1. A shop stores x kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. Then the third customer also buys half the remaining amount plus half a kg of rice. Thereafter, no rice is left in the shop. Which following best describes the value of x?

(1) $2 \le x \le 6$

(2) $5 \le x \le 8$

(3) $9 \le x \le 12$

(4) $11 \le x \le 14$

(5) $13 \le x \le 18$

Soln: Initial quantity of rice is x.

After 1st customer, rice available $= x - \left(\frac{x}{2} + \frac{1}{2}\right) = x - \frac{x}{2} - \frac{1}{2}$

In the Same way

$$\frac{\frac{\frac{x}{2}-\frac{1}{2}}{2}-\frac{1}{2}\ \text{(2nd)}}{2}-\frac{1}{2}\ \text{(2nd)}=0$$

$$\frac{\frac{\frac{x-1}{4}-\frac{1}{2}}{2}}{2}-\frac{1}{2}=0$$

$$\frac{x-3}{8}-\frac{1}{2}=0 \Rightarrow \frac{x-3}{8}=\frac{1}{2} \Rightarrow x-3=4 \Rightarrow x=7$$

So, answer option is (2).

Directions for Questions 2 and 3:
Let $f(x) = ax^2 + bx + c$, where a, b and c are certain constants and $a \neq 0$. It is known that f(5) = - 3 f(2) and that 3 is a root of f(x) = 0.

2. What is the other root of f(x) = 0?

(1) -7

(2) -4

(3) 2

(4) 6

(5) cannot be determined

Soln: $f(x) = ax^2+bx+c$
$f(3) = 0$

Therefore, $9a+3b+c = 0$
Therefore, $c= - (9a+3b)$
$f(5)=-3f(2)$

Therefore, $25a + 5b + c = -3[4a+2b+c]$

Therefore, $37a + 11b + 4c = 0$

Substituting value of c we get, $37a + 11b + 4[-(9a+3b)] = 0$

Therefore, a=b and $c=-(9a+3b) = -12a$
The equation is $ax^2+ax-12a=0$
Therefore, $a(x2 + x -12) = 0$
$a(x+4)(x-3) = 0$

As a is not equal to 0, x=-4 and x=3 are the roots.
Hence, the answer is option (2).

3. What is the value of a + b + c ?

(1) 9

(2) 14

(3) 13

(4) 37

(5) cannot be determined

Soln: Now the given function is $f(x) =ax^2+bx+c =ax^2+ax-12a$ (since, b = a, and c= -12a)
Thus we can get infinite values of a, b, c
Hence, the answer is option (5)

4. The number of common terms in the two sequences 17, 21, 25, ..., 417 and 16, 21, 26, ..., 466 is

(1) 78

(2) 19

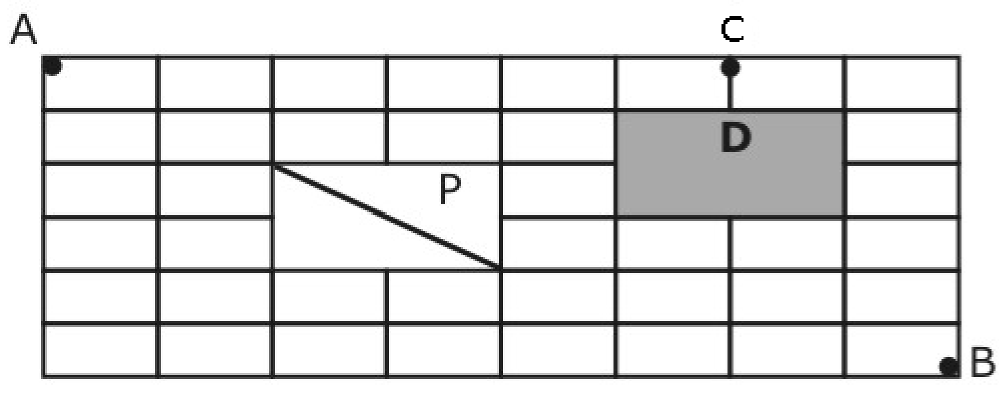
(3) 20

(4) 77

(5) 22

Soln: S_1 = 17, 21, 25….. 417
S_2 = 16, 21, 26……..466
Common difference in S_1 is D_1 = 4
Common difference in S_2 is D_2 = 5
Also, first common term is 21
Next common term will be 21 + LCM (4, 5) = 21 + 20 = 41
So, common term will form A.P. 21, 41, 61, 81 ……(in general, (20X + 1))
Now, last term of sequence will be less then 417 and of the form 4X + 1
So, t_n = 401
So, 401 = 21 + (n-1) 20 ………………. (t_n = a + (n-1)d)
380 = (n-1) 20
n -1 = 19
n = 20, so there will be 20 common terms.
Hence, correct answer is option (3).

Directions for Questions 5 and 6:
The figure below shows the plan of a town. The streets are at right angles to each other. A rectangular park (P) is situated inside the town with a diagonal road running through it. There is also a prohibited region (D) in the town.



5. Neelam rides her bicycle from her house at A to her office at B, taking the shortest path. Then the number of possible shortest paths that she can choose is

(1) 60

(2) 75

(3) 45

(4) 90

(5) 72

Soln: No of ways to reach from A to M = ${}^{M+N}C_M$

Where, M = Number of steps of horizontal movement
N = Number of steps of vertical steps
${}^{2+2}C_2 = {}^4C_2 = 6$ ……… (1)

Number of ways to reach from M to N taking shortest possible root = 1 (diagonal MN)
Number of ways from N to B = (here M=4 & N=2 from logic used in (1)) ${}^6C_2$ = 15

So, total number of shortest ways to reach from A to B =6*1*15 =90 ways
Hence the answer option is (4).

6. Neelam rides her bicycle from her house at A to her club at C, via B taking the shortest path. Then the number of possible shortest paths that she can choose is

(1) 1170

(2) 630

(3) 792

(4) 1200

(5) 936

Soln: One can reach from B to C through O or through Q
Number of ways to reach from B to O = ${}^{5+1}C_1$= 6
Number of ways to reach C from O without passing through Q = 1
Number of ways to reach C from B through O without passing through Q = 6*1 = 6
Number of ways to reach Q from B =${}^7C_1$ = 7

Number of ways to reach C from B via Q = 7*1 = 7
so total Number of ways from A to B = 90 (from solution 5)
Number of ways from B to C = 13
Total number from A to C via B = 90*13 = 1170
Hence the answer option is (1).

7. Let f(x) be a function satisfying f(x) f(y) = f(xy) for all real x, y. If f(2) = 4, then what is the value of f(1/2)?

(1) 0

(2) 1/4

(3) 1/2

(4) 1

(5) cannot be determined

Soln: f(xy) = f(x)f(y)
f(2)=f(2).f(1) ….(x = 2 , y = 1)
4 = 4 x f(1)
f(1)=1
Now, f(1)=f(2).f(½) …..(x=2, y = ½)
1=4 x f(½)
f (½) = ¼
Hence, the answer is option (2).

8. The integers 1, 2, ..., 40 are written on a blackboard. The following operation is then repeated 39 times: In each repetition, any two numbers, say a and b, currently on the blackboard are erased and a new number a + b — 1 is written. What will be the number left on the board at the end?

(1) 820

(2) 821

(3) 781

(4) 819

(5) 780

Soln: Here each time we are adding 2 numbers a and b
And we are replacing those two numbers a and b by (a+b-1)
i.e. for every repetition, we are subtracting '1' and adding any 2 numbers.
So, in 39 repetitions we are adding all 40 numbers and subtracting total of 39
So, answer will be = $\sum_{n=1}^{40} n - 39 = \frac{40 \times 41}{2} - 39 = 820 - 39 = 781$
So, answer is option (3).

9. Suppose, the seed of any positive integer is defined as follows:
seed(n) = n, if i < 10
= seed ($s(n)$), otherwise,
where $s(n)$ indicates the sum of digits of n. For example,
seed(7)= 7, seed(248) = seed(2 + 4 + 8) = seed(14) = seed(I + 4) = seed(5) = 5 etc.
How many positive integers n, such that n <500, will have seed (n) = 9?

(1) 39

(2) 72

(3) 81

(4) 108

(5) 55

Soln: Given seed (n) = sum of digits
We want n such that seed (n) =9
We know that sum of the digits of all multiples of 9 is 9.
For eg. 9 -> 9
18 -> 1 + 8 = 9
27 -> 2 + 7 = 9
36 -> 3 + 6 = 9
Just find all the multiples of 9 in the range of 1 to 500
i.e. 55
55 multiple of 9 are there between 1 and 500
Answer is 55, and correct option is (5).

10. In a triangle ABC, the lengths of the sides AB and AC equal 17.5 cm and 9 cm respectively. Let D be a point on the line segment BC such that AD is perpendicular to BC. If AD = 3 cm, then what is the radius (in cm) of the circle circumscribing the triangle ABC?

(1) 17.05

(2) 27.85

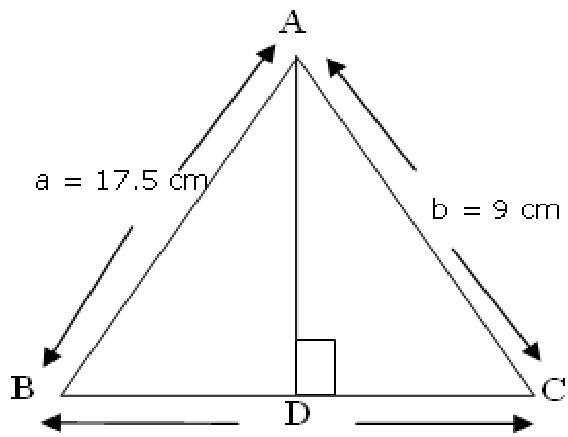
(3) 22.45

(4) 32.25

(5) 26.25

Soln: Given AD is perpendicular to BC (Figure not drawn to scale)
Using Pythagoras theorem for Δ ADC & Δ ADB
$AC^2 = AD^2 + DC^2$.

Therefore, DC = 8.5 cm $(\sqrt{72})$
Also $AB^2 = AD^2 + BD^2$
$AB \approx 17.25$ cm $(\sqrt{217.25})$



Therefore, BC = 25.75 cm

$$R = \frac{abc}{4 * \text{area}} = \frac{(AB)(AC)(BC)}{4(\frac{1}{2})(BC)(AD)} = \frac{17.5 * 9 * 25.75}{2.4 * \frac{1}{2} * 25.75 * 3} = 26.25 \text{ cm}$$

By formula
Hence the answer option is (5).

11. What are the last two digits of 7^{2008} ?

(1) 21

(2) 61

(3) 01

(4) 41

(5) 81

Soln: Finding out last two digits means getting a remainder when the number is divided by 100.

$$\left.\frac{7^{2008}}{100}\right]_R = \left.\frac{\left(7^4\right)^{502}}{100}\right]_R$$

Now, $7^4 = 2401$ & $\left.\frac{7^4}{100}\right]_R = 01$

So, $\left.\frac{\left(7^4\right)^{502}}{100}\right]_R = 01$

So last two digits are 01

Hence the answer option is (3)

12. If the roots of the equation $x^3 - ax^2 + bx - c = 0$ are three consecutive integers, then what is the smallest possible value of b ?

(1) $-\frac{1}{\sqrt{3}}$

(2) -1

(3) 0

(4) 1

(5) $\frac{1}{\sqrt{3}}$

Soln: $x^3 - ax^2 + bx - c = 0$
Let roots are α, β γ .
b = αβ+β γ +γα
For b to be minimum
Take any root, say α = 0

b = 0 x β + β x γ + 0 x γ
b = β x γ
For b minimum -> (β x γ)min -> -ve
As α, β γ are consecutive integers.
β=1, γ=-1
b = -1
Hence, correct answer is option (2).

13. Consider obtuse-angled triangles with sides 8 cm, 15 cm and x cm. If x is an integer, then how many such triangles exist?

(1) 5

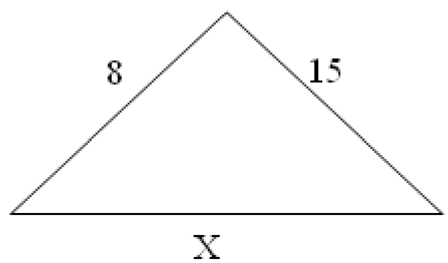
(2) 21

(3) 10

(4) 15

(5) 14

Soln:



Three sides of a triangle – 8, 15, X
X< 15 + 8
X< 23 and X >15-8
X > 7

Between 7 and 23 (both exclusive)
There are 15 values possible for X.
But at X = 17, we will get a right angled triangle.

Now, when 12< X <17 we will get acute angled triangles.
So, X>17 and X<23
So, 5 values possible.
Also, for 7<x<13 we will get obtuse angled triangles.
So, 5 more values possible in this range.
So, total 10 values are there.
Hence, answer is option (3).

14. How many integers, greater than 999 but not greater than 4000, can be formed with the digits 0, 1, 2, 3 and 4, if repetition of digits is allowed?

(1) 499

(2) 500

(3) 375

(4) 376

(5) 501

Soln: (i) since repetition is allowed, the hundredth, tens and units place can be each filled in 5 ways.

(ii) Given numbers has to lie between 999 and 4000 and given digits are 0, 1, 2, 3, 4.

(iii) Thousand places can be filled 3 ways
Total numbers between 999 and 4000 = 3 x 5 x 5 x 5 = 375

(iv) We also must include 4000

Number of integers formed = 375 + 1 = 376
Hence, correct answer is option (4).

15. What is the number of distinct terms in the expansion of $(a + b + c)^{20}$?

(1) 231

(2) 253

(3) 242

(4) 210

(5) 228

Soln: (1) Number of distinct terms of $(x_1 + x_2 + x_3 ....x_m)^n$ is equal to ${}^{m+n-1}C_{m-1}$

(2) This is equal to total no of ways of dividing identical items among n persons, each one of whom can receive 0, 1, 2, or more items (≤ n)

(3) No. of distinct terms = ${}^{20+3-1}C_{3-1} = {}^{22}C_2 = 231$

Hence, correct answer is option (1)

16. Consider a square ABCD with midpoints E, F, G, H of AB, BC, CD and DA respectively. Let L denote the line passing through F and H. Consider points P and Q, on L and inside ABCD, such that the angles APD and BQC both equal 120^0. What is the ratio of the area of ABQCDP to the remaining area inside ABCD?

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

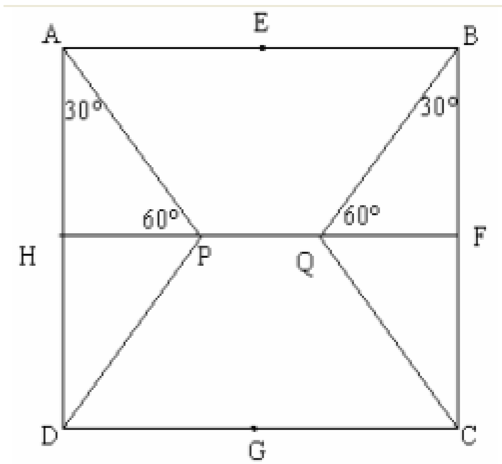
(2) $2 + \sqrt{3}$

(3) $\dfrac{10-3\sqrt{3}}{9}$

(4) $1+\dfrac{1}{\sqrt{3}}$

(5) $2\sqrt{3}-1$

Soln:



Let, AH = X
side of square = 2 X
Now Δ AHP is 30 – 60 – 90 Δ

$\therefore$ HP= $\dfrac{1}{\sqrt{3}}X$

$\therefore$ area (Δ AHP) = $\dfrac{X^2}{2\sqrt{3}}$

$\Delta AHP \cong \Delta HPD \cong \Delta BQF \cong \Delta QFC$

$\therefore$ Total area [Δ AHP + Δ HDP + area of (Δ BQF+ Δ QCF)] = $4\times\dfrac{X^2}{2\sqrt{3}} = 2\dfrac{X^2}{\sqrt{3}}$

Area of square $= 4 \times \dfrac{\text{Area of ABQCDP}}{\text{Remaining area}} = \dfrac{4X^2-\dfrac{2X^2}{\sqrt{3}}}{\dfrac{2X^2}{\sqrt{3}}} = 2\sqrt{3}-1$

Hence, correct answer is option (5).

17. Three consecutive positive integers are raised to the first, second and third powers respectively and then added. The sum so obtained is a perfect square whose square root equals the total of the three original integers. Which of the following best describes the minimum, say m, of these three integers?

(1) $1 \le m \le 3$

(2) $4 \le m \le 6$

(3) $7 \le m \le 9$

(4) $10 \le m \le 12$

(5) $13 \le m \le 15$

Soln: Let the numbers be x-1, x, x+1
By given condition
$(x-1) + x^2 + (x+1)^3 = (x-1+x+x+1)^2 = x-1+x^2 + x^3+3x^2+3x+1=9x^2$.

Therefore, $x^3-5x^2+4x = 0$.
Solving this equation, we get x=0, 1, 4
Since integers are positive.
x = 4 is the only possible value.

Therefore, the integers are 3, 4, 5
So the range of the smallest integer $1 \le m \le 3$.
Hence , the answer is option (1).

18. Find the sum $\sqrt{1+\frac{1}{1^2}+\frac{1}{2^2}}+\sqrt{1+\frac{1}{2^2}+\frac{1}{3^2}}+\ldots\ldots+\sqrt{1+\frac{1}{2007^2}+\frac{1}{2008^2}}$

(1) $2008-\frac{1}{2008}$

(2) $2007-\frac{1}{2007}$

(3) $2007-\frac{1}{2008}$

(4) $2008-\frac{1}{2007}$

(5) $2008-\frac{1}{2009}$

Soln: $\sqrt{1+\frac{1}{1^2}+\frac{1}{2^2}}+\sqrt{1+\frac{1}{2^2}+\frac{1}{3^2}}+-------+\sqrt{1+\frac{1}{2007^2}+\frac{1}{2008^2}}$

$\Rightarrow \sqrt{\frac{4+4+1}{4}}+\sqrt{\frac{36+9+4}{36}}+---------+\sqrt{\frac{2007^2\times 2008^2+2007^2}{2007^2\times 2008^2}}$

$\Rightarrow \frac{3}{2}+\frac{7}{6}+\frac{13}{12}+-----------$

$\Rightarrow (1+\frac{1}{2})+(1+\frac{1}{61})+(1+\frac{13}{12})+--------1+\frac{1}{2007\times 2008}$

$\Rightarrow (1+1+1+1+-----2007 \text{ times})+(\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+---)$

$\Rightarrow 2007 + (\frac{1}{1\times 2}+\frac{1}{2\times 3}+\frac{1}{3\times 4}+\frac{1}{4\times 6}-----)$

$\Rightarrow 2007+(\frac{1}{1}-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\frac{1}{4}-\frac{1}{5}+------+\frac{1}{2007}-\frac{1}{2008})$

$\Rightarrow 2007+\left(1-\frac{1}{2008}\right)$

$\Rightarrow 2008 - \frac{1}{2008}$

Hence, the answer is option (1).

19. Two circles, both of radii 1 cm, intersect such that the circumference of each one passes through the centre of the other. What is the area (in sq cm) of the intersecting region?

(1) $\frac{\pi}{3}-\frac{\sqrt{3}}{4}$

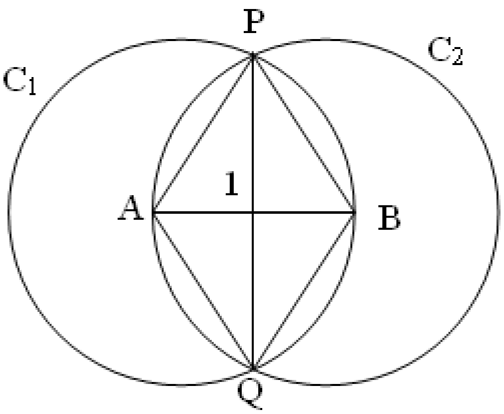
(2) $\frac{2\pi}{3}+\frac{\sqrt{3}}{2}$

(3) $\frac{4\pi}{3}-\frac{\sqrt{3}}{2}$

(4) $\frac{4\pi}{3}+\frac{\sqrt{3}}{2}$

(5) $\frac{2\pi}{3}-\frac{\sqrt{3}}{2}$

Soln:



A and B are centre of two circles ($C_1$and C_2) having radii = 1.
They intersect at points P and Q.

Therefore, Δ APB and Δ ABQ are equilateral triangles.

Therefore, $\angle PAQ = 60° + 60° = 120° = \angle PBQ$

Now Join PQ.
Area of common region = area of segment [(PBQ) + (PAQ)]
= [area of sector (APQ) – A(ΔAPQ)] + [area of sector (BPQ) - A(Δ BPQ)]
Now, area of sector (APQ)= area of sector (BPQ). …………. (By congruency)

$$= \frac{120°}{360°} \times \pi = \frac{\pi}{3}$$

$$\text{And, area } (\Delta\, APQ) = \text{area } (\Delta BPQ) = \frac{1}{2} \times (1) \times (1) \times \sin 120° = \frac{1}{2} \times \frac{\sqrt{3}}{2}$$

$$\therefore \text{Area of common region} = 2 \times \frac{\pi}{3} - 2\left(\frac{\sqrt{3}}{4}\right) = \frac{2\pi}{3} - \frac{\sqrt{3}}{2}$$

So, correct answer is option (5).

20. Rahim plans to drive from city A to station C, at the speed of 70 km per hour, to catch a train arriving there from B. He must reach C at least 15 minutes before the arrival of the train. The train leaves B, located 500 km south of A, at 8:00 am and travels at a speed of 50 km per hour. It is known that C is located between west and northwest of B, with BC at 60^0 to AB. Also, C is located between south and southwest of A with AC at 30^0 to AB. The latest time by which Rahim must leave A and still catch the train is closest to

(1) 6:15 am

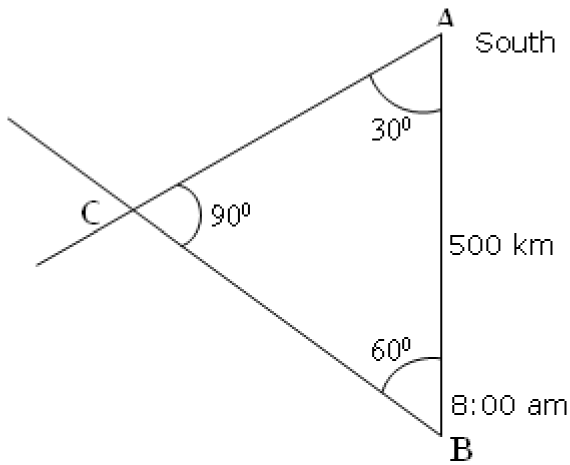
(2) 6:30 am

(3) 6:45 am

(4) 7:00 am

(5) 7:15 am

Soln:



By sine rule

$$\frac{\sin 90}{500} = \frac{\sin 30}{BC} = \frac{\sin 60}{AC}$$

$\therefore BC = 250 km \qquad AC = 250\sqrt{3}\,km$

Time taken by Train $(T_T) = \frac{distBC}{spdS_T} = \frac{250}{50} = 5\,hours$

$\therefore$ Train reaches station C at 1pm

Rahim Takes Time $= \frac{AC(dist)}{S_R} = \frac{250\sqrt{3}}{70} = 6.18$ hours

Rahim must reach C at 12:45 pm. (at least 15 min before 1 pm)

Therefore, He starts 6.18 hours before 12:45pm

So from given options, we can conclude that he has to start somewhere between 6:30 and 6:45 am

So answer is (2).

21. Consider a right circular cone of base radius 4 cm and height 10 cm. A cylinder is to be placed inside the cone with one of the flat surfaces resting on the base of the cone. Find the largest possible total surface area (in sq cm) of the cylinder.

(1) $\frac{100\pi}{3}$

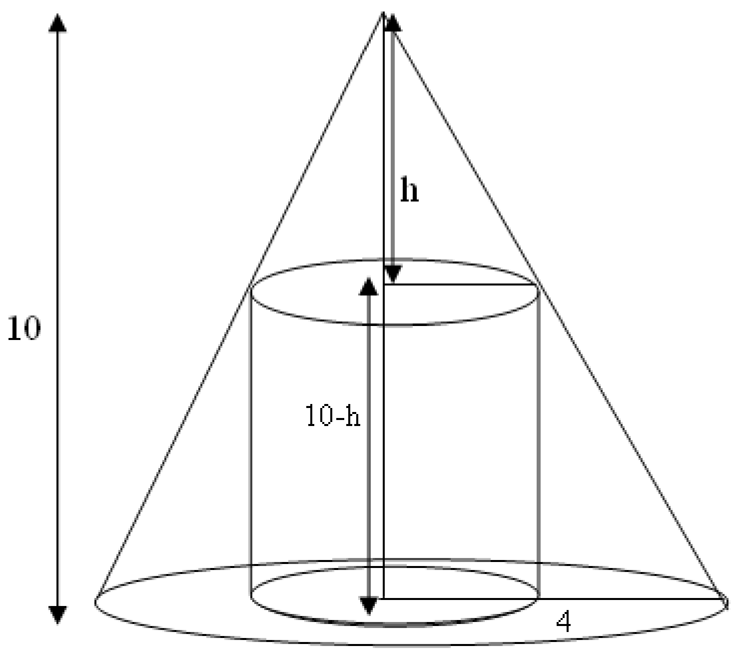
(2) $\frac{80\pi}{3}$

(3) $\frac{120\pi}{3}$

(4) $\frac{130\pi}{3}$

(5) $\frac{110\pi}{3}$

Soln:



Given:

$r = \frac{2}{5}h$

$= 2\pi R(R + H)$

$= 2\pi(\frac{2}{5}h)(\frac{2}{5}h + 10 - h)$

$= \frac{4\pi}{25}(50h - 3h^2)$

$= \frac{4\pi}{3 \times 25}3h(50 - 3h)$

$= \frac{4\pi}{3 \times 25}[3h(50 - 3h)]_{max}$

$= \frac{4\pi}{75}[A.B]_{max}$

A = 3h B=50-3h

For A x B to be maximum (if A + B constant)

Then A=B
3h=50-3h
3h=25

$$S_{A\,max} = \frac{4\pi}{75} \times 25 \times 25$$

$$= 100\frac{\pi}{3}$$

Hence, the answer is option (1).

Directions for Questions 22and 23:
Five horses, Red, White, Grey, Black and Spotted participated in a race. As per the rules of the race, the persons betting on the winning horse get four times the bet amount and those betting on the horse that came in second get thrice the bet amount. Moreover, the bet amount is returned to those betting on the horse that came in third, and the rest lose the bet amount. Raju bets Rs. 3000, Rs. 2000 and Rs. 1000 on Red, White and Black horses respectively and ends up with no profit and no loss.

22. Which of the following cannot be true?

(1) At least two horses finished before Spotted

(2) Red finished last

(3) There were three horses between Black and Spotted

(4) There were three horses between White and Red

(5) Grey came in second

Soln:

Case A	Investment	Return		Rank
Red	+3000		Lost	4th/5th
White	+2000	+6000	3 times	2nd
Black	+1000		Lost	4th/5th
Total	6000	+6000		

i. e no profit no loss

Rank	Possibility
1	
2	W
3	
4	R/B
5	B/R

If we put Spotted at 3rd rank
So statement in option (1) is true.
Option (2) Red finished last can be true.
Option (3) there are 3 horses between black and spotted
Which is possible if spotted has 1st rank and black has 5th rank
Option (4) can not be true.

Case B

	Investment	Return		Rank
Red	3000		Lost	4th/5th
White	2000	+2000	got back	3rd
Black	1000	+4000	4 times	1st
Total	6000	+6000		

i. e no profit no loss

Rank Possibility
1 B
2
3 W
4
5

So in this possibility Grey can came in 2nd position.

Hence, statement in option (5) can not be true.
Hence, answer is option (4).

23. Suppose, in addition, it is known that Grey came in fourth. Then which of the following cannot be true?

(1) Spotted came in First

(2) Red finished last

(3) White came in second

(4) Black came in second

(5) There was one horses between Black and White

Soln: If Grey came in fourth which is given in case B.

Rank Possibility
1 B

2 S
3 W
4 G
5 R

So by this case
We can eliminate option (2) Red finished last and option (5) there was one horse between Black & White

Case C

	Investment	Return		Rank
Red	3000	3000	got back	3rd
White	2000		Lost	4th/5th
Black	1000	3000	3 times	2nd
Total	6000	+6000		

Rank Possibility
1 S
2 B
3 R
4 G
5 W

So by case C we can eliminate
Option (1) Spotted came in first
Option (4) Black came in second

Hence answer option (3) is answer.

Directions for Questions 24 and 25:
Mark (1) if Q can be answered from A alone but not from B alone.
Mark (2) if Q can be answered from B alone but not from A alone.
Mark (3) if Q can be answered from A alone as well as from B alone.
Mark (4) if Q can be answered from A and B together but not from any of them alone.
Mark (5) if Q cannot be answered even from A and B together.

In a single elimination tournament, any player is eliminated with a single loss. The tournament is played in multiple rounds subject to the following rules:

(a) If the number of players, say n, in any round is even, then the players are grouped into n/2 pairs. The players in each pair play a match against each other and the winner moves on to the next round.

(b) If the number of players, say n, in any round is odd, then one of them is given a bye, that is, he automatically moves on to the next round. The remaining (n-1) players are grouped into (n-1)/2 pairs. The players in each pair play a match against each other and the winner moves on to the next round. No player gets more than one bye in the entire tournament.

Thus, if n is even, then n/2 players move on to the next round while if n is odd, then (n+1)/2 players move on to the next round. The process is continued till the final round, which obviously is played between two players. The winner in the final round is the champion of the tournament.

24. Q: What is the number of matches played by the champion ?

(1) A: The entry list for the tournament consist of 83 players.

(2) B: The champion recieved one bye.

Soln: Clearly, using statement B alone, it will not give us the answer, because we don't know number of players.

Using statement A alone,

Two cases are possible:-

No of players	83	42	21	12	6	3	2
Round	I	II	III	IV	V	VI	VII

(i) Now, if champion doesn't get a bye in any round, he has to play 7 matches.
(ii) Else, if he gets one or more byes, he will play less than 7 matches.

So, statement 'A' alone is not sufficient to answer.
Combining both the statements, we can determine no. of matches played by champion=6

Hence, the answer is option (4).

25. Q: If the number of players, say n, in the first round was between 65 and 128, then what is the exact value of n ?

(1) A: Exactly one player recieved a bye in the entire tournament.

(2) B: One player recieved a bye while moving on the fourth round from the third round

Soln: Now by using (A) alone, multiple cases are possible.
For example if number of players in the first round is 127 or 126 or 124, then exactly one player will get a bye in the entire tournament (though in different rounds).
So, (A) alone is not sufficient.

Using (B) alone, one player receives a bye while moving on to the fourth round from the third round:-

Let us consider two cases as an example:-

Number of players in first 4 rounds			
1^{st}	2^{nd}	3^{rd}	4^{th}
124	62	31	16
76	38	19	10
84	42	21	11

So many possibilities for bye condition from 3^{rd} to 4^{th} round, So B alone is not sufficient.

When we combine both the statements, only 124 is permissible value for number of players in the first round.
(Key here is to get power of 2 in the fourth round so that there will not be a single bye in the subsequent rounds.)

Hence, the answer is option (4).