OUNDLE

School

2017Academic Scholarship

Mathematics

Paper I

Time Allowed: **90 minutes**

Calculators are **NOT** allowed

Instructions to candidates:

- Answers on the lined paper provided.
- You are not expected to have time to do all the questions.
- 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**.
- Give answers to 3 significant figures where needed.
- Π may be taken to be 3.14.
- The number of marks for each question are shown in square brackets.

1. Work out the following
   a) 37% of 86
   b) $47 \times 58 - 47 \times 18$
   c) $108 \times 14 + 54 \times 72$
   d) $4\frac{1}{7} \times 3\frac{7}{9}$

[8]

2. Simplify the following expressions
   a) $-2a + 7a \times b - 3b + 8a - 5 \times b$
   b) $5x^2 - 2x(4 + 2x) + 4(3 - x) + x$
   c) $63x^3 \div 9x^2$
   d) $6x - 4(2 + x) - (2x + 3)$
   e) $\frac{5x-10}{3x-6}$

[10]

3. Solve the following equations
   a) $3(6x - 2) + 5 = -9$
   b) $\frac{3x}{9} - \frac{6-x}{3} = 1$
   c) $y^2 - 36 = 0$
   d) $\frac{x-3}{x+2} = 3$

[8]

4. a) I think of a number and subtract 5. I multiply the result by 4 and get a final answer of -40. What was my number?
   b) I think of a number, multiply it by 7 and then subtract 3. Twice the result is 28. What was my number?

[4]

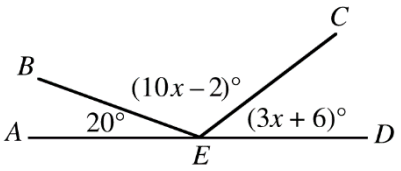
5. The sum of the digits of an even ten-digit integer is 89. What is the last digit? Explain your reasoning clearly.

[4]

6. Work out $(-50) + (-48) + (-46) + \cdots + 54 + 56$.

[2]

7. AD is a straight line segment and E is a point on AD.
Find the size of angle CED.



[4]

8. The ages of three contestants in the a contest are 15 years, 9 months; 16 years, 1 month; and 15 years, 8 months.
Work out their average (mean) age and express it in years and months.

[4]

9. Natural numbers are equally spaced around a circle in order from 1 to n. If the number 5 is directly opposite the number 14, then what is the value of n?

[3]

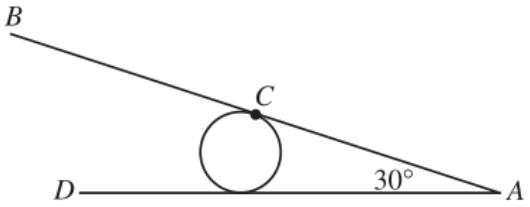
10. The average of 19 *consecutive* integers is 99. What is the largest of these integers?

[3]

11. a, b and c are *distinct* positive integers such that abc =16.
Find the largest possible value of $a^b - b^c + c^a$.

[4]

12. A metal rod with ends A and B is welded at its middle, C, to a cylindrical drum of diameter 12. The rod touches the ground at A making a 30° angle. The drum starts to roll along AD in the direction of D.



How far along AD must the drum roll for B to touch the ground?

[6]