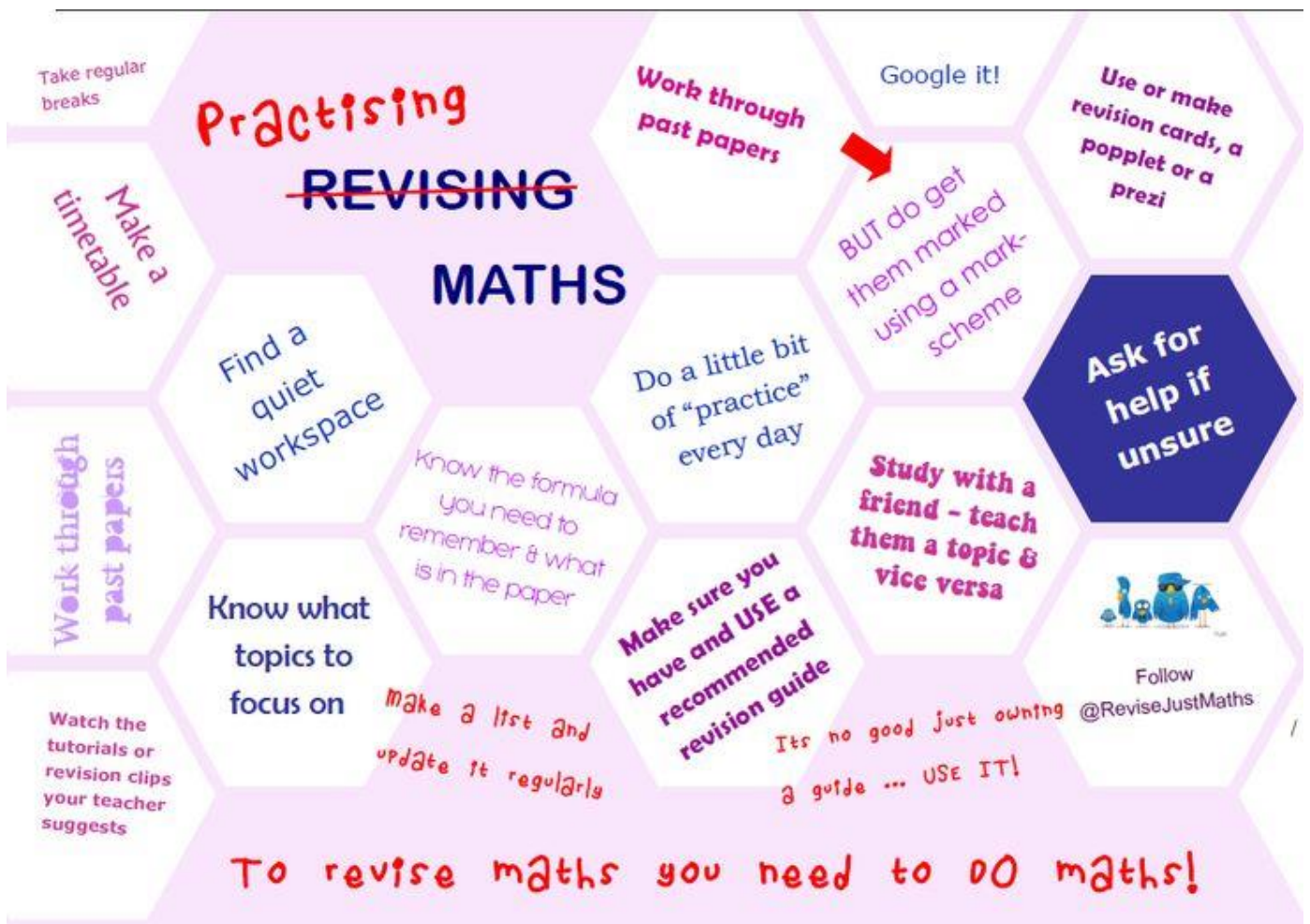


## Year 10 Foundation Tier Learn Sheet December 2016

### Higher revision topics

Using one calculation to answer another
Percentages, fractions of amounts
Stem and leaf
Expanding brackets
product of prime factors
calculations with the mean
transformations
Estimation
Lowest common multiples
Forming an equation
distance/time graph , speed
Straight line graph
Bearings, scale diagram
Inequalities

Standard form
Reverse percentages
Volume
Simultaneous equations
Indices
Forming an expression, area
Cumulative frequency
Similar shapes, volume
Algebraic fractions
Histograms
Completing the square
Conditional probability
Vectors
Transforming functions



### Translation

Describe with a vector

3 ← squares right  
4 ← squares up

### Rotation

To describe a rotation you need:

- the angle of rotation
- the direction
- the coordinates of the centre

Rotation of  $90^\circ$ , clockwise, about centre (2,-1)

anti-clockwise clockwise

Centre of rotation

### Reflection

Describe by naming the line of symmetry

Reflection in the line  $x = 2$ .

## Transformations

### Enlargement

Negative enlargements - HIGHER only!

Enlargement, scale factor 3, centre (0,7)

Always use **TRACING PAPER** for translation, reflection & rotation.

To describe an enlargement you need:

- the scale factor
- coordinates of the centre

Enlargement of scale factor -2.

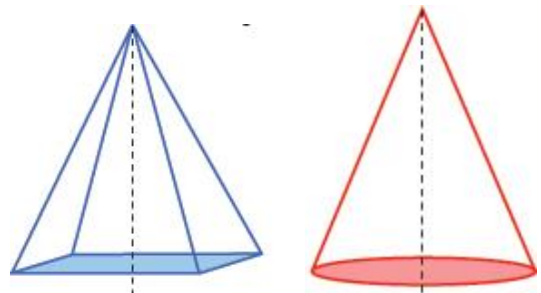
### Probability rules

- $P(A)$  means the probability of getting an event 'A'
- Write probabilities as fractions, decimals or % (never ratios)
- Probabilities add up to 1, so  $P(\text{not } A) = 1 - P(A)$
- 0 = impossible, 1 = certain
- AND rule – times probabilities together
- OR rule – add probabilities together
- tree diagrams – write probabilities on the branches

### Volume

A prism is a 3D shape with the same cross section all the way through the shape

- Volume of prism = (area of cross-section)  $\times$  length
- Volume of cone/pyramid =  $\frac{1}{3} \times$  base area  $\times$  height
- Volume of sphere =  $\frac{4}{3} \pi r^3$



### Completing the square

To complete the square:

1. Take the co-efficient of  $x$  at be, for example in:
  - $x^2 + 6x + 1$
2. Half this and then square it. Both add and subtract it from the equation (so the equation doesn't change) like so:
  - $x^2 + 6x + (6/2)^2 - (6/2)^2 + 1$
3. This can be factorised into:
  - $(x+3)^2 + 8$
4. To check you can expand to get:
  - $x^2 + 6x + 9 + (-9 + 1)$
5. Remember: that if it is  $4x^2 + \dots$  it has to be factorised into  $4(x + \dots)^2$  rather than  $(4x + \dots)^2$

### Simultaneous equations

Use elimination to solve the system of equations:

$$\begin{cases} 3x + 5y = -16 \\ 2x + 3y = -9 \end{cases}$$

**Step 1:** To eliminate  $x$ , multiply both sides of the first equation by 2 and both sides of the second equation by -3.

$$\begin{array}{r} 2(3x + 5y) = 2(-16) \quad 6x + 10y = -32 \\ -3(2x + 3y) = -3(-9) \quad -6x - 9y = 27 \end{array} \quad \begin{array}{l} \text{Add the} \\ \text{equations!} \end{array}$$

First part of the solution:  $y = -5$

Now find  $x$  by substitution

$$3x + 5(-5) = -16 \text{ gives } 3x - 25 = -16$$

$$3x = 9, \text{ so } x = 3$$