NEW MATHS CE EXPLANATION CONVERTED

The new CE Maths papers will have a fresh, new style and provide new interest and opportunity for candidates. Senior schools should be pleased with a good grounding of basics and a new emphasis on thinking, creativity and resilience.

With slightly shorter papers, a higher quality of working can be expected. To deepen understanding, candidates will be required to include units with answers, and more marks will be awarded for the working. However, so that candidates are not over-penalised, a limit of 3 marks lost per paper for units will be set. A similar limit for rounding will be set on Calculator Papers.

Candidates are encouraged to cross out mistakes rather than erase them, so that good attempts and resilience are shown, not hidden.

Diagrams will no longer be marked, 'not to scale'. There will be an instruction on the front cover.

Questions will fall into two categories: those that require working (long-answer) and those where an answer can simply be written down (short-answer).

Long-answer questions will **not** have dotted lines for the final result, but will have a grey box for the responses (apart from Additional and CASE, which will have white spaces), placing more emphasis on the candidate's overall approach to the question (working and final result), with the majority of the marks often given for working.

The distinction between short-answer and long-answer questions will make it much easier for candidates to know when working is, and is not, required.
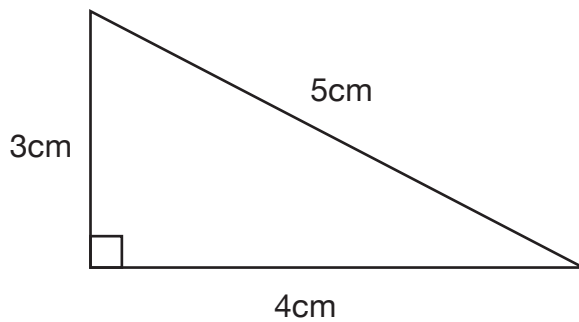
Please watch this video for more detail: ISEB Maths New Papers

Core Papers

- are designed to accommodate a broader range of ability, starting with more straightforward, routine questions, progressing to those with a little more challenge;

- are designed to be more accessible throughout, with fewer words and simpler language;

- are designed to be more interesting and thought-provoking, inviting genuine problem solving, resilience and depth of understanding, not just testing that which has been taught and practised;

- are designed to be positive, rewarding and encouraging for the candidates;

- are also designed to have less environmental impact, with most using 25% fewer pages than before.

Examples of long-answer questions.

1. Calculate the **area** and the **perimeter** of the triangle.

3cm

5cm

4cm

$$A = \frac{b \times h}{2}$$

$$= \frac{3 \times 4}{2}$$

$$= 6cm^2$$

$$P = 3 + 4 + 5$$

$$= 12 \ cm$$

[6]

2. Work out

a) 3 x 5 + 4

$$= 15 + 4$$
$$= 19$$

b) 2 + 3 x 4

$$= 2 + 12$$
$$= 14$$

c) 8 - 2 x 5 + 1

$$= 8 - 10 + 1$$
$$= -1$$

[6]

Candidates will be asked to double-underline their final answers to make them clear.
However, candidates should not be penalised if answers are made clear by other means.

There will often be less 'scaffolding', with candidates being expected to find their own approach
and steps to a solution, rather than being led through.

Short-answer questions will have no grey boxes, but will have dotted lines for the answers.

Examples of short-answer questions.

3.   Simplify

    i) $3a + 5a$ ii) $4w \times 7w$ iii) $9s + 4 - 2s + 3$

    $=$ $8a$ $=$ $28w^2$ $=$ $7s + 7$

  ....

[3]

4.   Given that $14 \times 16 = 224$, write down that value of

    a) 14×17 b) 28×17 c) 1.4×0.16

    $=$ 238 $=$ 448 $=$ 0.224

  ....

[3]

On the Non Calculator paper, there will be a little more emphasis on straight, routine arithmetic. Can you do the basics?

5.   Calculate

a) $\dfrac{4}{5} + \dfrac{3}{5} = \dfrac{7}{5}$ b) $\dfrac{7}{8} - \dfrac{5}{6}$ c) $8 \div \dfrac{2}{3}$

$= 1\dfrac{2}{5}$ $= \dfrac{21}{24} - \dfrac{20}{24}$ $= \dfrac{4\!\!\!/8}{} \times \dfrac{3}{2\!\!\!/}$

                      $= \dfrac{1}{24}$ $= 12$

[6]

For whole number and decimal arithmetic, squared paper will be printed to help layout.

6.   Calculate

a) $76.3 + 5.84$ b) 6.3×0.8 c) $3.8 \div 5$

7	6	·3					6	3									
	5	·8	4					8					0	·7	6		
8	2	·1	4			5	0	4			5	3	·³8	³0			
1	1						2										
						5	·0	4									

[6]

On the Calculator Paper, there will be a few more questions designed to test simple, calculator skills.

1. Use your calculator to work out the value of

    a) $\sqrt{56.25} - 1.5^2$ b) $\dfrac{1}{1 - 0.75}$

    = ... **5.25** .....   = ... **4** .....

[2]

2. Complete these
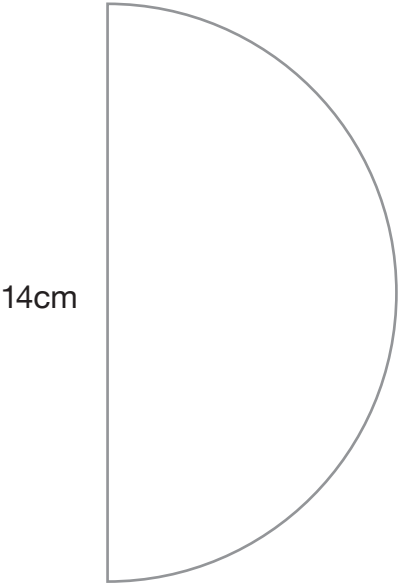
a) 9.43 + ... **14.27** ..... = 23.7   b)   19 − ..... **−23.68** ..... = 42.68

[2]

At all levels, more advanced calculators, which can, for example, solve equations or plot graphs, will not be allowed. A simple, scientific calculator is recommended.

It is just as important to show good working on a Calculator Paper as on a Non Calculator Paper.

3. Calculate the **area** of the semicircle correct to 1 decimal place.

14cm

$$A = \frac{\pi r^2}{2}$$

$$= \frac{\pi \times 7^2}{2}$$

$$= 77.0 \text{cm}^2 \ (1 \ d.p)$$

[3]

Puzzly Questions

On all papers, there will be a little more emphasis on interesting, unusual, perhaps more open-ended, investigative, thought-provoking puzzles and problems. These will often carry 4 marks each up to a total of around 15% to 20% of the paper. Candidates will not necessarily always be expected to find the correct solution, but will be rewarded for good attempts.

9. Aliens with only four fingers count like this:

0	1	2	3	10	11	12	13

The aliens write our number **eight** as **20** (two, zero).

The aliens write our number **sixteen** as **100** (one, zero, zero).

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a) How do the aliens write our number **twenty-five**?

16 : 100	20 : 110	24 : 120
17 : 101	21 : 111	25 : 121
18 : 102	22 : 112	
19 : 103	23 : 113	

b) Add these alien numbers together: **312** and **2103**

```
   312
  2103  +
  ─────
  3021
   1  1
```

3021

[4]

Foundation Papers

It is hoped that most candidates will be able to tackle the Core Papers, as they will be more accessible than before and have more routine, earlier questions. However, Foundation Papers will be available, where weaker candidates can be rewarded for success at a more gentle, appropriate level, helping ensure a good grounding and positive onward progress. They will have a similar format to the Core.

Mental Arithmetic

The Mental Arithmetic will no longer be read out from a CD, but will comprise 40, written questions in 10 minutes. There will be more genuine, straight, mental arithmetic, starting with some times tables, addition, subtraction, etc., building in difficulty to a few more challenging questions at the end. It is designed to be less stressful, easier to administer and to cater for a wider range of ability. Weaker candidates can achieve a good score, spending longer on the earlier questions, while stronger candidates can tackle the later, harder questions.

All Mental Arithmetic questions are worth 1 mark each with no working required.

1.	3 x 5 = ……….	2.	12 x 4 = ……….	3.	8 x 7 = ……….
4.	5 x 9 = ……….	5.	6 x 3 = ……….	6.	7 x 12 = ……….
7.	6 x 8 = ……….	8.	11 x 4 = ……….	9.	9 x 4 = ……….
10.	23 + 8 + 17 = ……….	11.	308 – 196 = ……….	12.	9 – 12 = ……….

37.   One side of a rectangle is 7m.

If the area is 28m^2, what is its perimeter?

. . . .

38.   Find the value of 423 x 19 + 423

. . . .

39.   Find the value of 58.6 ÷ 0.586

. . . .

40.   What is $\dfrac{3}{4}$ of $\dfrac{4}{5}$ of $\dfrac{5}{6}$?

. . . . .

Additional Papers

Unlike the old Level 3, the advanced, Additional Paper will be taken as an option after the two Core Papers, not instead. So, stronger candidates will still have their basics tested on a level playing field at the Core, where they can expect to score highly, and any score on the Additional can be considered a bonus: nothing to lose. It will be a single calculator paper.

The Additional Paper should provide an exciting challenge for the better mathematicians, requiring a higher level of thinking, along with a few more advanced topics, separate from the more prosaic. It will give candidates an opportunity to shine.

The more advanced topics include: Pythagoras, Simultaneous Equations, n^{th} Term of Sequences, Standard Form and Plotting Curves, but other topics and ideas will also be explored in greater depth.

Nearly all questions will be long-answer style with plenty of marks available to reward methods, approaches and ideas. All responses will be on the question paper; there will be no grey boxes. Final answers should include necessary units and be double-underlined.

1. Calculate the lengths marked y and z in the triangle ABC below.
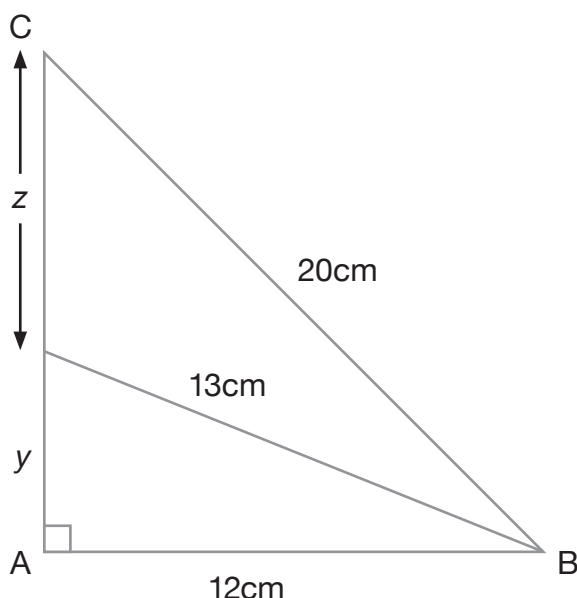
$$y = \sqrt{13^2 - 12^2}$$

$$= 5$$

$$AC = \sqrt{20^2 - 12^2}$$

$$= 16$$

$$z = 16 - 5$$

$$= 11cm$$

[6]

2. a) Factorise fully   b) Simplify

$24xy + 15y^2 - 3y$

$$\frac{2m^2 + 8m}{3m + 12}$$

$$= 3y(8x + 5y - 1)$$

$$= \frac{2m(m + 4)}{3(m + 4)}$$

$$= \frac{2m}{3}$$

[6]

Scholarship

CASE papers have evolved slightly to accommodate a somewhat broader range of ability, with a few more straightforward, early questions, but still progressing to the highest levels of challenge to bring the best out of the most talented.

As with the CE papers, there will be no dotted answer lines for the majority of questions, and units will be required.

1. Simplify

    i) $3p(2p - 4r) - 4r(r - 2p)$

    $= 6p^2 - 12r - 4r^2 + 8pr$

    $= 6p^2 - 4pr - 4r^2$

    ii) $6a^2b \times (2ab)^2$

    $= 6a^2b \times 4a^2b^2$

    $= 24a^4b^3$
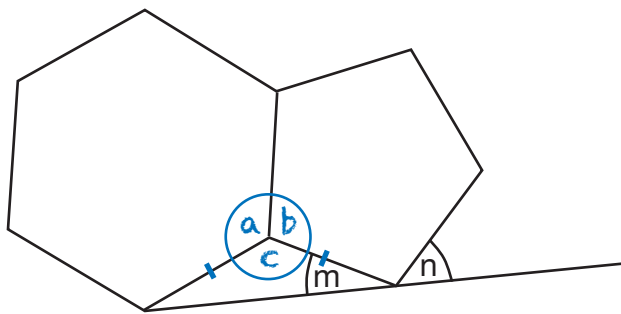
    iii) $(2xy^2)^3 \div (3x^2y)^2$

    $= \dfrac{8x^3y^6}{9x^4y^2} = \dfrac{8y^4}{9x}$

2. The diagram shows a regular pentagon touching a regular hexagon.

    Calculate the size of the angles marked m and n

$a = 120°, b = 108°$

$c = 360° - (120° + 108°)$

$= 360° - 228°$

$= 132°$

$m = \dfrac{180° - 132°}{2}$

$= \dfrac{48°}{2}$

$= 24°$

$n = 180° - (24° + 108°)$

$= 180° - 132°$

$= 48°$