Show how the calculation gives the estimated answer.

Question	Calculation	Estimated Answer
1	$213 + 456$	700
2	$748 - 97$	600
3	34×49	1500
4	$214 \div 52$	4
5	4.3^2	16
6	$\frac{109 + 376}{48}$	10
7	$(77 - 18) \times 3.2$	180
8	$6.7^2 + 231$	249
9	$2.6 \times 4.1 - 3.2^2$	3
10	$\frac{228 + 417}{380 - 123}$	2
11	$(5.6^2 - 2.7^2) \times 3.12$	81
12	$(5.6 - 2.7)^2 \times 312$	2700
13	$\frac{708 - 43.8}{4.3^2 + 3.9}$	33

