

**What we can learn from  
past performance?**

**Actually ....**

**Questions, questions,  
questions**

# Email me

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# WTF?

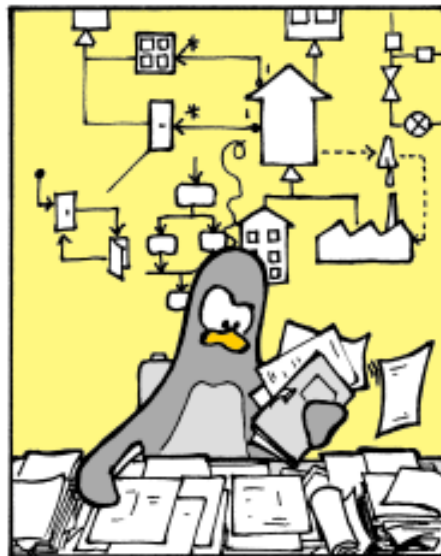
ResultsPlus

Examiners reports

Grade boundaries

Exam papers (Script viewer)

Exam board analysis



ETC

ETC

ETC

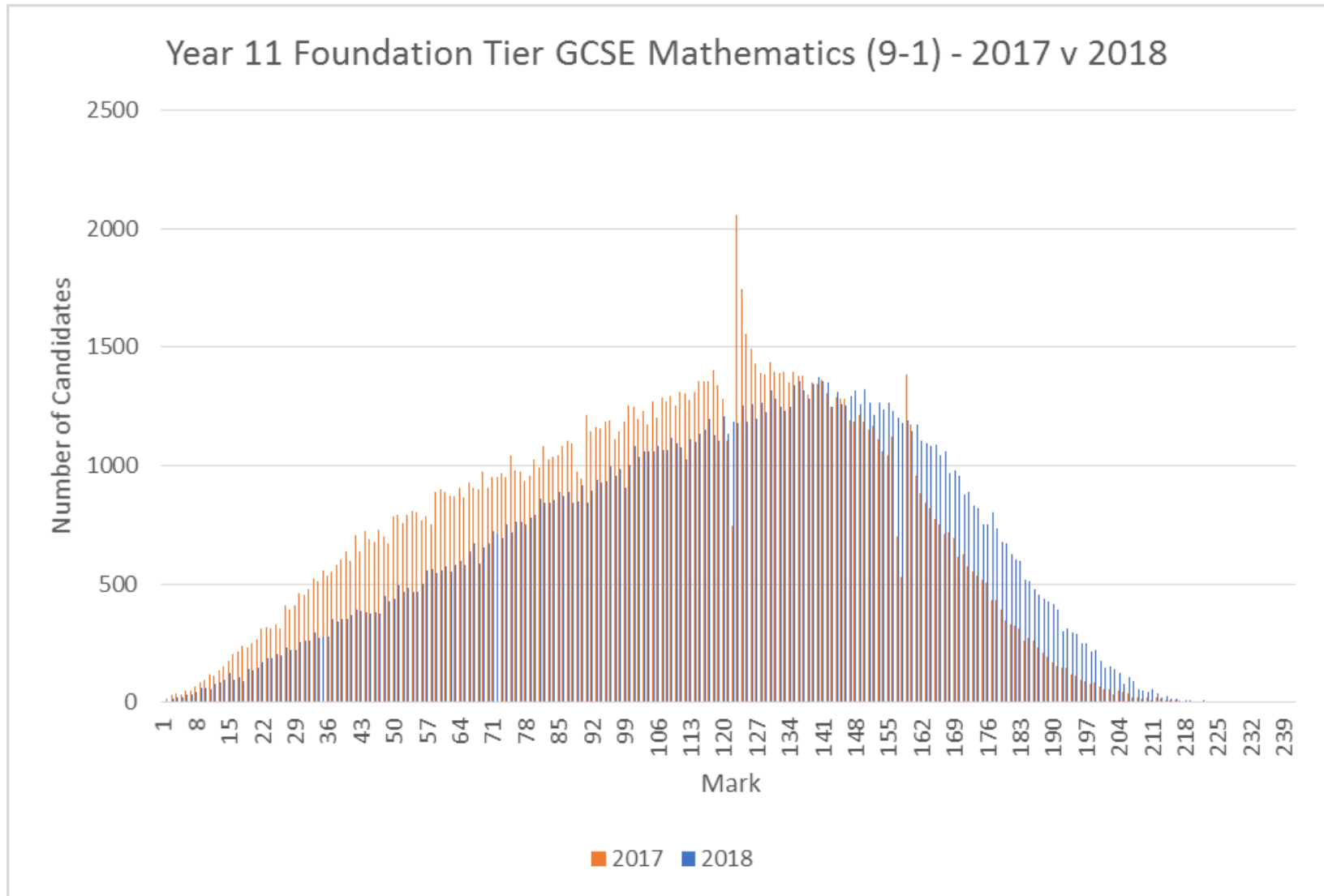
ETC

ETC

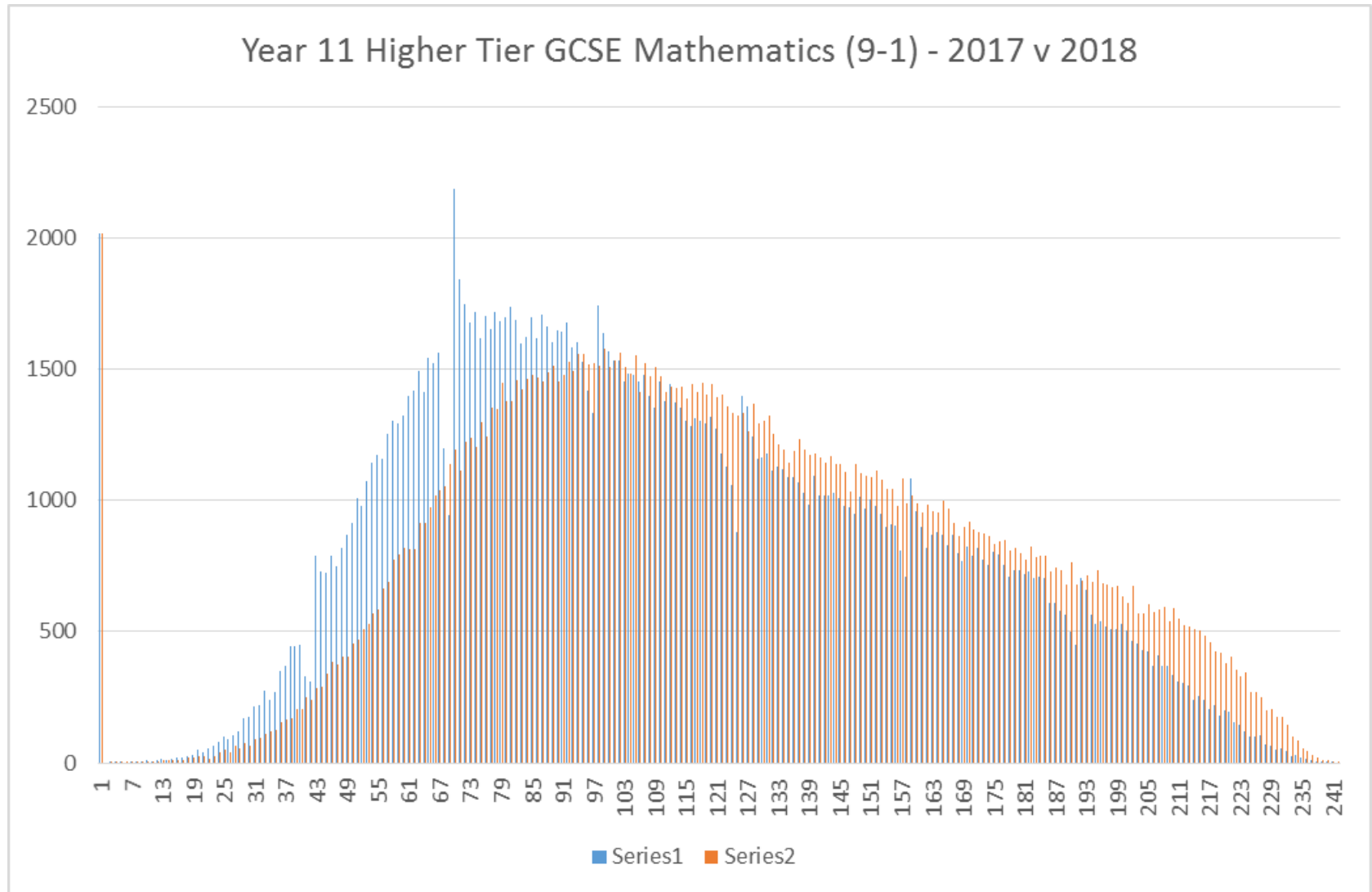
ETC

ETC

# GCSE Mathematics: Distributions - F



# GCSE Mathematics: Distributions - H



# GCSE Mathematics: topics

## Foundation Tier

		Number	Algebra	Geom	Ratio	Prob	Stats	Total
2017	Total	61	49	36	57	15	22	240
	%	57	39	30	33	50	70	100
2018	Total	62	48	34	59	16	21	240
	%	66	36	26	49	50	57	100

## Higher Tier

		Number	Algebra	Geom	Ratio	Prob	Stats	Total
2017	Total	35	70	51	49	16	19	240
	%	55	34	42	46	66	74	100
2018	Total	31	76	53	46	19	15	240
	%	54	46	43	59	60	63	100

## Questions ...

**To what extent should the curriculum time reflect these %?**



# GCSE Mathematics: AO1, AO2, AO3

## Foundation Tier

		AO1	AO2	AO3
2017	Total	120	60	60
	%	47	49	36
2018	Total	120	60	60
	%	52	43	45

## Higher Tier

		AO1	AO2	AO3
2017	Total	96	72	72
	%	45	49	45
2018	Total	96	72	72
	%	64	45	52

# Questions ...

**To what extent do the style of questions used in class reflect these %?**

**Can H and F tier be taught together? 2**

# GCSE Mathematics: performance data

All performance data available on emporium

Topic Spec	AO	Quest	Skill tested	Edexcel averages: scores of candidates who achieved grade:													Overall percentage of ALL candidates scoring each mark total											
				Mean	Max	s. Mean	ALL	9	8	7	6	5	4	3	2	1	U	0	1	2	3	4	5	6				
<b>Paper 1H NON CALCULATOR (H)</b>																												
Numbe N8	1	Q01a	Calculate exactly with fractions	1.62	2	81	1.62	1.97	1.94	1.88	1.75	1.52	1.15	0.73	-	-	0.43	15.3	7.6	77.1								
Numbe N8	1	Q01b	Calculate exactly with fractions	1.23	2	62	1.23	1.86	1.70	1.50	1.29	1.04	0.72	0.41	-	-	0.24	19.3	38.6	42.1								
Ratio R6	3	Q02	Ratio in real context	2.34	3	78	2.34	2.95	2.85	2.70	2.47	2.18	1.71	1.07	-	-	0.51	13.2	12.4	1.8	72.6							
Ratio R1/R3/R4	3	Q03	Percentages and problems involving percentages	3.33	4	83	3.33	3.89	3.77	3.62	3.43	3.21	2.84	2.18	-	-	1.47	3.6	2.1	18.9	8.3	67.1						
Ratio R1/R1/R1E	1	Q04a	Approximation and estimation	2.13	3	71	2.13	2.84	2.64	2.45	2.21	1.94	1.57	1.03	-	-	0.58	3.0	10.9	17.9	16.6	51.7						
Ratio R11	3	Q04b	Use compound units	0.90	1	90	0.90	0.98	0.96	0.95	0.92	0.89	0.82	0.71	-	-	0.51											
Geom G2, G1	2	Q05a	Plans and elevations of 3D shapes	1.47	2	74	1.47	1.81	1.69	1.62	1.51	1.40	1.20	0.92	-	-	0.63	6.4	8.2	15.2	16.3	14.1	13.2	26.7				
Geom G17, N2	1	Q05b	Surface area and volume of spheres, pyramids, cones and cylinders	2.23	4	56	2.23	3.71	3.32	2.85	2.35	1.76	1.05	0.51	-	-	0.33											
Geom G11/A8	3	Q06	Geometrical problems on coordinate axes	2.55	5	51	2.55	4.58	3.82	3.11	2.51	1.97	1.45	0.93	-	-	0.54	15.9	13.8	15.4	31.4	0.5	22.9					
Geom G7	2	Q07	Combinations of transformations	1.19	2	60	1.19	1.88	1.72	1.52	1.27	0.96	0.59	0.28	-	-	0.13	26.6	28.1	45.3								
Ratio R5/G6/	3	Q08	Ratio in real context	3.20	4	80	3.20	3.86	3.70	3.56	3.39	3.10	2.50	1.50	-	-	0.80	5.8	2.3	17.6	14.9	59.3						
Numbe N7	1	Q09a	Index notation	0.82	1	82	0.82	1.00	0.99	0.96	0.90	0.78	0.57	0.40	-	-	0.23	17.9	82.1									
Numbe N7	1	Q09b	Index notation	0.87	1	87	0.87	1.00	0.98	0.96	0.92	0.83	0.72	0.58	-	-	0.40	12.8	87.2									
Numbe N7	1	Q09c	Index notation	1.24	2	62	1.24	1.97	1.86	1.65	1.33	0.94	0.57	0.31	-	-	0.12	25.9	24.2	49.8								
Statisti S4	2	Q10a	Box plots	2.91	3	97	2.91	2.99	2.98	2.97	2.96	2.92	2.83	2.59	-	-	1.86	1.3	0.7	3.1	94.9							
Statisti S4	2	Q10b	Measures of spread (range, including considering outliers)	0.82	2	41	0.82	1.76	1.42	1.10	0.79	0.53	0.31	0.17	-	-	0.10	58.6	0.6	40.7								
Geom G10	2	Q11	Circle theorems	1.45	5	29	1.45	4.11	3.10	2.04	1.20	0.63	0.29	0.12	-	-	0.07	35.6	27.5	15.4	7.8	5.3	8.4					
Algebr: N6/A4/	2	Q12	Mathematical arguments and proofs	1.43	4	36	1.43	3.82	3.28	2.33	1.20	0.41	0.13	0.04	-	-	0.01	57.0	5.0	3.3	8.0	26.8						
Numbe N8	2	Q13	Calculate exactly with surds	1.54	3	51	1.54	2.93	2.75	2.26	1.57	0.90	0.46	0.24	-	-	0.12	31.1	22.7	7.6	38.6							
Ratio R13/A4	3	Q14	Solve problems involving direct and inverse proportion	2.16	5	43	2.16	4.32	3.57	2.92	2.24	1.43	0.76	0.35	-	-	0.12	30.2	4.9	9.6	36.2	12.6	6.5					
Algebr: A4	1	Q15a	Factorise expressions	0.46	1	46	0.46	0.93	0.77	0.59	0.45	0.31	0.21	0.12	-	-	0.07	53.9	46.1									
Algebr: A4	1	Q15b	Expand expressions	1.10	3	37	1.10	2.49	1.92	1.47	1.07	0.67	0.37	0.19	-	-	0.09	37.7	35.9	5.2	21.2							
Probab P4	3	Q16	Probabilities of an exhaustive set of outcomes	1.33	3	46	1.33	2.85	2.41	1.88	1.39	0.93	0.46	0.11	-	-	0.03	43.0	5.7	2.4	42.9							
Algebr: A4	1	Q17	Simplify and manipulate algebraic expressions	1.25	3	42	1.25	2.92	2.59	1.96	1.18	0.51	0.18	0.07	-	-	0.03	43.5	12.2	2.7	35.6							
Algebr: A13	2	Q18	Translations and reflections of a function	1.10	2	55	1.10	1.91	1.69	1.44	1.13	0.82	0.53	0.29	-	-	0.16	40.7	8.3	51.0								
Algebr: A22/A1	3	Q19	Solve quadratic inequalities	1.18	5	24	1.18	4.57	3.37	1.67	0.61	0.16	0.04	0.01	-	-	0.00	58.3	14.9	7.4	2.4	4.3	12.7					
Algebr: A22	1	Q20	Graphs and equations of lines	1.52	5	30	1.52	3.97	2.72	1.84	1.35	0.94	0.58	0.32	-	-	0.15	30.7	36.7	6.8	12.2	3.2	10.4					
				****		80	54	****	****	64.51	****	****	****	****	****	****	****	24.61	16.18									
<b>Paper 2F NON CALCULATOR (F)</b>																												
Ratio R9	1	Q01	Percentages and problems involving percentages	0.61	1	61	0.61	-	-	-	-	0.93	0.84	0.66	0.43	0.21	0.07	38.8	61.2									
Numbe N15	1	Q02	Rounding, inequality notation to specify error intervals	0.67	1	67	0.67	-	-	-	-	0.97	0.90	0.75	0.48	0.20	0.06	33.3	66.7									
Numbe N7	1	Q03	Roots and powers	0.84	1	84	0.84	-	-	-	-	0.99	0.97	0.91	0.77	0.52	0.24	16.0	84.0									
Numbe N2	1	Q04	Apply four operations	0.71	1	71	0.71	-	-	-	-	0.90	0.85	0.76	0.62	0.39	0.14	29.4	70.6									
Ratio R1	1	Q05a	Change between standard units and compound units	0.62	1	62	0.62	-	-	-	-	0.88	0.78	0.64	0.50	0.35	0.16	37.9	62.1									
Ratio R1	1	Q05b	Change between standard units and compound units	0.56	1	56	0.56	-	-	-	-	0.85	0.75	0.59	0.41	0.24	0.12	43.9	56.1									
Ratio R1	1	Q05c	Change between standard units and compound units	0.49	1	49	0.49	-	-	-	-	0.86	0.71	0.50	0.32	0.17	0.06	50.4	49.6									
Numbe N4	3	Q06	Primes, factors, multiples	2.10	3	70	2.10	-	-	-	-	2.72	2.56	2.29	1.77	1.08	0.47	14.5	9.1	28.0	48.4							
Numbe N5	1	Q07	Listing strategies/Product rule for counting	1.38	2	69	1.38	-	-	-	-	1.79	1.65	1.44	1.19	0.85	0.37	11.4	39.6	49.0								
Numbe N4/N13	3	Q08	Units of mass, length, time, money and other measures	4.38	5	88	4.38	-	-	-	-	4.88	4.80	4.65	4.28	3.16	1.18	3.0	3.9	2.0	2.5	20.0	68.6					
Ratio R11	1	Q09a	Use compound units	1.77	2	89	1.77	-	-	-	-	1.98	1.94	1.87	1.72	1.27	0.52	10.1	2.8	87.0								
Ratio R11	1	Q09b	Use compound units	1.70	2	85	1.70	-	-	-	-	1.97	1.91	1.81	1.62	1.17	0.50	13.5	2.4	84.1								
Numbe N4	1	Q10a	Primes, factors, multiples	0.98	2	49	0.98	-	-	-	-	1.71	1.47	1.05	0.56	0.20	0.05	41.7	18.6	39.7								

1MA1 - June 2018

By Qn



# Some specifics ....

# Summer 18

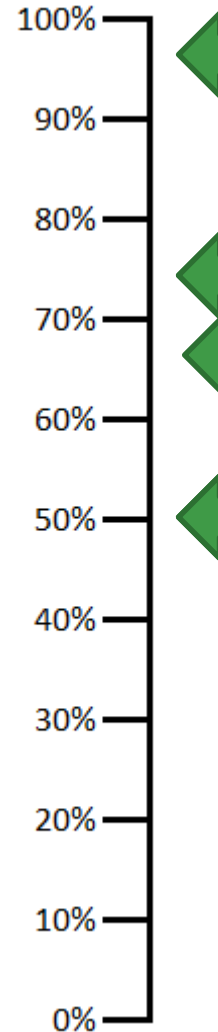
## Qn 20 2F and Qn 1 2H

(a) Simplify  $m^3 \times m^4$

(b) Simplify  $(5np^3)^3$

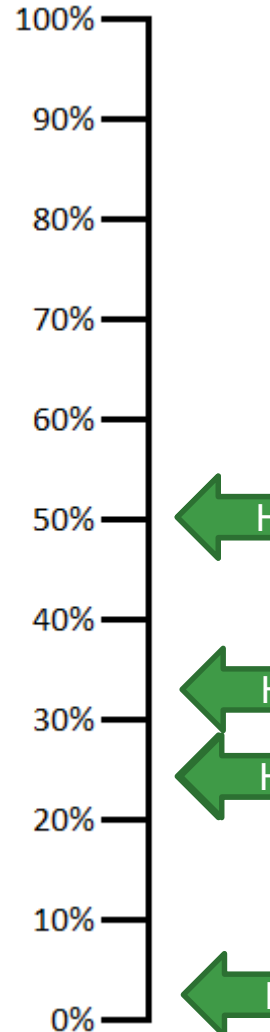
(c) Simplify  $\frac{32q^9r^4}{4q^3r}$

69% got this correct



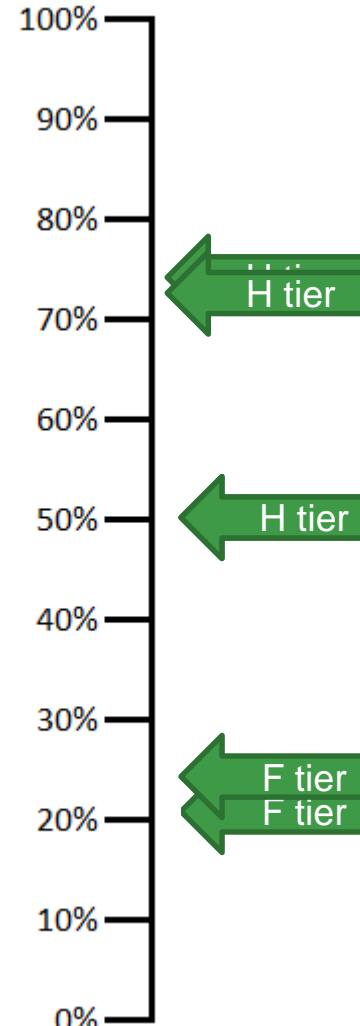
Part (a)

31% got this correct



Part (b)

21% got this correct



Part (c)

# Think about?

$$m^2 \times m^3$$

$$\frac{m^5}{m^2}$$

$$(2np^2)^3$$

# Summer 17

## Qn 1

1 (a) Simplify  $5p - 3p + p$

$$\begin{array}{r} 2p \quad 3p \\ \hline \end{array}$$

$$\begin{array}{r} 3p \\ \hline \end{array}$$

(1)

(b) Simplify  $m^3 + m^3$

$$\begin{array}{r} 2m^3 \\ \hline \end{array}$$

(1)

(c) Simplify  $10d + 3d + 5d - 7d + d$

$$6d - 4d + 10$$

$$\begin{array}{r} 6d - 4d + 10 \\ \hline \end{array}$$

(2)

(Total for Question 1 is 4 marks)

13% got b)  
correct

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%



**More questions ...**

**How often are students allowed to make mistakes?**

**Are they included in the lesson?**

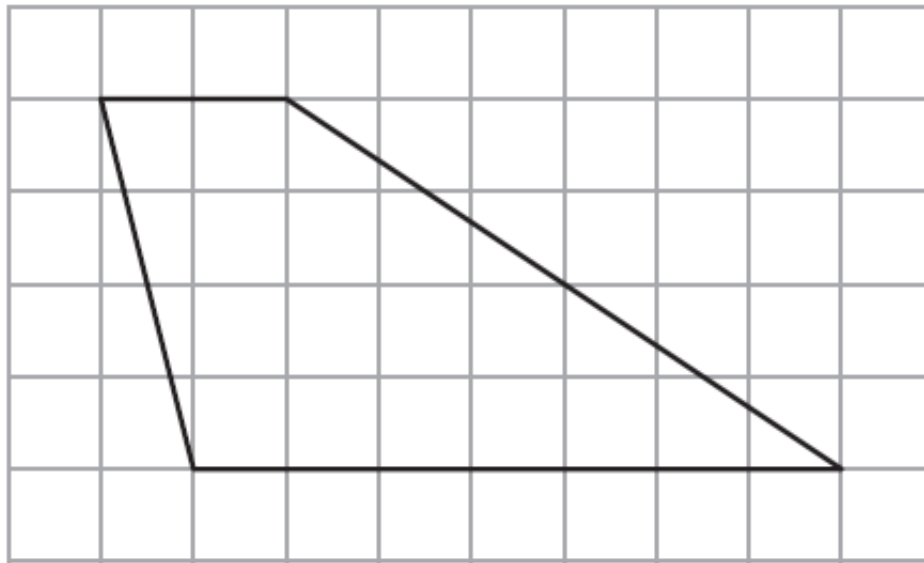
**Environment? Culture**



# Crossover question: Geometry

## Qn 21 3F and Qn 3 3H

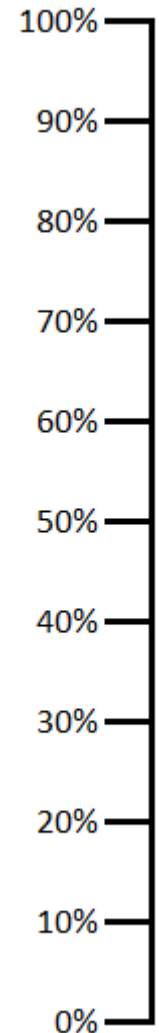
Here is a trapezium drawn on a centimetre grid.



On the grid, draw a triangle equal in area to this trapezium.

What % got 2/2?

59% got b)  
correct



**Questions ...**

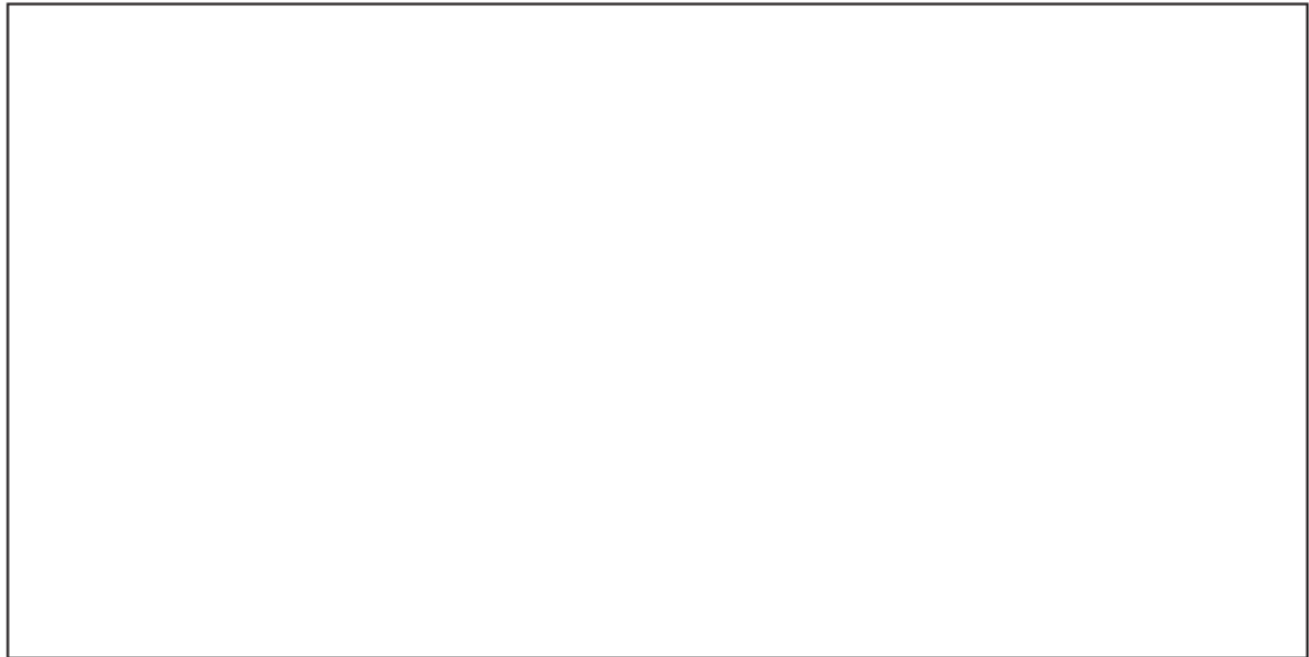
**Same trapezium every time**

**Counting squares? Formula**

# Ratio: Qn 12, Paper 3F

The diagram shows a scale drawing of a tennis court.

Anyone care to  
guess the mean  
score /5?



The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.  
Give your answer in metres.

1.46

## Questions ...

**When was the last time you used something that didn't have units on?**

**BUT do maps in real life have units?**

# Ratio: Qn 11, Paper 3H

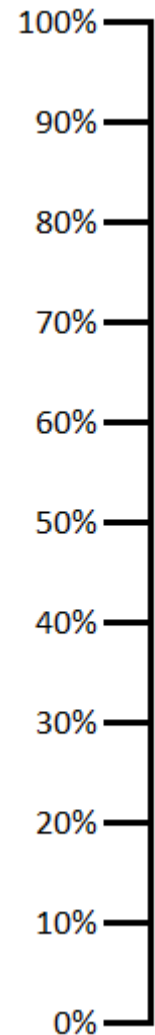
In 2003, Jerry bought a house.

In 2007, Jerry sold the house to Mia.  
He made a profit of 20%

In 2012, Mia sold the house for £162 000  
She made a loss of 10%

Work out how much Jerry paid for the house in 2003

What % got ZERO?  
WHY?



48% got zero!!

## Questions ...

**When was the last time you used a double reverse %?**

## Crossover question: Number

### Qn 21 1F and Qn 3 1H

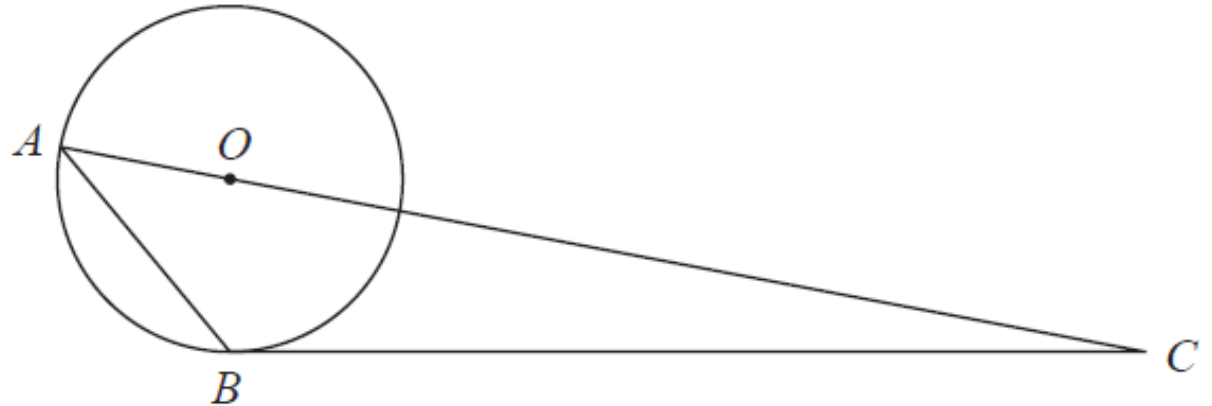
Renee buys 5 kg of sweets to sell.  
She pays £10 for the sweets.

Renee puts all the sweets into bags.  
She puts 250 g of sweets into each bag.  
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

# Summer 2018



$A$  and  $B$  are points on a circle, centre  $O$ .

$BC$  is a tangent to the circle.

$AOC$  is a straight line.

Angle  $ABO = x^\circ$ .

Find the size of angle  $ACB$ , in terms of  $x$ .

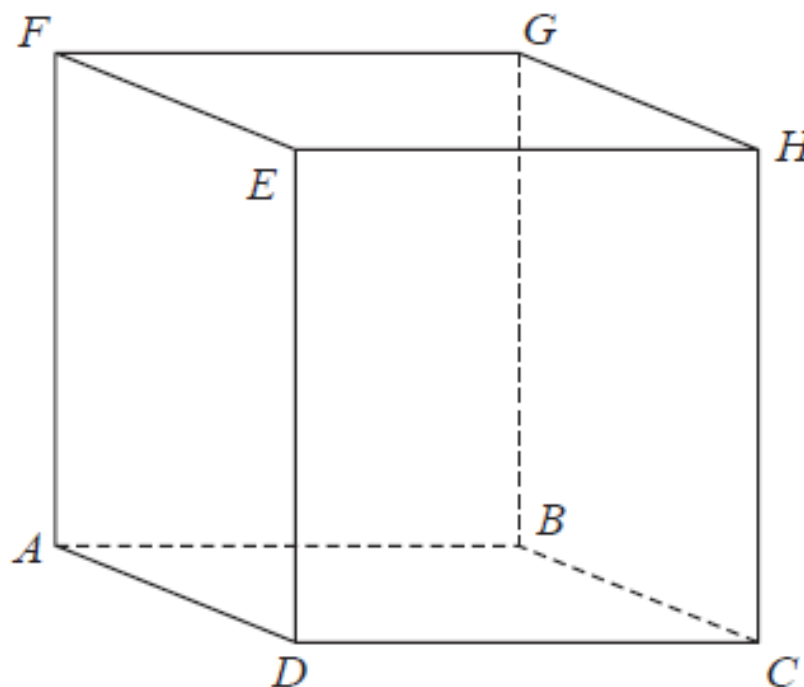
Give your answer in its simplest form.

Give reasons for each stage of your working.



# Summer 2018

$ABCDEFGH$  is a cuboid.



$$AB = 7.3 \text{ cm}$$

$$CH = 8.1 \text{ cm}$$

$$\text{Angle } BCA = 48^\circ$$

Find the size of the angle between  $AH$  and the plane  $ABCD$ .

Give your answer correct to 1 decimal place.

Can select each paper

Or 'Absolute terms'

The screenshot displays a results analysis interface for 'GERARD RO...' in 'June 2017' for '1MA1 GCSE MATHEMATICS'. The interface includes a 'Paper' dropdown menu set to 'All', a 'Questions' section with filters for 'This cohort's best 5 questions' and 'in relation to the Edexcel average', and a table of question performance data. The table columns are Question, Score, Performance (with a bar chart), Edexcel Ave: ALL, Residual, and Skill tested. The 'Performance' column uses a color scale from green (high performance) to red (low performance).

Question	Score	Performance	Edexcel Ave: ALL	Residual	Skill tested
Q08b (Paper 3F - CALCULATOR (F))	1.84/2	[Green bar]	0.87/2	[Green]	[Skill icon]
Q22 (Paper 1F - CALCULATOR (F))	1.72/2	[Green bar]	0.83/2	[Green]	[Skill icon]
Q20 (Paper 1F - NON CALCULATOR (F))	1.84/2	[Green bar]	1.05/2	[Green]	[Skill icon]
Q23 (Paper 1F - NON CALCULATOR (F))	2.44/3	[Green bar]	1.32/3	[Green]	[Skill icon]
Q11b (Paper 3F - CALCULATOR (F))	1.16/2	[Green bar]	0.42/2	[Green]	[Skill icon]
This cohort's worst 5 questions in relation to the Edexcel average were:					
Question	Score	Performance	Edexcel Ave: ALL	Residual	Skill tested
Q12b (Paper 3H - CALCULATOR (H))	0.78/2	[Red bar]	1.09/2	[Red]	[Skill icon]
Q12a (Paper 1H - CALCULATOR (H))	1.14/2	[Red bar]	1.38/2	[Red]	[Skill icon]
Q05b (Paper 2F - CALCULATOR (F))	0.64/1	[Red bar]	0.74/1	[Red]	[Skill icon]
Q05a (Paper 2H - CALCULATOR (H))	0.67/2	[Red bar]	0.86/2	[Red]	[Skill icon]
Q01b (Paper 2F - CALCULATOR (F))	0.04/1	[Red bar]	0.13/1	[Red]	[Skill icon]

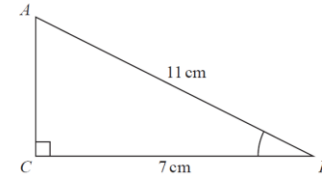
Between 1-10

# Summer 2018

26  $\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$        $\mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$

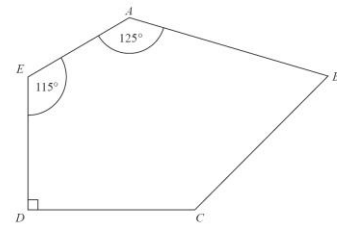
Work out  $2\mathbf{a} + \mathbf{b}$  as a column vector.

23  $ABC$  is a right-angled triangle.



(a) Work out the size of angle  $ABC$ .  
Give your answer correct to 1 decimal place.

26  $ABCDE$  is a pentagon.



Angle  $BCD = 2 \times$  angle  $ABC$ .  
Work out the size of angle  $BCD$ .  
You must show all your working.

Questions	
This cohort's best 5 questions in relation to the Edexcel average were:	
Question	Score
Q23a (Paper 3F - CALCULATOR (F))	1.36/2
Q26 (Paper 1F - NON CALCULATOR (F))	1.68/2
Q26 (Paper 3F - CALCULATOR (F))	
Q14a (Paper 3F - CALCULATOR (F))	2.8/3
Q18a (Paper 1F - NON CALCULATOR (F))	1.48/2
This cohort's worst 5 questions in relation to the Edexcel average were:	
Question	Score
Q20b (Paper 2H - CALCULATOR (H))	0.29/1
Q15a (Paper 1H - NON CALCULATOR (H))	0.21/1
Q02a (Paper 2H - CALCULATOR (H))	1.2/2
Q18b (Paper 3H - CALCULATOR (H))	0.57/1
Q17 (Paper 2F - CALCULATOR (F))	

2 (a) Find the lowest common multiple (LCM) of 40 and 56

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits

- 225 g butter
- 110 g caster sugar
- 275 g plain flour
- 75 g chocolate chips

Lucas has the following ingredients.

- 900 g butter
- 1000 g caster sugar
- 1000 g plain flour
- 225 g chocolate chips

What is the greatest number of biscuits Lucas can make?  
You must show your working.

Sian did this question.

Rationalise the denominator of  $\frac{5}{\sqrt{12}}$

Here is how she answered the question.

$$\begin{aligned} \frac{5}{\sqrt{12}} &= \frac{5\sqrt{12}}{\sqrt{12} \times \sqrt{12}} \\ &= \frac{5 \times 3\sqrt{2}}{12} \\ &= \frac{5\sqrt{2}}{4} \end{aligned}$$

Sian's answer is wrong.

(b) Find Sian's mistake.

## Questions ...

**Are we ensuring the Higher tier kids are fluent in the basics?**

**Time on certain topics? Is it worth the effort?  
Can it be done earlier with H tier?**

Looking at the the scripts of key pupils!

26  $\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$        $\mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$        $\begin{matrix} + & - \\ - & \end{matrix}$

Work out  $2\mathbf{a} + \mathbf{b}$  as a column vector.

$$\begin{pmatrix} 5 \\ 2 \end{pmatrix} + \begin{pmatrix} 5 \\ 2 \end{pmatrix} = \begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} -1 \\ 7 \end{pmatrix} = \begin{pmatrix} 9 \\ 11 \end{pmatrix}$$

$\begin{pmatrix} 9 \\ 11 \end{pmatrix}$

Q26    2

2 (a) Find the lowest common multiple (LCM) of 40 and 56

40

^

2 20

^

2 10

^

2 5

56

^

2 28

^

2 14

^

2 7

4 x 10.  
5 x 8

8.

(2) Q02a    1

## Questions ...

**Are we underestimating students ability?**

**Do we limit access to topics unnecessarily?**

**SO ...**