

## Adding and subtracting integers

Adding a **negative** number **or** subtracting a **positive** number will have the **same result**.

$$3 + -5 = -2$$

$$3 - +5 = -2$$



Go down by 5.

Adding a **positive** number **or** subtracting a **negative** number will have the **same result**.

$$-1 + +4 = +3$$

$$-1 - -4 = +3$$



Go up by 4.

Use a number line to visualise the answer.

Adding a negative number means subtract.

Subtracting a negative number means add.

++	means	+
+-	means	-
-+	means	-
--	means	+

## Multiplying and dividing integers

Look at these examples.

Multiplying a negative number by a positive number always gives a negative answer.

$$-5 \times +3 = -15$$

$$+5 \times -3 = -15$$

Multiplying two positive numbers **or** multiplying two negative numbers always gives a positive answer.

$$+4 \times +3 = +12$$

$$-4 \times -3 = +12$$

The same rules work for division.

$$+10 \div -5 = -2$$

$$-10 \div -5 = +2$$



This table summarises the rules:

+	× or ÷	+	=	+
+	× or ÷	-	=	-
-	× or ÷	+	=	-
-	× or ÷	-	=	+

A positive number multiplied by a negative number gives a negative answer.

A negative number multiplied by a negative number gives a positive answer.

### KEYWORDS

**Integer** ➤ An integer is a whole number; it can be positive, negative or zero.

**Positive** ➤ A number above zero.

**Negative** ➤ A number below zero.

## Use of symbols

Look at the following symbols and their meanings.

Symbol	Meaning	Examples
$>$	Greater than	$5 > 3$ (5 is greater than 3)
$<$	Less than	$-4 < -1$ (-4 is less than -1)
$\geq$	Greater than or equal to	$x \geq 2$ ( $x$ can be 2 or higher)
$\leq$	Less than or equal to	$x \leq -3$ ( $x$ can be -3 or lower)
$=$	Equal to	$2 + +3 = 2 - -3$
$\neq$	Not equal to	$4^2 \neq 4 \times 2$ (16 is not equal to 8)



## Place value

Look at this example.

Given that  $23 \times 47 = 1081$ , work out  $2.3 \times 4.7$

The answer to  $2.3 \times 4.7$  must have the digits 1 0 8 1 ← Do a quick estimate to find where the decimal point goes.

2.3 is about 2 and 4.7 is about 5. Since  $2 \times 5 = 10$ , the answer must be about 10.

Therefore  $2.3 \times 4.7 = 10.81$



Write the following symbols and numbers on separate pieces of paper.

+   -   ×   ÷   =   0

+2   -2   +4   -4   +8   -8

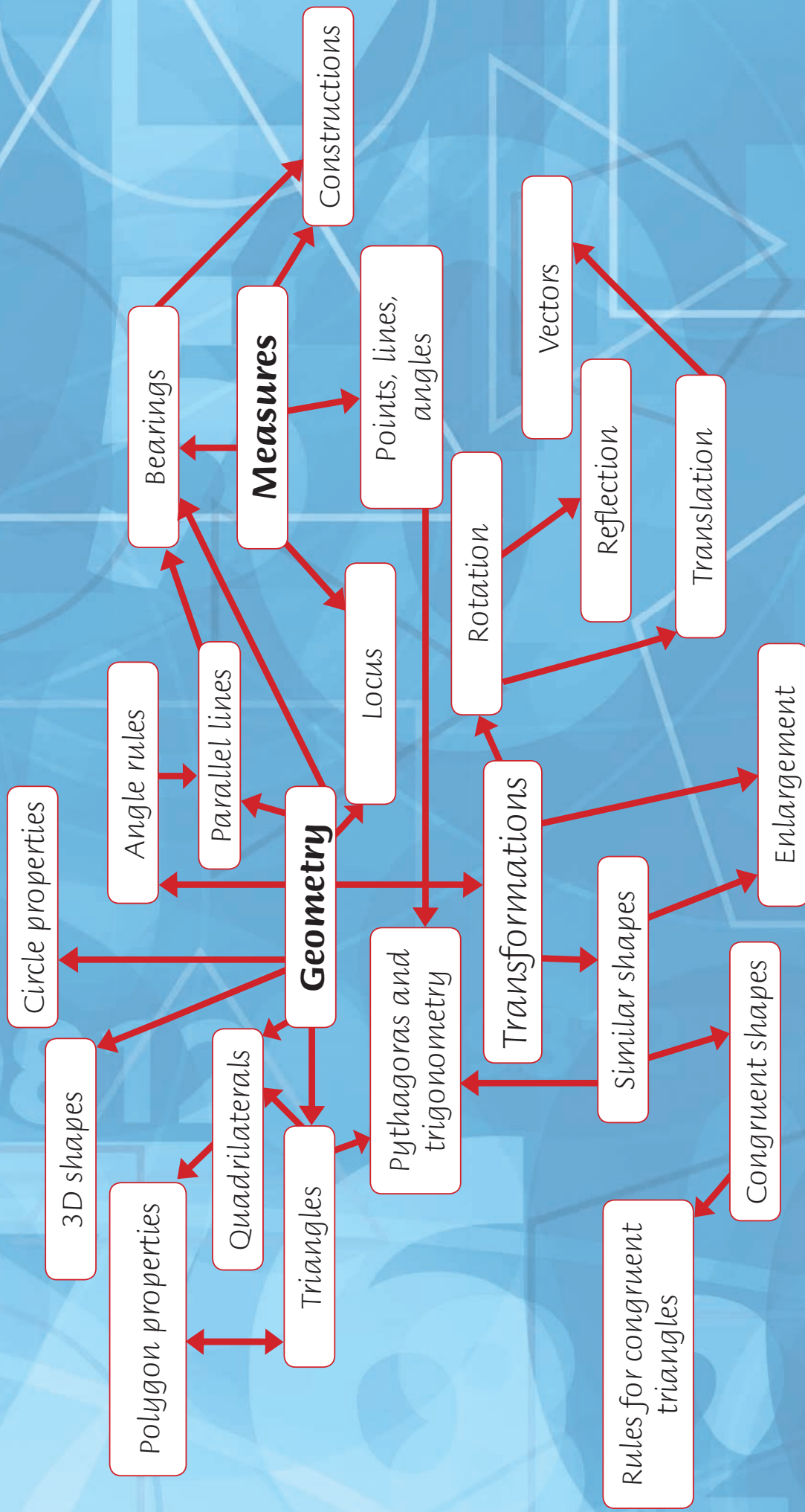
Arrange them to form a correct calculation.

How many different calculations can you make? For example:

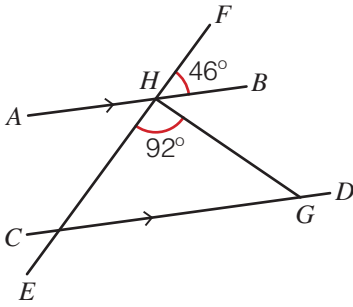
+2   -   -2   =   +4



- Calculate the following:
  - $-5 - -8$
  - $-2 + -6$
  - $-7 + -3 - -5$
- Calculate the following:
  - $-12 \times -4$
  - $24 \div -3$
  - $-3 \times -4 \times -5$
- State whether these statements are true or false.
  - $6 < 3$
  - $-4 > -5$
  - $2 + -3 = 2 - +3$
- Given that  $43 \times 57 = 2451$ , calculate the following:
  - $4.3 \times 0.57$
  - $430 \times 570$
  - $2451 \div 5.7$

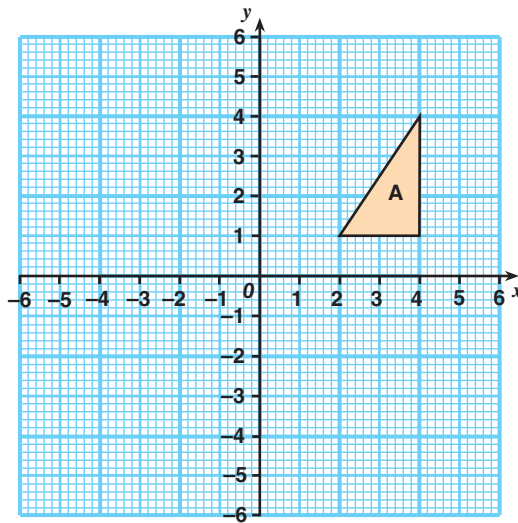


1. If the interior angle of a regular polygon is  $156^\circ$ , how many sides does it have? [2]
2. Find the angle  $HGD$  giving all your reasons. [3]

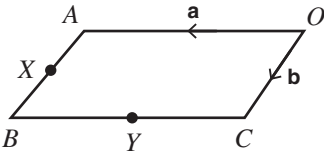


3. In triangle  $ABC$  the length  $AB = 10\text{cm}$ , angle  $BAC = 92^\circ$  and angle  $ABC = 20^\circ$ .  
In triangle  $RST$  the length  $SR = 10\text{cm}$ , angle  $RST = 20^\circ$  and angle  $STR = 68^\circ$ .  
Draw triangles  $ABC$  and  $RST$  and show that they are congruent, giving your reasons. [3]

4. (a) Rotate shape A  $90^\circ$  clockwise about the point  $(0, 0)$  and label the image B. [2]
- (b) Reflect B in the line  $x = 0$  and label the image C. [1]

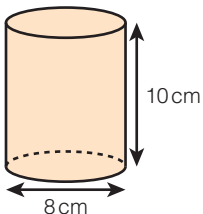



5.  $OABC$  is a parallelogram with  $X$  the midpoint of  $AB$  and  $Y$  the midpoint of  $BC$ .



Use the vectors  $\mathbf{a}$  and  $\mathbf{b}$  to write:

- (a)  $\vec{OA}$  [1]                      (b)  $\vec{OB}$  [1]                      (c)  $\vec{OY}$  [2]
6. [3]
- (a) Find the length  $NQ$ . Give your answer to 2 decimal places. [3]
- (b) Find the angle  $NMQ$ . Give your answer correct to 3 significant figures. [3]
7. Find the volume of this cylinder. Give your answer in terms of  $\pi$ . [3]



**1** Circle the numbers which are **not** equivalent to 3.75  [2 marks]

$\frac{30}{8}$       37.5%      375%       $\frac{14}{5}$        $3\frac{5}{8}$        $\frac{750}{200}$

**2** Write the following numbers in ascending order.  [2 marks]

0.21      20%       $\frac{3}{10}$       0.211       $\frac{2}{9}$

.....

.....

**3** Is 2.125 or  $2\frac{4}{5}$  closer to  $2\frac{1}{2}$ ? Explain your reasoning.  [2 marks]

.....

.....

**4** On a new estate of 32 houses,  $\frac{3}{8}$  have two bedrooms.  $\frac{5}{6}$  of the two-bedroom houses have a garage. [2 marks]

What percentage of the whole estate is represented by two-bedroom houses with a garage?

.....

**5** Claire makes soft toys to sell at a Christmas market. [2 marks]

**(a)** Each dog toy costs £3.45 to make and Claire sells them for £5.99.

What is her percentage profit?

.....

**(b)** A tiger toy costs 15% more to make than a dog toy and she makes 80 tiger toys. Claire sells 55 of them for £6.99 and the rest at the reduced price of £4. [4 marks]

What percentage profit does she make on tiger toys?

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**6** At Mathstown School 55% of the students are girls. 40% of the girls and 65% of the boys have school lunch.

**(a)** What percentage of students at the school have school lunch? [3 marks]

.....


**(b)** What fraction of the boys do not have school lunch? [2 marks]

.....

**Score**    /19

For more help on this topic, see Letts GCSE Maths Foundation Revision Guide pages 46–47.



**1** Simplify these ratios and circle the odd one out. You must show all your working.  [2 marks]

£4 : £6      10 : 15      20cm : 3m      750g : 1.125kg      40 seconds : 1 minute

.....  
.....  
.....

**2** Jane is making 'mist blue' paint for her room. She mixes navy blue, grey and white paint in the ratio 1 : 2 : 7

**(a)** How much of each colour does Jane need to make 2 litres of 'mist blue' paint? [3 marks]

Navy blue: ..... ml      Grey: ..... ml      White: ..... ml

**(b)** Jane finds she has  $\frac{3}{4}$  litres of navy blue, 1200ml of grey and 6 litres of white paint.

What is the maximum amount of 'mist blue' she can make? [2 marks]

..... litres

**3** The ratio of A : B is 5 : 8

Complete this statement. A is  $\frac{\square}{\square}$  of B.  [1 mark]

**4** This is a recipe for shortbread:

Makes 15 biscuits			
110g butter	50g sugar	175g flour	50g chocolate chips

**(a)** Amil has 70g of sugar. How many biscuits can he make? [2 marks]


.....

**(b)** How much flour is needed to make 12 biscuits? [2 marks]

..... g

**5** Lucy makes green paint by mixing yellow and blue paint in the ratio 5 : 2

Blue paint costs £30 for 5 litres and yellow paint costs £28 for 7 litres.

Lucy sells her green paint for £4.50 per litre. Will she make a profit? Show your working to justify your decision.  [3 marks]

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Score /15

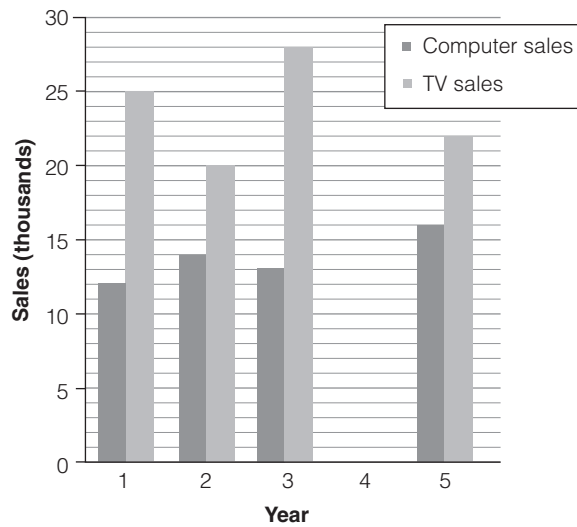
20. Simplify  $(3x^2y^5)^2$

[2]

21. The total TV sales over a five-year period for a national electrical store were 120 000 units. Find the sales figures for computers and TVs in year 4.

[3]

Year	Computer sales (thousands)	TV sales (thousands)
1	12	
2	14	
3	13	
4	$a$	$2a + 5$
5	16	



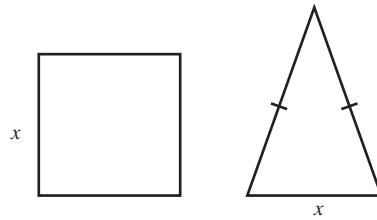
TV sales: .....

Computer sales: .....

22. Find the equation of the line that is parallel to  $y = 2x + 7$  and passes through the point  $(0, -3)$ .

[2]

23. Here is a square and an isosceles triangle.



The length of each of the equal sides of the triangle is 3cm greater than the side of the square.

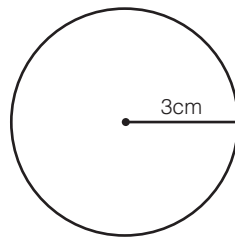
(a) If the perimeters of the two shapes are equal, find the value of  $x$ . [3]

.....

(b) Show that the height of the triangle is equal to the diagonal of the square. [3]

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.....  
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24. Calculate the circumference of this circle.



Leave your answer in terms of  $\pi$ . [2]

..... cm