JAIPURIA
INSTITUTE OF MANAGEMENT
LUCKNOW NOIDA JAIPUR INDORE

Previous year Quant's for CAT Preparation

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Dear CAT Aspirants,

It's a tough journey to reach where we want to be in the career. It takes lots of efforts, struggles, long studying hours to crack CAT – One of the toughest management entrance exams in the country. Being one amongst the premier B School, Jaipuria Institute of Management accepts CAT score as one of its component in the selection process.

The process being very stringent, a limited number of aspirants are able to make through the selection process. In our endeavor to encourage and nurture management aspirants, we share lots of CAT related material in form of articles, ebooks, videos and even organize free career-oriented workshops. So, this time here we are with Reading Compression with their solutions.

Happy Reading!

Quant

Question 1

If Y is the number such that $2^{Y^{2\log_3 5}} = 5\log_2 3$, then Y equals to:

A $\log_2(\frac{1}{5})$

B $\log_2(\frac{1}{3})$

C $-\log_2(\frac{1}{5})$

D $-\log_2(\frac{1}{3})$

Answer: B

Question 2

A gentleman decided to treat a few children in the following manner. He gives half of his total stock of toffees and one extra to the first child, and then the half of the remaining stock along with one extra to the second and continues giving away in this fashion. His total stock exhausts after he takes care of 5 children. How many toffees were there in his stock initially?

Answer:62

Question 3

How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

Answer:21

Question 4

The number of real-valued solutions of the equation $2^x + 2^{-x} = 2 - (x-2)^2$ is:

A 1

B 2

C infinite

D 0

Answer: D

Question 5

How many disticnt positive integer-valued solutions exist to the equation $(X^2 - 7x + 11)^{(X^2 - 13x + 42)} = 1$?

A 8

B 4

C 2

D 6

Answer: D

Question 6

A solid right circular cone of height 27 cm is cut into two pieces along a plane parallel to its base at a height of 18 cm from the base. If the difference in volume of the two pieces is 225 cc, the volume, in cc, of the original cone is

A 243

B 232

C 256

D 264

Answer: A

Question 7

The area of the region satisfying the inequalities $\mid x \mid -y \leq 1, y \geq 0$ **and** $y \leq 1$ **is**

Answer:3

Question 8

On a rectangular metal sheet of area 135 sq in, a circle is painted such that the circle touches two opposite sides. If the area of the sheet left unpainted is two-thirds of the painted area then the perimeter of the rectangle in inches is

A $3\sqrt{\pi}(5 + {}^{12}\pi)$

B $4\sqrt{\pi}(3 + {}^{9}\pi)$

C $3\sqrt{\pi}({}^{5}2 + {}^{6}\pi)$

D $5\sqrt{\pi}(3 + {}^{9}\pi)$

Answer: A

Question 9

A circle is inscribed in a rhombus with diagonals 12 cm and 16 cm. The ratio of the area of circle to the area of rhombus is

A ${}^{6\pi}25$

B ${}^{5\pi}18$

C ${}^{3\pi}25$

D ${}^{2\pi}15$

Answer: A

Question 10

Among 100 students, x_1 **have birthdays in january,** X_2 **have girthdays in february, and so on. If** $x_0 = max(x_1, x_2, ..., x_{12})$**, then the smallest possible value of** x_0 **is**

A 8

B 9

C 10

D 12

Answer: B

Question 11

A straight road connects points A and B. Car 1 travels from A to B and Car 2 travels from B to A, both leaving at the same time. After meeting each other, they take 45 minutes and 20 minutes, respectively, to complete their journeys. If Car 1 travels at the speed of 60 km/hr, then the speed of Car 2, in km/hr, is

A 100

B 90

C 80

D 70

Answer: B

Question 12

A person spent Rs 50000 to purchase a desktop computer and a laptop computer. He sold the desktop at 20% prot and the laptop at 10% loss. If overall he made a 2% prot then the purchase price, in rupees, of the desktop is

Answer:20000

Question 13

A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one fourths of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

Answer:8

Question 14

If $x = (4096)^{7+4\sqrt{3}}$, then which of the following equals to 64?

A $\frac{x^7}{x^{2\sqrt{3}}}$

B $\frac{x^{\frac{7}{2}}}{x^{\sqrt{3}}}$

C $\frac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$

D $\frac{x^7}{x^{4\sqrt{3}}}$

Answer: C

Question 15

An alloy is prepared by mixing three metals A, B and C in the proportion 3 : 4 : 7 by volume. Weights of the same volume of the metals A. B and C are in the ratio 5 : 2 : 6. In 130 kg of the alloy, the weight, in kg. of the metal C is

A 48

B 84

C 70

D 96

Answer: B

Question 16

The number of distinct real roots of the equation $(x+\frac{1}{x})^2-3(x+\frac{1}{x})+2=0$ **equals**

Answer:1

Question 17

If $\log_4 5=(\log_4 y)(\log_6 \sqrt{5})$**, then y equals**

Answer:36

Question 18

Leaving home at the same time, Amal reaches office at 10:15 am if he travels at 8 lan/hr, and at 9:40 am if he travels at 15 km/hr. Leaving home at 9.10 am, at what speed, in km/hr, must he travel so as to reach office exactly at 10 am?

A 13

B 12

C 14

D 11

Answer: B

Question 19

A train travelled at one-thirds of its usual speed, and hence reached the destination 30 minutes after the scheduled time. On its return journey, the train initially travelled at its usual speed for 5 minutes but then stopped for 4 minutes for an emergency. The percentage by which the train must now increase its usual speed so as to reach the destination at the scheduled time, is nearest to

A 50

B 58

C 67

D 61

Answer: C

Question 20

The mean of all 4-digit even natural numbers of the form 'aabb',where $a > 0$, is

A 4466

B 5050

C 4864

D 5544

Answer: D

Question 21

Two persons are walking beside a railway track at respective speeds of 2 and 4 km per hour in the same direction. A train came from behind them and crossed them in 90 and 100 seconds, respectively. The time, in seconds, taken by the train to cross an electric post is nearest to

A 87

B 82

C 78

D 72

Answer: B

Question 22

If a, b and c are positive integers such that ab = 432, bc = 96 and c < 9, then the smallest possible value of a + b + c is

A 49

B 56

C 59

D 46

Answer: D

Question 23

In a group of people, 28% of the members are young while the rest are old. If 65% of the members are literates, and 25% of the literates are young, then the percentage of old people among the illiterates is nearest to

A 62

B 55

C 59

D 66

Answer: D

Question 24

Veeru invested Rs 10000 at 5% simple annual interest, and exactly after two years, Joy invested Rs 8000 at 10% simple annual interest. How many years after Veeru's investment, will their balances, i.e., principal plus accumulated interest, be equal?

Answer:12

Question 25

If $f(5+x)=f(5-x)$ for every real x, and $f(x)=0$ has four distinct real roots, then the sum of these roots is

A 0

B 40

C 10

D 20

Answer: D

Question 26

Let A, B and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is

A 5

B 4

C 6

D 7

Answer: C

Instructions
For the following questions answer them individually

Question 1

Two alcohol solutions, A and B, are mixed in the proportion 1:3 by volume. The volume of the mixture is then doubled by adding solution A such that the resulting mixture has 72% alcohol. If solution A has 60% alcohol, then the percentage of alcohol in solution B is

A 90%

B 94%

C 92%

D 89%

Answer: C

Question 2

A batsman played n + 2 innings and got out on all occasions. His average score in these n + 2 innings was 29 runs and he scored 38 and 15 runs in the last two innings. The batsman scored less than 38 runs in each of the first n innings. In these n innings, his average score was 30 runs and lowest score was x runs. The smallest possible value of x is

A 4

B 3

C 2

D 1

Answer: C

Question 3

Let m and n be positive integers, If $x^2 + mx + 2n = 0$ **and** $x^2 + 2nx + m = 0$ **have real roots, then the smallest possible value of** $m + n$ **is**

A 7

B 6

C 8

D 5

Answer: B

Question 4

A contractor agreed to construct a 6 km road in 200 days. He employed 140 persons for the work. After 60 days, he realized that only 1.5 km road has been completed. How many additional people would he need to employ in order to finish the work exactly on time?

Answer:40

Question 5

If $x_1 = -1$ **and** $x_m = x_{m+1} + (m+1)$ **for every positive integer m, then** X_{100} **equals**

A -5050

B -5151

C -5051

D -5150

Answer: A

Question 6

If $\log_a 30 = A, \log_a \binom{5}{3} = -B$ **and** $\log_2 a = \frac{1}{3}$**, then** $\log_3 a$ **equals**

A $\frac{2}{A+B-3}$

B $\frac{2}{A+B} - 3$

C $\frac{A+B}{2} - 3$

D $\frac{A+B-3}{2}$

Answer: A

Question 7

Dick is thrice as old as Tom and Harry is twice as old as Dick. If Dick's age is 1 year less than the average age of all three, then Harry's age, in years, is

Answer:18

Question 8

Vimla starts for office every day at 9 am and reaches exactly on time if she drives at her usual speed of 40 km/hr. She is late by 6 minutes if she drives at 35 km/hr. One day, she covers two-thirds of her distance to office in one-thirds of her usual time to reach office, and then stops for 8 minutes. The speed, in km/hr, at which she should drive the remaining distance to reach office exactly on time is

A 29

B 26

C 28

D 27

Answer: C

Question 9

Let m and n be natural numbers such that n is even and $0.2 < \frac{m}{20}, \frac{n}{m}, \frac{n}{11} < 0.5$. Then $m - 2n$ equals

A 3

B 1

C 2

D 4

Answer: B

Question 10

How many integers in the set {100, 101, 102, ..., 999} have at least one digit repeated?

Answer:252

Question 11

In the final examination, Bishnu scored 52% and Asha scored 64%. The marks obtained by Bishnu is 23 less, and that by Asha is 34 more than the marks obtained by Ramesh. The marks obtained by Geeta, who scored 84%, is

A 357

B 417

C 439

D 399

Answer: D

Question 12

If a,b,c are non-zero and $14^a = 36^b = 84^c$, then $6b(\frac{1}{c} - \frac{1}{a})$ is equal to

Answer:3

Question 13

A person invested a certain amount of money at 10% annual interest, compounded half-yearly. After one and a half years, the interest and principal together became Rs.18522. The amount, in rupees, that the person had invested is

Answer:16000

Question 14

A man buys 35 kg of sugar and sets a marked price in order to make a 20% profit. He sells 5 kg at this price, and 15 kg at a 10% discount. Accidentally, 3 kg of sugar is wasted. He sells the remaining sugar by raising the marked price by p percent so as to make an overall profit of 15%. Then p is nearest to

A 22

B 35

C 25

D 31

Answer: C

Question 15

The points (2,1) and (-3,-4) are opposite vertices of a parallelogram.If the other two vertices lie on the line $x + 9y + c = 0$, then c is

A 12

B 13

C 15

D 14

Answer: D

Question 16

A and B are two railway stations 90 km apart. A train leaves A at 9:00 am, heading towards B at a speed of 40 km/hr. Another train leaves B at 10:30 am, heading towards A at a speed of 20 km/hr. The trains meet each other at

A 11 : 45 am

B 11 : 20 am

C 11 : 00 am

D 10 : 45 am

Answer: C

Question 17

Let N, x and y be positive integers such that $N = x + y, 2 < x < 10$ and $14y < y < 23$. If $N > 25$, then how many distinct values are possible for N?

Answer:6

Question 18

Let k be a constant. The equations $kx + y = 3$ and $4x + ky = 4$ have a unique solution if and only if

A $| k | \neq 2$

B $| k | = 2$

C $k \neq 2$

D $k = 2$

Answer: A

Question 19

How many of the integers 1, 2, … , 120, are divisible by none of 2, 5 and 7?

A 42

B 41

C 40

D 43

Answer: B

Question 20

How many pairs(a, b of positive integers are there such that $a \leq b$ and $ab = 4^{2017}$?

A 2018

B 2019

C 2017

D 2020

Answer: A

Question 21

Anil, Sunil, and Ravi run along a circular path of length 3 km, starting from the same point at the same time, and going in the clockwise direction. If they run at speeds of 15 km/hr, 10 km/hr, and 8 km/hr, respectively, how much distance in km will Ravi have run when Anil and Sunil meet again for the first time at the starting point?

A 4.8

B 4.6

C 5.2

D 4.2

Answer: A

Question 22

In a trapezium $ABCD$, AB is parallel to DC, BC is perpendicular to DC and $\angle BAD = 45^0$. If DC = 5cm, BC = 4 cm,the area of the trapezium in sq cm is

Answer:28

Question 23

The area, in sq. units, enclosed by the lines $x = 2, y = \mid x - 2 \mid +4$, the X-axis and the Y-axis is equal to

A 10

B 6

C 8

D 12

Answer: A

Question 24

If $(x + y) = f(x)f(y)$ and $f(5) = 4$, then $f(10) - f(-10)$ is equal to

A 14.0625

B 0

C 15.9375

D 3

Answer: C

Question 25

$\frac{2\times4\times8\times16}{(\log_2 4)^2(\log_4 8)^3(\log_8 16)^4}$ **equals**

Answer:24

Question 26

The vertices of a triangle are (0,0, (4,0 and (3,9. The area of the circle passing through these three points is

A $\frac{14\pi}{3}$

B $\frac{123\pi}{7}$

C $\frac{12\pi}{5}$

D $\frac{205\pi}{9}$

Answer: D

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Question 1:

In a class, 60% of the students are girls and the rest are boys. There are 30 more girls than boys. If 68% of the students, including 30 boys,pass an examination, the percentage of the girls who do not pass is [TITA]

Correct Answer. 20

Given that there are 60 % girls and 40 % boys
It is also given that there are 30 more girls than boys.
So, (60 % - 40 %) of total class strength = 30 students
=> 20 % of total class strength = 30 students
=> Total class strength = 30 x 5 = 150 students
It is also given that 68% of students pass the the examination, which includes 30 boys
So, Number of students passed = 68% of Total students
=> Number of students passed = 68/100x 150 = 102 students
=> Since the number of boys passed is 30,
=> Number of girls passed = 102 - 30 = 72
Total number of girls = 60/100 x 150 = 90
Total number of girls = Girls who passed + Girls who did not pass
Girls who did not pass = 90 - 72 = 18
Percentage of girls who did not pass = 18/90 x 100 = 20 %

Question 2:

With rectangular axes of coordinates, the number of paths from (1,1) to (8,10) via (4,6), where each step from any point (x,y) is either to (x,y+1) or to (x+1,y) is [TITA]

Correct Answer. 3920

Let us first consider travelling from (1,1) to (4, 6)
This means, Travelling from 1 to 4 units in the x axis -> 3 horizontal (h h h)

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IAnd travelling from 1 to 6 units in the y axis-> 5 vertical movements
(v v v v v)
No matter how we proceed, reaching from **(1,1)** to **(4,6)** requires **5** vertical movements and 3 horizontal movements.
\So, Number of paths to travel from (1,1) to **(4,6)** = Number of ways of arranging (h h h v v v v v)
Number of ways of arranging (h h h v v v v v) = 8!/3!5!
imilarly, travelling from (4, 6) to (8, 10) requires 4 horizontal movements and 4 vertical movements
Number of ways of arranging (h h h h v v v v) =-8!/4!4!
Total number of paths = 3920

Question 3:
A club has 256 members of whom 144 can play football, 123 can play tennis, and 132 can play cricket.Moreover, 58 members can play both football and tennis, 25 can play both cricket and tennis, while 63 can play both football and cricket.If every member can play at least one game, then the number of members who can play only tennis is
A. 32
8.43
C.38
D.45

Correct Answer. 43
From observing the data given, we find that it is a closed 3 set Venn diagram. Let the three sports be F, T and C for Football, Tennis and Cricket respectively n(FUTUC) = 256 , n(F) = 144, n(T) = 123, n(C) = 132, n(F T) = 58, n(CnT) = 25, n(F C) = 63

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We know, the product of rectangles formed by two intersecting chords are always equal
So, AE x EB = CE x ED
AE x EB = 7 x15
Also, we know that AB = 20.5 ems = AE + EB
So, the Sum of AE and EB must be 20.5 and their product must be
equal to 7 x15 =105
The numbers must be close to each other, for their sum to be 20.5
From trial and error, we find their values to be10 and10.5 ems respectively So, AE x EB = 7 x15
10 x10.5 = 7 x15
Difference =10.5 -10 ems = 0.5 ems

Question 5:
Meena scores 40% in an examination and after review, even though her score is increased by 50%, she fails by 35 marks. If her post-review
score is increased by 20%, she will have 7 marks more than the passing score. The percentage score needed for passing the examination is
A. 75
8.86
C.60
D.70

Correct Answer. 70
Meena scores 40 % in an exam
After review, she scores 50 % more => Increase of 50 % from 40 % = 40% + 20% = 60%
She fails by 35 marks, by scoring60%
60% score = Pass mark - 35 ----- (1)
If her post review score is increased by 20%, she would have 7 more than the pass mark.

We know, the product of rectangles formed by two intersecting chords are always equal
So, AE x EB = CE x ED
AE x EB = 7 x15
Also, we know that AB = 20.5 ems = AE + EB
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Question 5:

Meena scores 40% in an examination and after review, even though her score is increased by 50%, she fails by 35 marks. If her post-review
score is increased by 20%, she will have7 marks more than the passing score. The percentage score needed for passing the examination is

A.75
8.86
C.60
D.70

Correct Answer. 70
Meena scores 40 % in an exam
After review, she scores 50 % more => Increase of 50 % from 40 % = 40% + 20% = 60%
She fails by 35 marks, by scoring60%
60% score = Pass mark - 35 ----- (1)
If her post review score is increased by 20%, she would have7 more than the pass mark.

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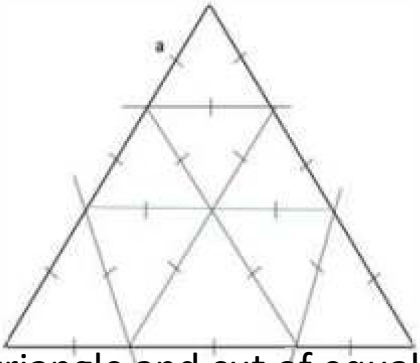
20% of 60% = 12 %
So, 60% + 12% = 72% of marks = Pass mark + 7 ------ (2)
So, 12% marks = 35 + 7 (5: 1 ratio)
So, similarly 12% can be re written as 10 % and 2 %
maintaining the 5:1 ratio)
Hence the pass percentage = 60 % + 10 % = 70%

Question 6:
Corners are cut off from an equilateral triangle T to produce a regular hexagon H. Then, the ratio of the area of H to the area of T is

A.5 : 6
B.3 :4
C.2 : 3
D.4: 5

Correct Answer. 2.3



Construct an Equilateral triangle and cut of equal lengths from all three sides.
So we obtain a hexagon and three equilateral triangles of
side 'a' in return.
We know that a hexagon comprises of 6 Equilateral Triangles. Since the side of the hexagon is also 'a', we obtain 6 equilateral triangles in return. Thus, we have a total of 6 + 3 = 9 equilateral triangles of side 'a'
Ratio of area of Hexagon with Area of Triangle = 6: 9 = 2: 3

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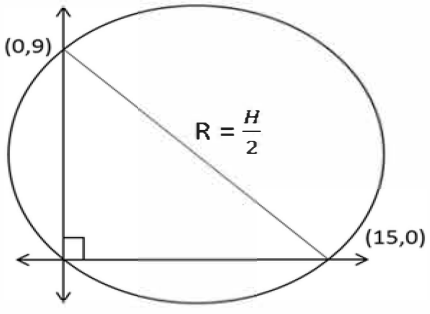
Question 7:

Let T be the triangle formed by the straight line 3x + 5y - 45 = 0 and the coordinate axes. Let the circumcircle of T have radius of length L, measured in the same unit as the coordinate axes. Then, the integer closest to L is [TITA]

Correct Answer. 9



We know that the equation of the straight line is 3x + 5y = 45 x/15 + y/9 =l

The intercepts are (15,0) and (0,9) respectively

Since it's a right-angled triangle, we know that Circumradius (R) =hypotenuse/2

Circumradius = $\frac{\sqrt{9^2 + 5^2}}{2} = \frac{3}{2}$ x

We know that √34 is approximately equal to 6

So, from trial and error to find the closest number, we find that the value of Circumradius is very close to 9

So, the integer closest to L = 9

Question 8:

For any positive integer n, let f(n) = n(n + 1) if n is even, and f(n) = n + 3 if n is odd. If m is a positive integer such that 8f(m + 1) - f(m) = 2, then m equals [TITA]

Correct Answer. 10
If n is even, f(n)= n (n + 1)
So, f (2)= 2(2+1)= 2 (3)= 6
If n is odd, f(n)= n + 3
f (1) = 1 + 3 = 4
It is given that, 8 x f(m+1)- f(m)=2
So, m can either be even or odd
Case-1: If m were even and m+1 odd
So, 8 x f(m+1)- f(m)=2
8(m + 4)- m (m + 1)= 2
8m + 32 - m2 - m = 2
m2 - 7m - 30 = 0
(m-10)(m+3)= 0
m = 10 or -3
m = 10, since m is positive
Case-2: If m were even and m+1 odd
8 x f(m+l)- f(m)=2
8 (m +1)(m + 2)- (m + 3)= 2
Now, let us substitute m = 1 which is the minimum possible value
8 (1 + 1)(1 + 2)- (1 + 3)3
Case 2 does not work

Question 9:
A person invested a total amount of Rs 15 lakh. A part of it was invested in a fixed deposit earning 6% annual interest, and the remaining amount was invested in two other deposits in the ratio 2 : 1, earning annual interest at the rates of 4% and 3%, respectively. If the total annual interest income is Rs 76000 then the amount (in Rs lakh)invested in the fixed deposit was [TITA]

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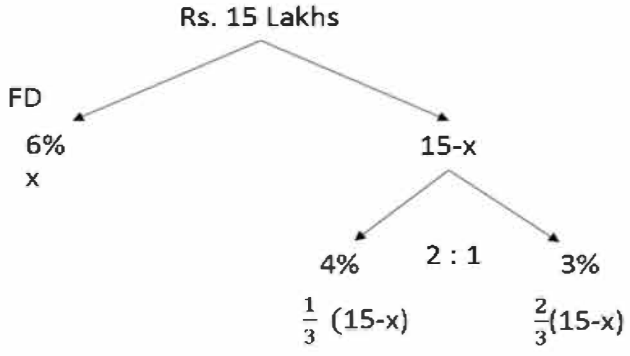
Correct Answer: 9



Let Rs x be invested in FD.
So, Remaining amount = Rs. 15 Lakhs - x, which is invested in the ratio 2 : 1 So, each investment would have 1/3{15-x) and 2/3{15-x) investments respect So, Total annual interest income = 6% of x + 4% of 1/3(15-x) + 3% of 2/3(15-x) = 76000
Rewriting Rs.76000 as Rs.076 Lakhs,
6% of x + 4% of 1/3(15-x) + 3% of 2/3(15-x) = 0.76
Multiply both sides by 100,
6x + 4/3{15-x) + 2(15-x) = 76
6x + 11/3{15-x) = 76
165 + 1Bx -11x = 228
7x = 63
x =9 (or) Rs.9 Lakhs

Question 10 :
The product of two positive numbers is 616. If the ratio of the difference of their cubes to the cube of their difference is 157 : 3, then the sum of the two numbers is

A. 50
B. 85
C. 95
D. 58

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Correct Answer. 50

Let the two numbers be a and b

From the question, we know

axb=616

and $\frac{a^3-b^3}{(a-b)^3}=\frac{157}{3}$

$\frac{(a-b)(a^2+ab+b^2)}{(a-b)^3}=\frac{157}{3}$

$\frac{(a^2+ab+b^2)}{a^2-2ab+b^2}=\frac{157}{3}$

$\frac{(a^2-2ab+b^2)+3ab}{(a^2-2ab+b^2)}=\frac{157}{3}$

$\frac{3ab}{(a-b)^2}=\frac{157}{3}-1=\frac{154}{3}$

$\frac{3ab}{(a-b)^2}=\frac{154}{3}$

$\frac{3(616)}{(a-b)^2}=\frac{154}{3}$

$(a-b)^2=3\times 3\times 4=36$

a - b=6, ab=616

616 can be rewritten as22 x28, where28 -22=6 using trial and error So, a + b= 28 +22 =50

Question 11 :

On selling a pen at 5% loss and a book at 15% gain, Karim gains Rs. 7. If he sells the pen at 5% gain and the book at 10% gain, he gains Rs. 13. What is the cost price of the book in Rupees?

A.80
8.85
C. 100
D. 95

Correct Answer. 80
From the question, let us frame the following equations
-P x 5% + b x 15% = 7 ---(1}
P x 5% + b x 10% = 13 --- (2)

(+)
b x (25%} = 20
Price of Book = b = Rs. 80

Question 12 :
If al + a2 + a3 + ... + an = 3{2n+1 - 2}, then al1 equals [TITA]

Correct Answer. 6144
Let n = 1,
al = 3(21+1 -2} = 3(4-2} = 6 = 3 x 21
a2 = 3(22+1 -2} = 3(8-2} = 18, a2 = 18 - 6 = 12 = 3 x 22
a3 = 3(23+1 -2} = 3(14} = 42 a3 = 42 - 12 - 6 = 42-18 =24 = 3 x 23
So, al1 = 3 x 211 = 3 x 2048
all = 6144

Question 13 :
The number of the real roots of the equation 2cos(x(x + 1)) = 2x + 2-x is

A. 0
B. infinite
C. 1
D. 2

Correct Answer. 1
2cos (x(x + 1)) = 2x + 2-x
Consider RHS, 2x + 2-x
This is of the form, y+1/y
We know that y+1/y >_2when y is positive and y+1/y <_2 when y is negative
Here, since we are dealing with 2x, y+1/y >_2 is considered respectively So,
2cos (x (x + 1)) >_2
Substitute x = 0, 2x + 2-x = 20 + 20 = 2
2cos (x (x + 1)) = 2cos (0(0 + 1)) = 2cos (0) = 2 x = 0 is a valid solution
Any value other than this wont work.
Therefore, only x = 0 works and there is only one real solution

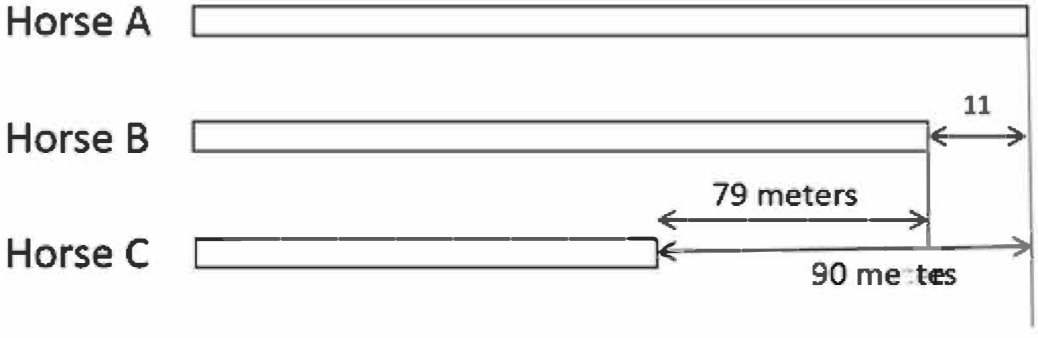
Question 14 :
The income of Amala is 20% more than that of Bimala and 20% less than that of Kamala. If Kamala's income goes down by 4% and Bimala's goes up by 10%, then the percentage by which Kamala's income would exceed Bimala's is nearest to
A. 28
8.29
C.31
D.32

Correct Answer. 31
Let Bimala's income be B. Amala's income is 20% more than B. So,
A = 1.2 B
Similarly, Amala's income is 20% less than that of Kamala.
A= 0.8K

Therefore, 1.28 = 0.8K (or) K = 3/28
Now, 8imala's new income goes up by 10% = 1.18
Kamala's income goes down by 4%
4% (1.58) = 0.068
Therefore, Kamala's new income is = 1.58 - 0.068 = 1.448
So, K = 1.448 and 8 = 1.1 8
Percentage change = 0.34 8 = 0.34/1.1 x 100 = 31%

Question 15:
In a race of three horses, the first beat the second by 11 metres and the third by 90 metres. If the second beat the third by 80 metres, what was the length, in metres, of the racecourse? [TITA]

Correct Answer. 880



A beats 8 by 11 meters. When 8 completes the 11 meters, there is a lead of 80 meters to C
So, C must have travelled only 90 - 80 = 10 meters
When 8 travels 11 meters, C travels only 10 meters
Ratio of distance travelled by second and third horse arel 1x and 10 x respectively
We know that the second horse beats the third horse by 80 meters. So,
Length of the track = Distance travelled by the second horse
=11 x 80 = 880 meters

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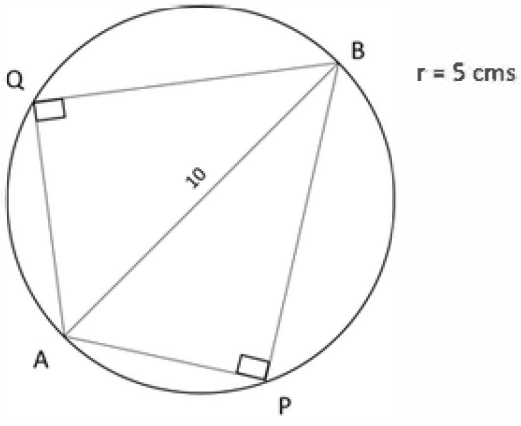
Question 16:

IAB is a diameter of a circle of radius 5 cm. Let P and Q be two points on the circle so that the length of PB is 6 cm, and the length of AP is wice that of AQ. Then the length, in cm, of QB is nearest to

A. 8.5
B. 9.3
C. 9.1
D. **7.8**

Correct Answer: 9.1



We know that angle APB = AQB = 900
We know PB = 6, AB = 10 and AP = 2AQ
From using Pythagorean triplet, we find that AP = 8 ems
So, AQ = 4cms
AQ2 + QB2 = AB2
16 + QB2 = 100
QB2 = 84
QB= 9.3

Question 17:

One can use three different transports which move at 10, 20, and 30 kmph, espectively. To reach from A to B, Amal took each mode of transport 1/3 of his total journey time, while Bimal took each mode of transport 1/3 of the total distance.

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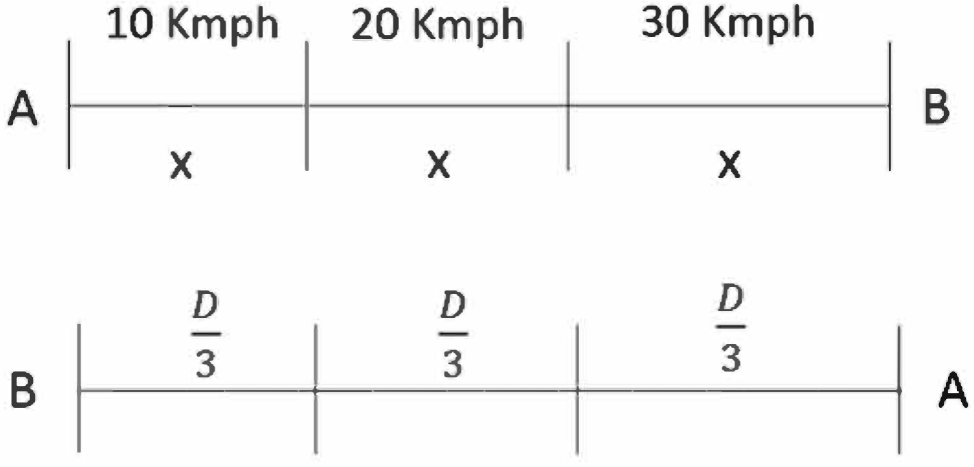
The percentage by which Bimal's travel time exceeds Amal's travel time is nearest to

A.22
B.19
C.21
D.20

Correct Answer. 22



Let the distance be = 60 Kms.
So, Bimal travels a distance of 20Kms in each mode and Amal travels 10, 20 and 30 Kms respectively in 1 hour each
Time taken by Bimal = Time taken to travel 20 kms in 10 Kmph + Time taken to travel 20 kms in 20 Kmph + Time taken to travel 20 kms in 30 Kmph Time taken by Bimal = 2 **+** 1 **+** 2/3hours = 3 **+** 2/3hours
Extra time taken by Bimal = 2/3hour
Percentage increase in time = 2/3/3 x 100 = 2/9 x 100 = 22
So, Percentage increase in time = 22

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Question 18:

Amala, Bina, and Gouri invest money in the ratio 3 : 4 : 5 in fixed deposits having respective annual interest rates in the ratio 6 : 5 : 4. What is their total interest income (in Rs} after a year, if Bina's interest income exceeds Amala's by Rs 250?

A. 7000
B. 6000
C. 6350
D. 7250

Correct Answer. 7250

	Amala	Bimala	Gouri
Amount invested	3	4	5
Interest rate	6	5	4

We know, Interest income Amount invested
And Interest income Interest rate
Therefore, Interest income must be in the ratio of the product of their Amount invested and Interest rate.
So, Ratios of Interest incomes of Amala, Bimala and Gouri = 18: 20: 20 Bina's Interest income exceeds Amala by 250 Rs.
So, 20 x - 18 x = 250
2x = 250
So, Total Interest income = 250 x (9 + 10 + 10} = 7250 Rs.
Total Interest Income = Rs. 7250

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Question 19:

IA chemist mixes two liquids 1 and 2. One litre of liquid 1 weighs 1 kg and one litre of liquid 2 weighs 800 gm. If half litre of the mixture weighs 480 gm, then the percentage of liquid 1 in the mixture, in terms of volume, is

A. 70
B. 85
C. 80
D. 75

Correct Answer. 80

In Liquid L1 - 1L = 1000 grams
So, 1000 ml = 1000 grams
1 ml = 1 gram
x ml = x grams
In Liquid L2 - 1L = 800 grams
1000 ml = 800 grams
1ml = 0.8 grams
(500-x) ml = (500-x) x 0.8 grams
Total mass = x + 400 - 0.8x = 480 grams
0.2x = 80 grams
x = 400 grams
Therefore, Liquid 1 has 400 ml and Liquid 2 has 500 - 400 = 100 Ml Therefore, Percentage of Liquid 1 = 400/500 x 100 = 80%

Question 20:

Let S be the set of all points (x,y) in the x-y plane such that |x| + |y| ≤ 2 and |x| ≥ 1. Then, the area, in square units, of the region represented by S equals [TITA]

Correct Answer. 2

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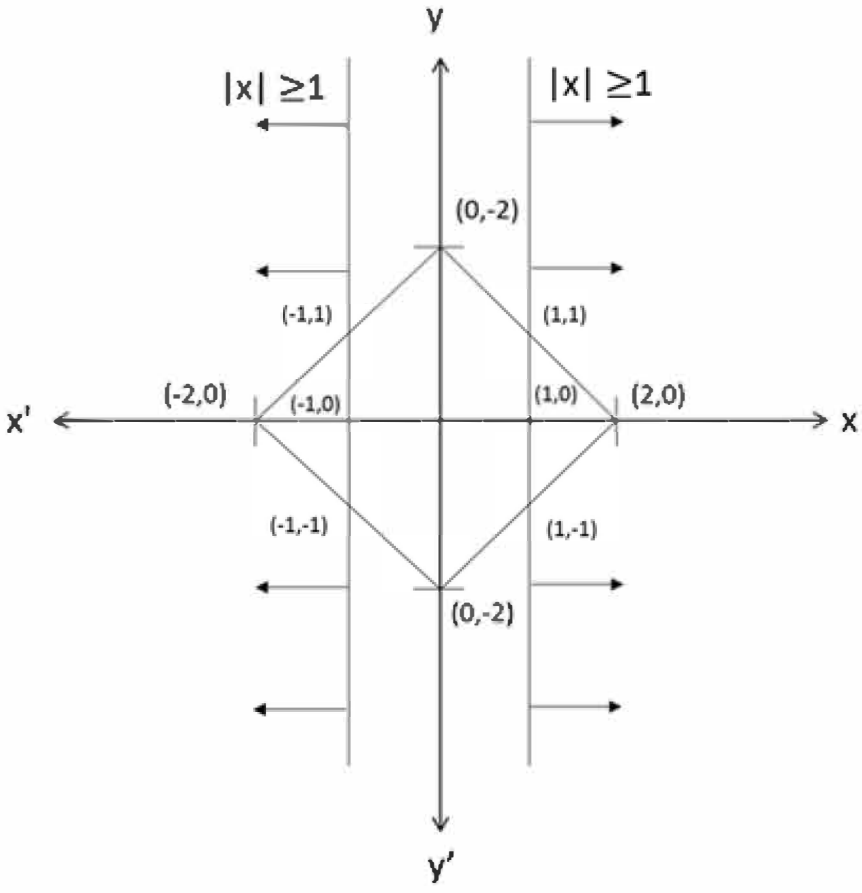

Construct the given data on a rough graph.
Required area = Sum of area of two smaller triangles [(-2,0) (-1,1) (-1,-1) and (2,0) (1,-1) (1,1)]
Required area = 2 x 1/2 x base x height
Required area = 1 x 2 = 2 Sq units

Question 21 :
The number of solutions of the equation lxl(6x2 + 1) = 5x2 is [TITA]

Correct Answer. 5

lxl (6x2 **+** 1} = 5x2
We know that lx2I = x2
Let y = lxl
So, y2 = x2
So, y (6y2 **+** 1} = 5y2
6y2 **+** 1 = 5y
6y2 -5 **+** 1 = 0
y = 1/3orl/2
Since, y = lxl
y = 1/3or-1/3, 1/2 or -1/2
Since we have cancelled y in our first step, x = 0 is also a solution
So, Number of possible solutions = 4 **+** 1 = 5

Question 22:
Three men and eight machines can finish a job in half the time taken by three machines and eight men to finish the same job. If two machines can finish the job in 13 days, then how many men can finish the job in 13 days? [TITA

Correct Answer. 13
Let Machines be referred as R and men be referred as M
It is given that, three men and eight machines can finish a job in half the time taken by three machines and eight men to finish the same job. From the given data,
3M + BR = 2 x (3R + BM}
2R = 13M
R = 13/2 M
Therefore, if two machines can finish a job in 13 days, 2 Robos can finish the job in 13 days.

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