

# Week 1

## 1. Simplify

a.  $3x + 6x - 5x = 4x$

b.  $y + y + y + y = 4y$

c.  $4x + 3y + 2x - y = 6x + 2y$

d.  $6a - 5b - a + 2b = 5a - 3b$

## 2. Expand

a.  $3(2x + 5) = 6x + 15$

b.  $x(x - 5) = x^2 - 5x$

c.  $6(x + y) = 6x + 6y$

d.  $3x(x - 2y) = 3x^2 - 6xy$

## 3. Expand and Simplify

a.  $3(x + 4) + 5(2x - 3)$   
 $3x + 12 + 10x - 15$   
 $13x - 3$

b.  $4(x - 1) - 3(x + 2)$   
 $4x - 4 - 3x - 6$   
 $x - 10$

## 4. Expand and Simplify

a.  $(x + 5)(x + 6)$   
 $x^2 + 6x + 5x + 30$   
 $x^2 + 11x + 30$

c.  $(x - 5)(x - 6)$   
 $x^2 - 6x - 6x + 30$   
 $x^2 - 11x + 30$

b.  $(x - 7)(x + 3)$   
 $x^2 + 3x - 7x - 21$   
 $x^2 - 4x - 21$

d.  $(2x - 3)(x + 5)$   
 $2x^2 + 10x - 3x - 15$   
 $2x^2 + 7x - 15$

## 5. Factorise

a.  $10x - 12$   
 $2(5x - 6)$

c.  $x^2 + 9x + 20$   
 $(x + 4)(x + 5)$

b.  $x^2 + 8x$   
 $x(x + 8)$

d.  $x^2 - 16$   
 $(x + 4)(x - 4)$

## 6. Solve

a.  $3x + 9 = 12$   
 $-9 \quad -9$   
 $3x = 3$   
 $x = 1$

b.  $4x + 3 = 2x + 14$   
 $2x = 11 \quad x = 5.5$

## 7. Simplify

a.  $x^7 \div x^3 = x^4$

b.  $4s^2t \times 3s^5t^3 =$   
 $12s^7t^4$

c.  $(y^5)^3$   
 $y^5 \times y^5 \times y^5 = y^{15}$

## 8. Nth Term

a. Find the Nth Term of

3      8      13      18  
 $5n - 2$

b. Is 598 in the sequence?

$5n - 2 = 598$   
 $5n = 600$   
 $n = 120$  so Yes.

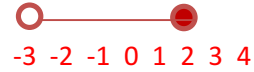
**9. Inequalities**

a. Solve  $3x + 7 < 13$

$3x < 6$

$x < 2$

b. Represent  $-3 < x \leq 2$  on a number line.



**10. Units**

Fill in the blanks

$3.1 \text{ cm} = 31 \text{ mm}$

$4500 \text{ g} = 4.5 \text{ kg}$

$3.1 \text{ litres} = 3100 \text{ ml}$

$0.75 \text{ km} = 750 \text{ m}$

**11. Factors and Multiples**

a. Write down the factors of 20.  $1, 20, 2, 10, 4, 5$

b. Write down the first 5 multiples of 12.  $12, 24, 36, 48, 60$

c. Work out the Highest Common Factor of 20 and 30.  $10$

d. Work out the Lowest Common Multiple of 20 and 30.  $60$

**12. Primes**

a. Write down the first 5 prime numbers.

$2, 3, 5, 7, 11$

b. Write 200 as a product of prime factors.

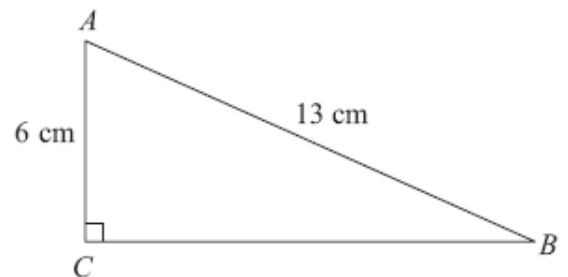
$2 \times 2 \times 2 \times 5 \times 5 = 2^3 \times 5^2$

**13. Pythagoras**

Work out the length of  $BC$ .

Give your answer correct to 3 significant figures.

$13^2 - 6^2 = 133 \quad \sqrt{133} = 11.5 \text{ cm}$



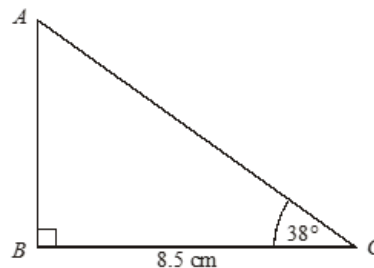
..... cm

**14. Trigonometry**

Work out the length of  $AB$ .

Give your answer correct to 3 significant figures.

$\text{Tan}(38) \times 8.5 = 6.64 \text{ cm}$



..... cm

**15. Speed**

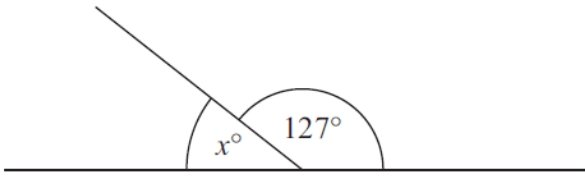
A sprinter runs a distance of 200 metres in 25 seconds.

Work out the average speed of the sprinter.

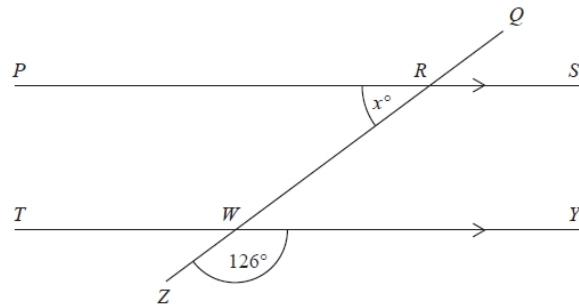
$S = \frac{d}{t} = \frac{200}{25} = 8 \text{ m/s}$

### 16. Angle Facts.

Find  $x$ . Give all reasons.



$X = 180 - 127 = 53$   
**Angles on a straight line add up to 180**



$YWR = 54$  Angles on a straight line add up to 180  
 $X = 54$  because alternate angles are equal.

### 17. Ratio

a. Share £60 in the ratio 3:2.

$60/5 = 12$     $3 \times 12: 2 \times 12$     $36:24$

b. The ratio of the number of boys to the number of girls in a class is 2:3.

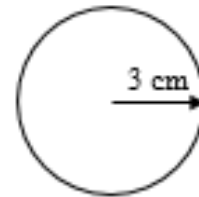
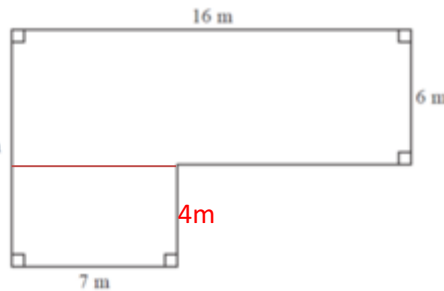
There are 24 girls in the class.  $3 \text{ parts} = 24$

How many boys are there?    $1 \text{ part} = 8$     $2 \text{ parts boys} = 16$

### 18. Area

Calculate the area.

$16 \times 6 = 96$   
 $4 \times 7 = 28$   
 $96 + 28 = 124\text{m}^2$



$\pi \times 3^2 = 28.3\text{cm}^2$

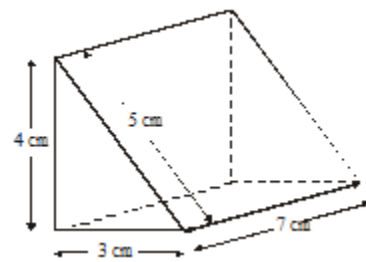
### 19. Volume.

Calculate the volume of this triangular prism.

Vol = area of Front face  $\times$  length

Area =  $(4 \times 3) / 2 = 6$

Vol =  $6 \times 7 = 42\text{cm}^2$



### 20. Proportion

a. 3 cakes cost £1.77.

$1 \text{ cake} = 0.59$

How much would 5 cost?

$5 \times 0.59 = \text{£}2.95$

$\text{£}1 = \$1.23,$

b. Convert £80 to dollars.    $80 \times 1.23 = \$98.40$

c. Convert \$300 to pounds.    $300 \div 1.23 = \text{£}243.90$

### 21. Averages.

13   7   6   6

Calculate the:

a. Mode   **Mode = 6**

b. Range   **Range =  $13 - 6 = 9$**

d. Mean



**22. Four Functions**

a.  $200 - 78$

122

b.  $452 \div 4$

113

c.  $1.23 \times 2.7$

Grid 3.321

**23. Fractions. Calculate**

a.  $\frac{3}{4} + \frac{1}{5}$

$$\frac{15}{20} + \frac{4}{20} = \frac{19}{20}$$

b.  $\frac{3}{4} \times \frac{1}{5}$

$$\frac{3 \times 1}{4 \times 5} = \frac{3}{20}$$

c.  $2\frac{3}{4} + 1\frac{1}{5}$

$$\frac{11}{4} + \frac{6}{5} = \frac{55}{20} + \frac{24}{20} = \frac{79}{20} = 3\frac{19}{20}$$

d.  $1\frac{3}{4} \div \frac{4}{5}$

$$\frac{7}{4} \div \frac{4}{5} = \frac{7}{4} \times \frac{5}{4} = \frac{7 \times 5}{4 \times 4} = \frac{35}{16} = 2\frac{3}{16}$$

**24. Estimate**

$$\frac{5.79 \times 312}{0.523}$$

$$\frac{6 \times 300}{0.5} = \frac{1800}{0.5} = 3600$$

**25. Percentages**

a. Calculate 15% of 120

$$10\% = 12 \quad 5\% = 6 \quad 15\% = 18$$

b. Increase £80 by 30%

$$10\% = 8 \quad 30\% = 24 \quad 80 + 24 = \text{£}104$$

**26. FDP**

a. Write 20% as a fraction in its simplest form.

$$\frac{20}{100} = \frac{1}{5}$$

b. Write 0.15 as a percentage.

15%

**27. Decimals**

Write the following decimals in order from smallest to largest.

0.34      0.4      0.304      0.304      0.34      0.4

**28. Probability**

a. I roll a normal dice. What is the probability I get a 4?

$$\frac{1}{6}$$

Pupils are asked about their favourite food.

b. Find the probability of a pupil choosing pasta.

Snack	burger	pizza	pasta	salad
Probability	0.35	0.15		0.2

$$0.35 + 0.15 + 0.2 = 0.7$$
$$1 - 0.7 = 0.3$$

c. 200 pupils were asked Calculate how many said salad.

$$0.2 \times 200 \text{ or } 20\% \text{ of } 200 = 40$$