



OUNDLE

School

2019 Academic Scholarship

Mathematics

Paper II

Time Allowed: **2 hours**

Calculators may NOT be used for this paper

Instructions to candidates:

- You are not expected to have time to do all the questions.
- Answer on the lined paper provided
- You may answer the questions in any order.
- Choose those questions which you think you can answer best.
- **Remember to show your working and clearly show the method you are using.**
- Answers should be given to 3 significant figures where appropriate.
- π may be taken as 3.14.
- **The number of marks for each question is show in square brackets**

1. It takes 6 cooks, 6 hours to bake 6 pies. Assuming that all cooks work at the same rate then how long will it take 12 cooks to bake 12 pies?

[2]

2. In the grid shown, each symbol (square, circle, star) has a certain value and in each column or row these add to the totals shown.

Which symbol should replace the question mark in the centre?

			12
	?		14
			10
12	13	11	

[2]

3. The 3 different faces of a cuboid have perimeters 32cm, 38cm and 42cm. What are the dimensions (length, width, height) of the cuboid?

[4]

4. Sally sees her brother Ally at a distance of 200 metres. Sally can run at a speed of $5\frac{1}{6}$ metres/second and Ally can run at a speed of $4\frac{1}{3}$ metres/second. If both of them start running at the same time and maintain their top speeds, how long would it take Sally to catch Ally?

[4]

5. Bear, Billy and Bobby share 94 oranges between them. Bear gets 5 less than Billy and Bobby receives 3 more than double Billy's share. How many oranges does each boy have?

[4]

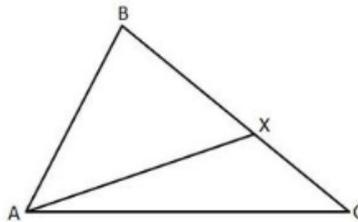
6. In the following equation, can you find values for A and B which are integers but where neither is a multiple of 10?
If not, why not? If so, is there more than 1 way?

$$A \times B = 1000$$

[3]

7. In the following diagram, the area of triangle ABX is 12 units and the ratio of lengths BX : XC is 3:2.

What is the area of triangle ACX ? (Explain your reasoning clearly)

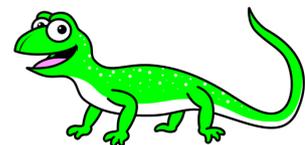


[3]

8. The Korean Peninsula is made up of 2 countries, North and South Korea which were separated after the Korean War.
The area of South Korea is $\frac{10}{37}$ of the area of Japan. The area of North Korea is $\frac{12}{25}$ of the area of Texas. If the area of Texas is $\frac{25}{37}$ of the area of Japan and the area of Japan is $\frac{37}{982}$ of that of the United States then what fraction of the Korean Peninsula is South Korea?

[3]

9. Lefty the Lizard is lost and starts to wander aimlessly. Each minute, the probability that he walks one metre forward is $\frac{1}{2}$, the probability that he moves one metre to the left is $\frac{1}{3}$ and the probability that he moves one metre backwards is $\frac{1}{6}$. Lefty never moves to the right.

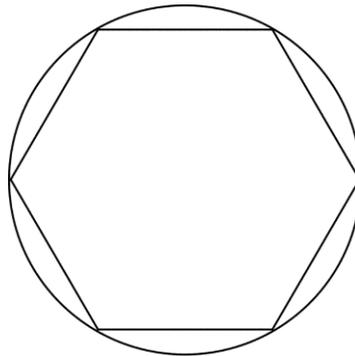


After one hour, how far (in a straight line) is he expected to be from his starting point?
[You may leave your answer as a square root]

[4]

10. What is the largest 3-digit number that is a multiple of 12 and 21 but is not a multiple of 22?
[3]

11. a) The diagram shows a circle which circumscribes a regular hexagon. If the diameter of the circle is 4cm, what is the area of the hexagon?
(Circumscribe means to be outside the shape and touching its vertices)

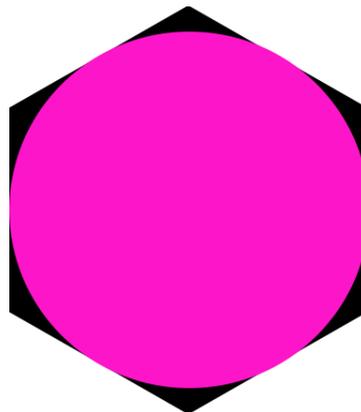


[4]

- b) The following diagram shows a circle which inscribes a regular hexagon. If we know the length of a side of the hexagon, we can find the area of the circle.

Describe in simple steps the method you would use to find the area of the circle.

(Inscribe means that the edges touch but do not cross/intersect)



[3]

12. A game with the spinner below has 2 winning colours which are next to each other.



A player spins the wheel and lands on red. They are told that this is not one of the winning colours and the next player is then offered a choice:

1. Spin the wheel again
2. Move the pointer to the purple, the space next to red.

Explain which of these choices will make it more likely for the second player to win and state the probability of winning for each choice.

[4]

13. Jeronimo is out in the Big C shopping mall where there are 2 escalators going upwards to the Menswear floor. One of these is broken and if he walks up it he will take 54 seconds for him to reach the top. If he takes the working escalator and stands still, it takes him to the top in 28 seconds.

If he were to walk up the working escalator, how long would it take him to reach the top?
(Give your answer to the nearest second)

[4]