ST EDWARD'S
OXFORD

14+ ENTRANCE EXAMINATION

For entry in
September 2017

Mathematics

Time: 1 hour

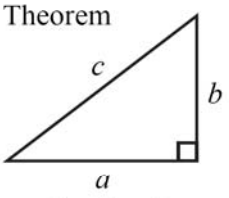
Candidates Name: ……

Instructions to Candidates

- 60 Marks
- 1 Hour
- Calculators are allowed
- Write all answers, including your workings, in this booklet.

IGCSE MATHEMATICS 4400
FORMULA SHEET – HIGHER TIER

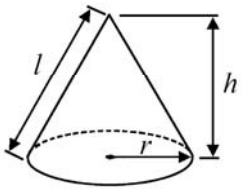
Pythagoras' Theorem



$a^2 + b^2 = c^2$

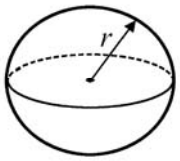
Volume of cone = $\frac{1}{3}\pi r^2 h$

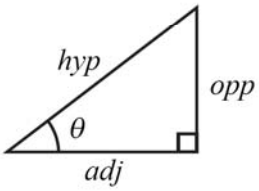
Curved surface area of cone = $\pi r l$



Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$





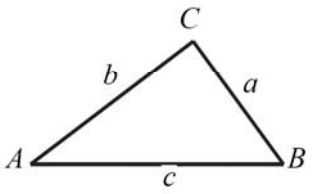
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

or $\sin\theta = \frac{\text{opp}}{\text{hyp}}$

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

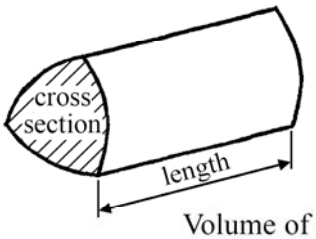
In any triangle ABC



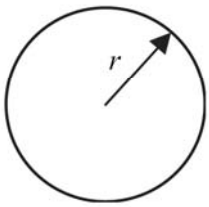
Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle = $\frac{1}{2}ab\sin C$



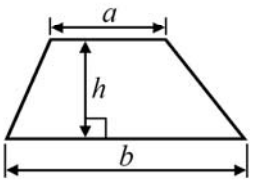
Volume of prism = area of cross section × length

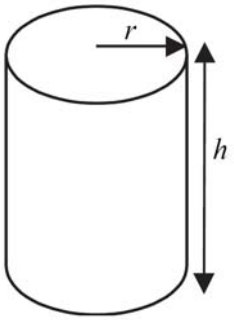


Circumference of circle = $2\pi r$

Area of circle = πr^2

Area of a trapezium = $\frac{1}{2}(a + b)h$





Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$

The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. Put these numbers in order, smallest first: $\frac{1}{4}$ 0.8 $\frac{3}{20}$

....

[2]

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2. Work out the following.

a) $\frac{3}{10} \times \frac{5}{7}$

.....

b) $\frac{5}{8} + \frac{3}{4}$

.....

c) $1\frac{1}{3} - \frac{1}{5}$

.....

d) $\frac{b}{a} \div \frac{c}{2a}$

.....

[8]

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3 In her first IGCSE mathematics test, Lina was given 17 marks out of 25.
In her second test she gained 71%. In which test did she do better (you must show workings).

.....

[2]

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4 Put these numbers in order, smallest first:

5^2 3^2 3^3 2^4

....

[2]

(b) 5^5 is 3125. What is 5^7?

..... [2]

5. Solve these equations.

a) $7k - 1 = 20$

k = ...

[1]

b) $3(m + 1) = 60$

m = ...

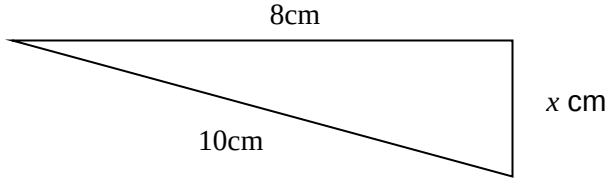
[2]

c) $2t - 3 = t - 5$

t = ...

[2]

6. Find the length marked x.



x = ...cm.

[2]

7. Evaluate the following expressions with a = 3 and b = - 2

a) a + b

…… [1]

b) ab

…… [1]

c) $(a - b)^2$

…… [1]

d) b^a

…… [2]

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8. A car travels at 24 km/hour. How far does it travel in 25 minutes? Give your answer in km.

…….

[3]

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9. Anna, Bertie and Chris split £240 between them in the ratio 1:2:3. How much does each get?

Anna: …… Bertie: ……..…… Chris: …….

Explain why they cannot split the money exactly if they use the ratios 2:2:3?

[3]

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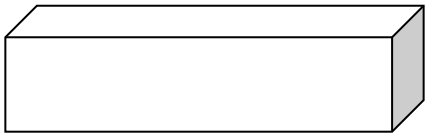
10. **a)** What is the volume of a cube with side length 5cm?

.....[1]

b) This cube has a **square** cross-sectional area and is three times as long as it is wide. The volume is 192 cm^3. What is the surface area?



..... [3]

11. Simplify the following expressions:

a) $\dfrac{a^3b^2}{a^2b^2}$

[1]

b) $\dfrac{a^3b^2 - a^2b^3}{a^2b^2}$

[2]

12. (a) Multiply out and simplify these expressions:

$3(x - 2) - 2(4 - 3x)$

.....

[1]

$(x + 2)(x + 3)$

.....

[1]

$(x + 4)(x - 1)$

.....

[1]

$(x - 2)^2$

.....

[1]

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13. I have two fair 4-sided dice.

One dice is numbered **2**, **4**, **6** and **8**

The other is numbered **2**, **3**, **4** and **5**

I throw both dice and **add** the scores.

What is the probability that the total is **even**?

You **must** show working to explain your answer.

[2]

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14. Solve these simultaneous equations using an algebraic method.

$4x + 3y = 21$

$2x + \ y = \ 8$

You **must** show your working.

$x =$ ..... $y =$ .....

[3]

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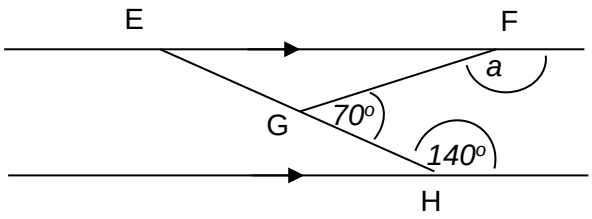
15. Find angle a, explaining each step of your working:



a = ...

[2]

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16. a) What is the gradient of the line $y = 4x - 5$?

.....[1]

b) Where does the line $y + 4x = 7$ cross the y-axis?

.....[1]

c) Give the equation of a line which is perpendicular to the line $2y + 4x = 7$?

.....[2]

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17. a) The value of a house has increased by 20% since 2005. It is now worth £360 000.

How much was it worth in 2005?

.....[2]

b) Mr Smith's salary goes up by £270 per month. He now earns £2070 per month.

What is the percentage increase?

.....[2]

END OF TEST