

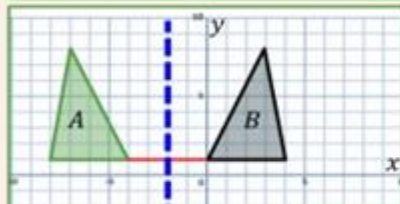
Transformations

Knowledge Organiser

Reflection

Reflection: the replacement of each point on one side of a line by the point symmetrically placed on the other side of the line.

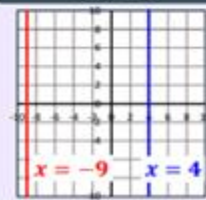
Need a mirror line



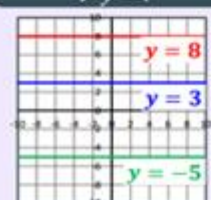
Reflection in the line
 $x = -2$

Horizontal and vertical lines

Vertical lines
 $\rightarrow x = ?$



Horizontal lines
 $\rightarrow y = ?$



Rotation

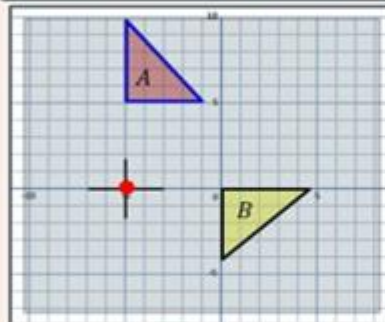
Rotation: the action of rotating a shape about an axis or central point.

Need a Centre point

Need a Direction

Need a measure of turn

Use of tracing paper



Rotation

90°
Clockwise

About $(-5, 0)$

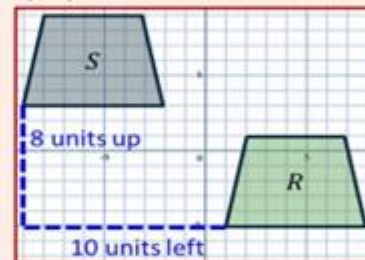
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Translation

Translation: the action of 'sliding' a shape to a new position.

Described using Vector Notation

$\begin{pmatrix} x \\ y \end{pmatrix}$ Direction along
Direction up/down



$R \rightarrow S =$
Translation $\begin{pmatrix} -10 \\ 8 \end{pmatrix}$

Enlargement

Enlargement: the action of resizing a shape to the scale factor given from a specific point.

Need a Centre point

Need a scale factor

$\frac{\text{New shape}}{\text{Original shape}}$



$R \rightarrow S$

Use
projection
lines

Enlargement

Scale factor
3

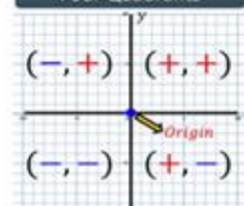
From $(3, -6)$

Co-ordinate review

(x, y)
Direction along the x-axis
Along the corridor
Direction up/down the y-axis
Up, Down the stairs

Start from a central point
 $(0, 0)$ - Origin

Four Quadrants

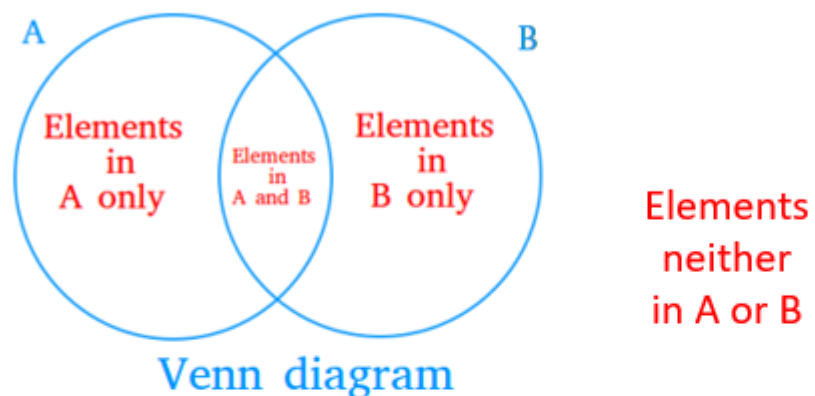




Venn diagrams

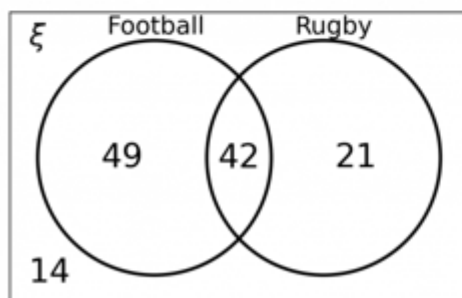
Knowledge Organiser

The Basics



Probabilities from Venn diagrams

Write any probabilities from a Venn diagram as a fraction



Find the probability someone plays football:

$$\frac{49 + 42}{49 + 42 + 21 + 14} = \frac{91}{126}$$

$49 + 42$

Tricky Questions

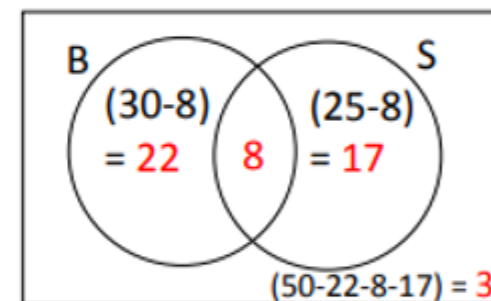
Be careful if the total number looks smaller than the individual totals given

Out of 50 people surveyed:

30 have a brother

25 have a sister

8 have both a brother and sister



Here there are 50 people altogether but

$$25 + 30 + 8 = 58$$

The difference goes into the middle of the Venn diagram



Inequalities

Key Words

equation

solve

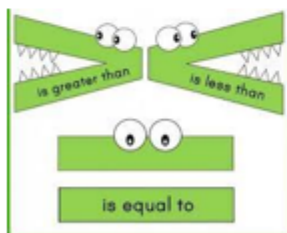
inequalities

greater than

less than

Understanding

Remember! The hungry alligator always eats the largest number.



Writing Inequalities

 $9 > 8$ 9 is bigger than 8

 $7 < 9$ 7 is smaller than 9

 $2 = 2$ 2 is equal to 2

Solving Inequalities

Solve inequalities the same way you would solve a normal equation but remember to include the inequality symbol in your answer.

Solve $x + 5 \leq 8$

$$\begin{array}{r} -5 \quad -5 \\ x \leq 3 \end{array}$$

Solve $x - 4 > 9$

$$\begin{array}{r} +4 \quad +4 \\ x > 13 \end{array}$$

Solve $3x + 4 \leq 7$

$$\begin{array}{r} -4 \quad -4 \\ 3x \leq 3 \\ \div 3 \quad \div 3 \\ x \leq 1 \end{array}$$

Solve $2x + 4 > x + 9$

$$\begin{array}{r} -4 \quad -4 \\ 2x > x + 5 \\ -x \quad -x \\ x > 5 \end{array}$$

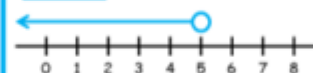
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Inequalities

On a number line

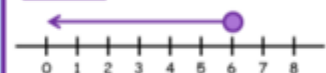
An **open circle** means that the value is **not included**:

 $x > 2$ x is greater than 2

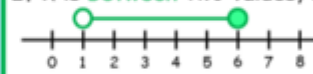
 $x < 5$ x is less than 5


A **filled in circle** means that the value is **included**:

 $x \geq 3$ x is greater than or equal to 3

 $x \leq 6$ x is less than or equal to 6


If x is **between** two values, use **two circles**:


 $1 < x \leq 6$

x is greater than 1, but less than or equal to 6.

Writing inequalities as integers

Write down the integers represented by $2 < x \leq 7$

3, 4, 5, 6, 7

Write down the integers represented by $1 \leq x \leq 4$

1, 2, 3, 4

Write down the integers represented by $4 < x < 9$

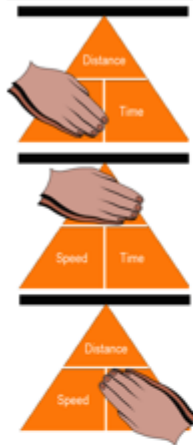
5, 6, 7, 8



Speed distance time

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The Basics

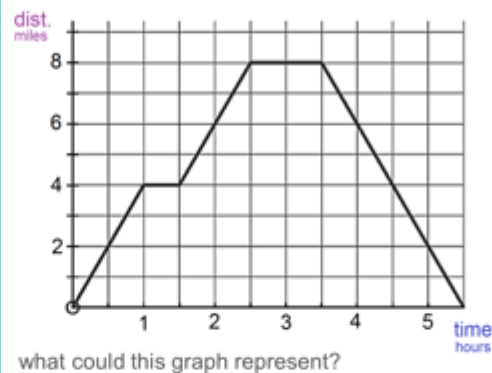


$$\text{Speed} = \text{Distance} \div \text{Time}$$

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Time} = \text{Distance} \div \text{Speed}$$

Graphs



A flat line shows they stopped

All other lines show movement to or from a destination

Calculations

Distance = 350 miles
Speed = 70mph

What is the time?

$$\begin{aligned} T &= D \div S \\ T &= 350 \div 70 \\ T &= 5 \text{ hours} \end{aligned}$$

Distance = 40 miles
Time = 2 hours

What is the speed?

$$\begin{aligned} S &= D \div T \\ S &= 40 \div 2 \\ S &= 20\text{mph} \end{aligned}$$

Time = 40 hours
Speed = 25mph

What is the distance?

$$\begin{aligned} D &= S \times T \\ D &= 40 \times 25 \\ D &= 1000 \text{ miles} \end{aligned}$$