TEST FOR SELECTING STUDENTS TO REPRESENT SRI LANKA AT THE INTERNATIONAL MATHEMATICS COMPETITIONS - 2014

Category I

INDEX NO - ____ **Time – 1 hour 30 minutes**

General Instructions

This paper consists of two parts. Answer all questions in both parts

Part A – Answers to be on the question paper itself. Select the correct choice and write the number of your choice as 1, 2, 3 or 4 in the cage in front of each question

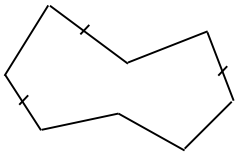
Part B

- You should provide a descriptive answer step by step for each question and write on the papers provided.
- No marks awarded for answers that are not clear.

The figures given may not drawn to scale

Part A

01. What is the perimeter of the figure shown ?



(1) 4 (2) 5 (3) 6 (4) 7

02. If $\frac{(a+1)}{a} = b$ and $\frac{(b-1)}{b} = a$, what is the value of $(a-b)$?

(1) -3 (2) -2 (3) -1 (4) 0

03. If $x@y = \frac{x^2+y^2}{xy}$, which is equal to 4@5 ?

(1) $\frac{1}{20}$ (2) $1\frac{1}{20}$ (3) $2\frac{1}{20}$ (4) $3\frac{1}{20}$

04. Which is equal to the sum of the digits of the product 9999 x 8888 ?

(1) 30 (2) 32 (3) 34 (4) 36

05. Liquid concentration of a solution containing water and a liquid is 60% by volume. By adding 20 litres of water to the solution the liquid concentration is reduced to 40% . How many liters of the liquid in the original solution ?

(1) 12 (2) 16 (3) 24 (4) 30

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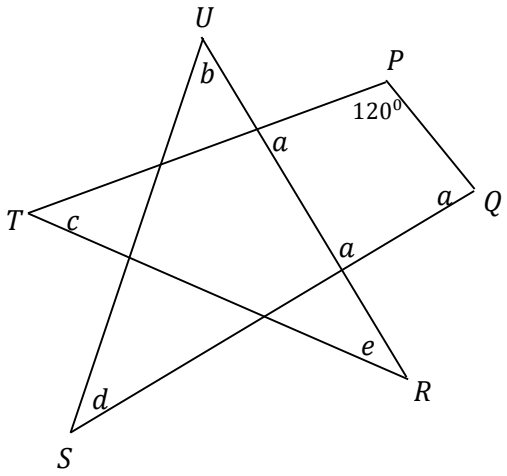
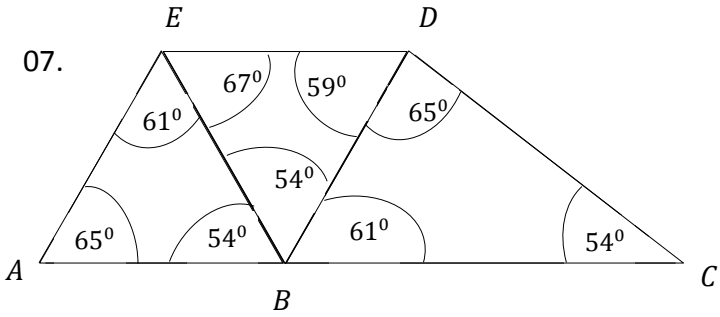
06.



In the adjacent figure $\widehat{P} = 120^0$.
What is the the value of $b + c + d + e$ in digrees?

(1) 130^0 (2) 140^0
(3) 150^0 (4) 160^0

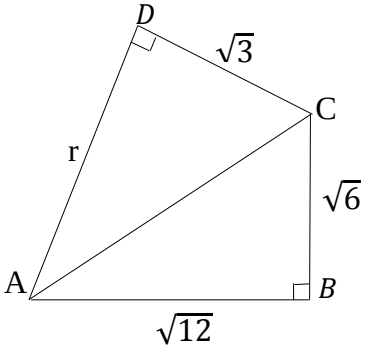
07.



Which segment is the longest in the above given diagram?

(1) BE (2) BC (3) BD (4) DC

08. What is the value of r ?



(1) $\sqrt{15}$ (2) $\sqrt{12}$ (3) 3 (4) 2

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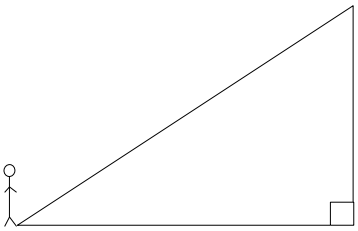
09. What is the value of $2015^2 - 2014^2$?

(1) 1 (2) 2014 (3) 2015 (4) 4029

10. What is the value of 1 - 3 + 5 - 7 + 9 - 11 + ….+ 77 - 79 ?

(1) - 20 (2) + 20 (3) - 40 (4) 40

11.

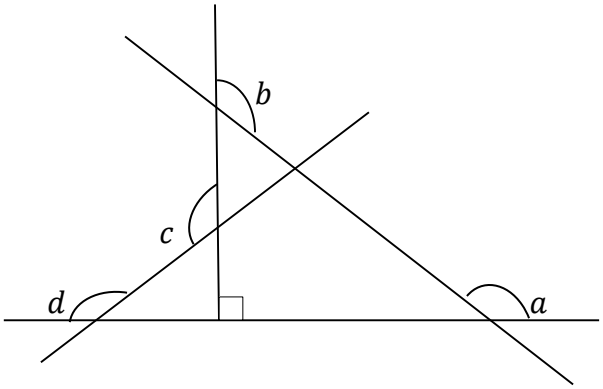


height

A mountain path has a gradient of 3 : 4 . If I walk 15m up the path, then how many meters higer am I than at my original position?

(1) 6 m (2) 9 m
(3) 12 m (4) 15 m

12.



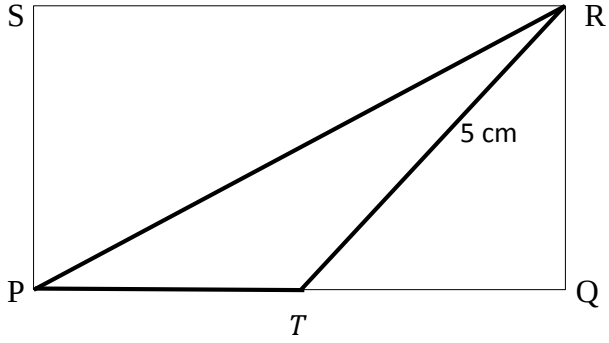
In the figure , four stratight lines intersect with angles a, b, c, d .

What is the value of $a + b + c + d$ in digrees ?

(1) 360^0 (2) 440^0
(3) 540^0 (4) 720^0

7 cm

13.



PQRS is a rectangle. If SR = 7 cm , SP = 3 cm, and RT = 5 cm, what is the area of PRT△ ?

(1) 2 cm^2 (2) 4.5 cm^2
(3) 6 cm^2 (4) 7.5 cm^2

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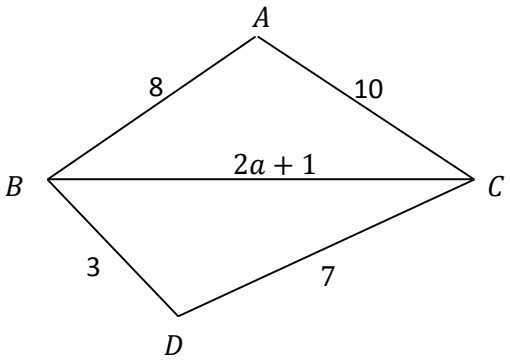
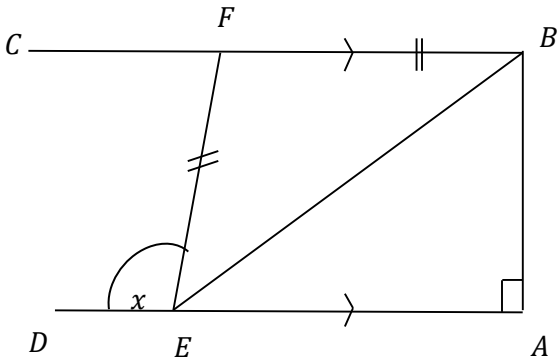
14.



In the figure AB = 8 , AC = 10, BD = 3, CD = 7 and BC= $2a + 1$. If a is an interger, which is equal to the sum of all the possible values of a ?

(1) 9 (2) 7
(3) 6 (4) 5

15.



CB is parallel to DA and FB = FE . In term of x , which is equal to $A\widehat{B}E$?

(1) $\frac{x}{3}$ (2) 90^0 - $\frac{x}{2}$
(3) $90^0 + \frac{x}{2}$ (4) $\frac{x}{2}$

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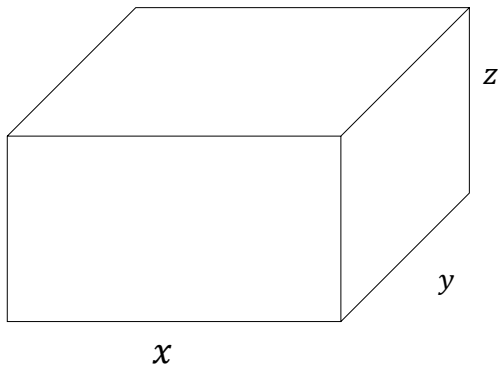
Part B

01.



The volume of a rectangular prism with length x cm, width y cm and height z cm is $240\ \text{cm}^3$ and $x + y + z = 19$ cm. If x, y, and z are whole numbers, find the largest possible area of a face in square meters. ?

02. If $\frac{a+b}{ab} = \frac{1}{2}$, $\frac{a+c}{ac} = \frac{1}{5}$, $\frac{b+c}{bc} = \frac{1}{4}$ and $abc \neq o$ find a, b and c.

03. Let Circle "C" is inscribed in a square with side length 2 cm . Two smaller circles "C_1" and "C_2" are inscribed in two corners of square so that C_1 and C_2 are tangent to circle C and the two sides of the square. Find the area of the shaded region in terms of π.