BEGINNERS TEST – MONDAY (100 marks)

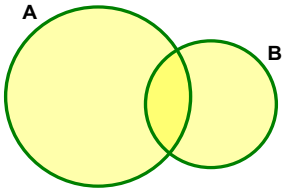
1. The six angles of two different triangles are listed from largest to smallest. The two smallest angles have been left off the list:

   120°, 80°, 65°, 37°,…

   In degrees, what is the last angle on the list?

2. The average of u and v is 200. The average of x, y and z is 150. Determine the average of u, v, x, y and z.

3. The diagram shows two overlapping circles, A and B. The shaded area is 65m^2 while the overlapping area is 15m^2. The ratio of the area of circle A to the area of circle B is 3:2. By how many square metres is circle A larger than circle B?

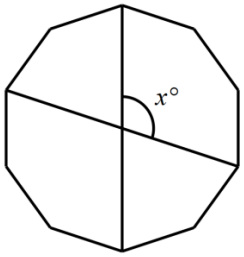


4. Determine the sum of all integers x which satisfy the equation $(218-x)^{221+x}=1$

5. The number 49 is special because it is possible to add the product and the sum of the digits and get 49 again. i.e. 4 x 9 + (4 + 9) = 36 + 13 = 49. How many such 2-digit positive integers are there in total?

6. In the equation (YE) x (ME) = TTT, each of the letters represents a different digit.
   Determine E + M + T + Y.

7. A regular decagon is shown. Determine the value of x.

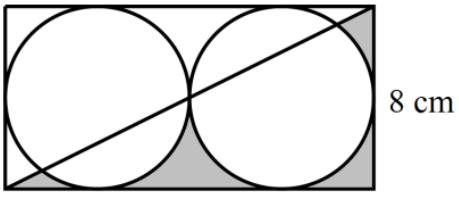


8. A hiker leaves home and walks south for 1½ hours, west for 2 hours, breaks for a 20 minute lunch, then walks directly home along a straight line. Assuming that he walks at the same speed, for how many minutes was he away from home?

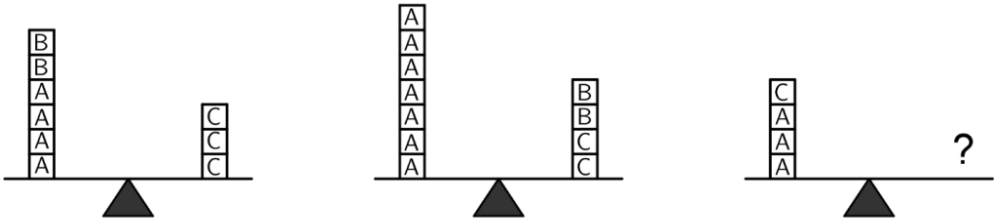
9. Determine the value of k if $\frac{20}{19}\left(\frac{1}{20}+\frac{1}{18}\right)=\frac{1}{k}$.

10. Calculate the area of the triangle formed by joining the points A (3 ; 6), B (1 ; 2) and C (5 ; 2) in the Cartesian plane.

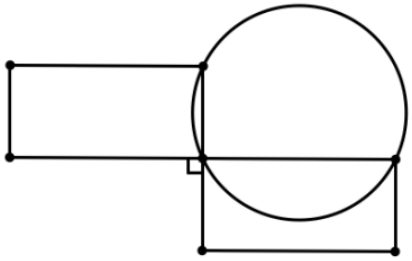
11. Two identical circles are drawn inside a rectangle as shown. If the area of the shaded region is $x-y\pi$ cm^2, then what is the value of $x+y$ if noth x and y are positive whole numbers?



12. If the first two scales below are balanced, how many B's should replace the question mark to balance the third scale?

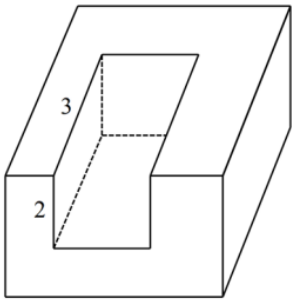


13. Two congruent rectangles are shown. The area of a rectangle is 12 and its perimeter is 14. If the circumference of the circle is $n\pi$, what is n?

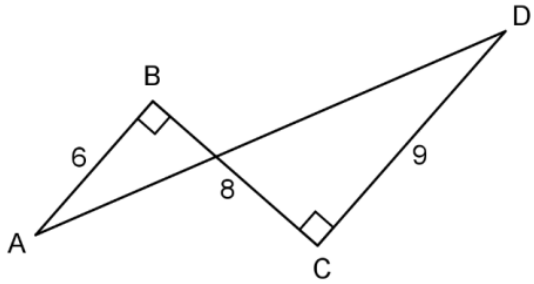


14. Busi correctly adds the lengths of three sides of a rectangle and gets 73cm. Caleb correctly adds the lengths of three sides of the same rectangle and gets 77cm. What is the perimeter of the rectangle in cm?

15. A prism, with two sides measuring 3cm by 2cm, is removed from a larger rectangular prism. If the original prism had a surface area of 96cm^2, what is the surface area of the new shape?



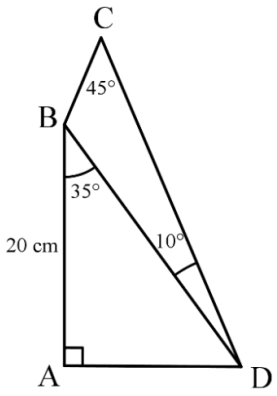
16. In the diagram, angles $A\hat{B}C$ and $B\hat{C}D$ are right angles. AB = 6cm, BC = 8cm and CD = 9cm. What is the length of AD in cm?



17. If the recurring decimal number $0,\dot{7}$ is represented by the fraction $\frac{a}{b}$ in lowest terms, what is $a + b$?

18. The sum of five consecutive positive integers, starting with n, is a perfect square. What is the smallest possible value of n?

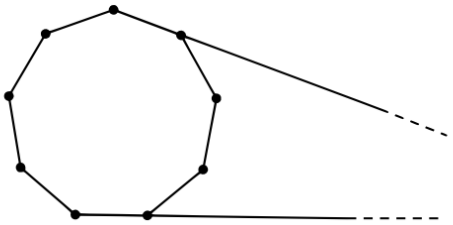
19. Determine the area of quadrilateral ABCD in cm^2.



20. All the prime numbers less than 2024 are multiplied together. What is the unit's digit of this product?

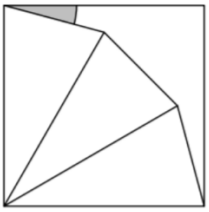
21. When the seven numbers 13; p ; 16 ; 7; 4; 15 ; 17 are arranged in ascending order, the median is the same as the mean. What is the value of p?

22. What is the size of the angle that is formed by extending two sides of a regular nonagon to eventually meet, as shown in the sketch?



23. What is the 50^{th} decimal digit of $\frac{1}{7}$?

24. Three identical isosceles triangles fit snugly into a square without overlapping, as shown in the diagram. Two of the triangles have edges in common with the square. What is the size in degrees of the shaded angle?



25. The number 16 is placed in the top left corner square of a 4 x 4 table. The remaining 15 squares are to be filled in using each of the numbers 1 to 15 once only, so that the sum of the four numbers in each row, each column and each diagonal is the same. Find the maximum value of the sum of the six numbers in the shaded squares shown in the diagram below.

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