

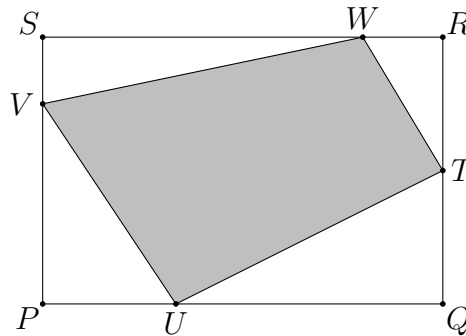
12. A six-sided dice has the numbers 1, 2, 2, 3, 3 and 3 on its faces. Two such dice are rolled and a score is made by adding the numbers on the uppermost faces. The probability of rolling an odd score is

- (A) $\frac{1}{9}$ (B) $\frac{2}{9}$ (C) $\frac{1}{3}$ (D) $\frac{4}{9}$ (E) $\frac{5}{9}$

13. If $x^2 = x + 3$, then x^3 equals

- (A) $x + 6$ (B) $2x + 6$ (C) $3x + 9$ (D) $4x + 3$ (E) $27x + 9$

14. The point T divides the side QR of the rectangle $PQRS$ into two equal segments. The point U divides PQ such that $PU : UQ = 1 : 2$. Point V divides SP such that $SV : VP = 1 : 3$ and finally, point W divides RS such that $RW : WS = 1 : 4$. Find the area of the quadrilateral $TUVW$ if the area of $PQRS$ equals 120.

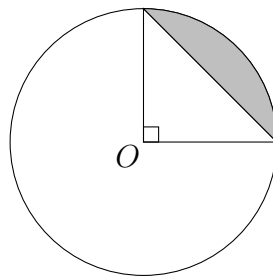


- (A) 67 (B) 70 (C) 72 (D) 75 (E) 77

15. Three line segments of lengths 1, a and $2a$ are the sides of a triangle. Which of the following defines all possible values of a ?

- (A) $\frac{1}{3} < a < 1$ (B) $0 < a < \frac{1}{3}$ (C) $a < 1$ (D) for all $a > 0$ (E) for no a

16. The shaded segment in the circle below, centre O , has an area of 1 cm^2 . The radius of the circle, in centimetres, is



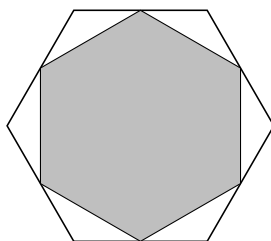
- (A) $\sqrt{\frac{4}{\pi}}$ (B) $\frac{8}{\pi}$ (C) $\sqrt{\frac{4}{\pi - 2}}$ (D) $\frac{4}{\pi}$ (E) $2\sqrt{\pi}$

17. Dan and Jane each have a measuring tape of length 1 m. Dan's tape got stuck in a door and was extended by 4 cm. Jane left her tape in a pocket and it shrank by 5 cm after washing. However, the centimetre marks on both tapes remained evenly distributed.

Measuring the schoolyard, Dan noted the length as 23.75 m. What length will Jane get measuring the same schoolyard with her tape?

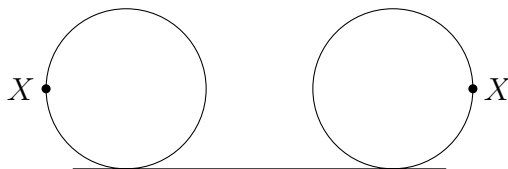
- (A) 23 m (B) 24 m (C) 25 m (D) 26 m (E) 27 m

18. In the regular hexagon pictured, the midpoints of the sides are joined to form the shaded regular hexagon. What fraction of the larger hexagon is shaded?



- (A) $\frac{3}{4}$ (B) $\frac{2}{3}$ (C) $\frac{5}{6}$ (D) $\frac{1}{2}$ (E) $\frac{7}{8}$

19. A circular wheel of radius r rolls, without slipping, through half a revolution. The point X is on the horizontal diameter at the start.



The distance between the starting and finishing position of the point X is

- (A) $2\pi r$ (B) $(\pi + 2)r$ (C) $(\pi - 2)r$ (D) $2(\pi + 1)r$ (E) $2(\pi - 1)r$

20. The sport of bingbong involves two players. Each match consists of a number of rounds and each round consists of a number of points. The first player to win four points in a round wins the round. The first player to win six rounds in a match wins the match.

Suppose that after a match of bingbong, the winner has won W points while the loser has won L points. What is the largest possible value of $L - W$?

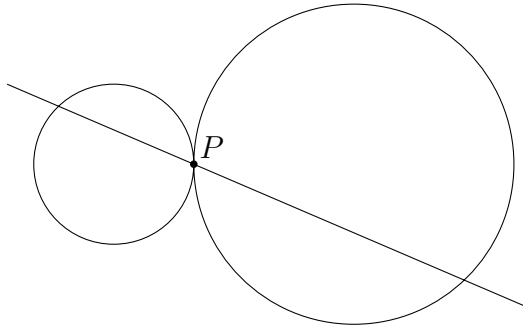
- (A) -6 (B) -4 (C) 0 (D) 12 (E) 14

Questions 21 to 25, 5 marks each

21. In how many ways can the numbers 1, 2, 3, 4, 5, 6 be arranged in a row so that the product of any two adjacent numbers is even?

- (A) 64 (B) 72 (C) 120 (D) 144 (E) 720
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22. Two circles, one of radius 1 and the other of radius 2, touch externally at P . A straight line through P cuts the area formed by these two circles in the ratio 1 : 2. In what ratio does this line cut the area of the smaller circle?



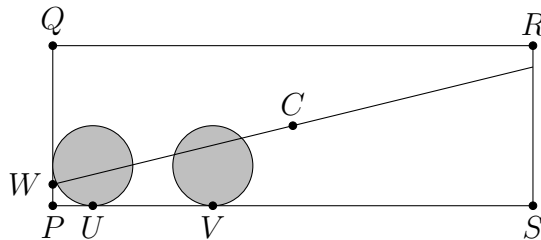
- (A) 1 : 2 (B) 2 : 5 (C) 1 : 3 (D) 2 : 7 (E) 1 : 4
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23. How many positive integers n are there such that $2n + 1$ is a divisor of $8n + 46$?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4
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24. The rectangle $PQRS$ shown has $PQ = 4$, $PS = 12$ and centre C . The two shaded circles have radius 1 and touch PS at U and V where $PU = 1$ and $PV = 4$.

The line CW divides the unshaded area in half. The length of PW is



- (A) $\frac{2}{7}$ (B) $\frac{2}{5}$ (C) $\frac{1}{4}$ (D) $\frac{1}{3}$ (E) $\frac{1}{2}$
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