

Non-calculator topics vs Calculator topics + other noticed differences

Below is some information regarding the contents of non-calculator vs calculator papers. This is in no way an exhaustive list and has been put together to provide some guidance, which we hope will be of help to students as they prepare for their exams.

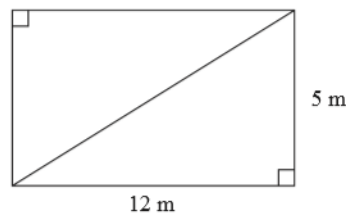
Typical non-calculator questions (that would not come on calculator papers)

- Surds (H)
- Calculations with fractions (H/F)
- Testing calculation skills – with decimals and long multiplication/division (H/F)
- Estimating answers (H/F)
- Product of prime factors (H/F)
- Standard form (H/F)
- Fractional and negative powers (H)

In the new papers, the following are also more common in the non-calculator paper:

- using Pythagorean triples (3, 4, 5; 5, 12, 13 etc). See example below (worked solution at end of document):

This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

- Trigonometry, with the students being expected to know the following values of sin, cos and tan:

For Higher:

The sine, cosine and tangent of some angles may be written exactly

	30°	45°	60°	0	90°
sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	0	1
cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	1	0
tan	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	0	

For Foundation:

The sine, cosine and tangent of some angles may be written exactly.

	30°	45°	60°	90°
sin	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	

Other common non-calculator questions, but can turn up in either paper:

- Tree diagrams (H)
- Vectors (H/F)
- Proof (H)
- Equations and Simultaneous equations (H/F)
- Graphs (H/F)
- Cumulative frequency and box plots (H)
- Transformations (H/F)
- Area and circumference of circles in terms of pi (H/F)
- Solving quadratics by factorising
- Completing the square

Common calculator questions:

- Solving quadratic equations using the Quadratic Formula
- Area of sectors/arc lengths
- Pythagoras' Theorem (H/F) (note what expected to know off by heart also on non-calc)
- Trigonometry (SOHCAHTOA (H/F), Sine/Cosine rule, area of any triangle using Sine, trig graphs (H)) (note what expected to know off by heart for non-calc)

Algebra

- Can come up in any paper; non-calculator or calculator

Ratio & proportion

- Now a much greater emphasis is put on questions involving ratio and proportion; including ratio, proportion, fractions, percentages, exchange rates, recipes, direct and indirect proportion, conversions etc.

Other noticed differences:

-More questions with more aspects included

Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4:5

Work out the number of lemon cakes Daniel bakes.

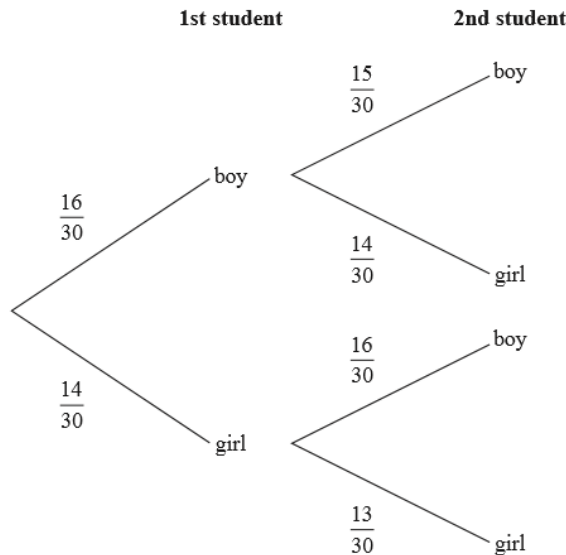
(H/F) (Calculator)

-More comments about whether a statement is correct or not, and to explain reasoning

There are 30 students in Mr Lear’s class.
16 of the students are boys.

Two students from the class are chosen at random.

Mr Lear draws this probability tree diagram for this information.



(a) Write down **one** thing that is wrong with the probabilities in the probability tree diagram.

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(1) (H/F)

Janie drove from Barnsley to York.

Janie’s average speed from Barnsley to Leeds was 80 km/h.
Her average speed from Leeds to York was 60 km/h.

Janie says that the average speed from Barnsley to York can be found by working out the mean of 80 km/h and 60 km/h.

(b) If Janie is correct, what does this tell you about the two parts of Janie’s journey?

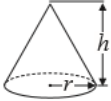
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(1) (H/F)

-More complicated estimation questions included

A cone has a volume of 98 cm^3 .
The radius of the cone is 5.13 cm .

(a) Work out an estimate for the height of the cone.

$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$	
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..... cm
(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?
Give reasons for your answer.

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.....
.....
(1)

(Total for Question 15 is 4 marks) (H)