XAT 2023

Quant

49. Amit has forgotten his 4-digit locker key. He remembers that all the digits are positive integers and are different from each other. Moreover, the fourth digit is the smallest and the maximum value of the first digit is 3. Also, he recalls that if he divides the second digit by the third digit, he gets the first digit.

How many different combinations does Amit have to try for unlocking the locker?

- A 2
 B 1
 C 4
- **D** 5
- **E** 3
- **50.** Suppose Haruka has a special key riangle in her caculator called delta ke:

Rule 1: If the display shows a one-digit number, pressing delta key \triangle replace the displayed number with twice its value.

Rule 2: If the display shows a two-digits number, pressing delta key \triangle replace the displayed number with the number sum of two digits.

Suppose Haruka enters the valie 1 and then presses delta key \triangle repeated. After pressing the key for 68 times, what will be the displayed number?

- **A** 7
- **B** 4
- **C** 10
- **D** 2
- **E** 8

- 51. Five students appeared for an examination. The average mark obtained by these five students is 40. The maximum mark of the examination is 100, and each of the five students scored more than 10 marks. However, none of them scored exactly 40 marks. Based on the information given, which of the following MUST BE true?
 - A At least, three of them scored a maximum of 40 marks
 - B At least, three of them scored more than 40 marks
 - C At least, one of them scored exactly 41 marks
 - D At most, two of them scored more than 40 marks
 - E At least, one of them scored less than 40 marks
- **52.** A painter draws 64 equal squares of 1 square inch on a square canvas measuring 64 square inches. She chooses two squares (1 square inch each) randomly and then paints them. What is the probability that two painted squares have a common side?
 - **A** $\frac{112}{2016}$ **B** $\frac{1}{3}$ **C** $\frac{512}{100034}$ **D** $\frac{3}{97}$ **E** $\frac{7}{108}$
- **53.** The addition of 7 distinct positive integers is 1740. What is the largest possible "greatest common divisor" of these 7 distinct positive integers?
 - **A** 42
 - **B** 60
 - **C** 74
 - **D** 140
 - E None of the above.
- 54. The problem below consists of a question and two statements numbered

1 & 2.

You have to decide whether the data provided in the statements are sufficient to answer the question.

In a cricket match, three slip fielders are positioned on a straight line. The distance between 1st slip and 2nd slip is the same as the distance between 2nd slip and the 3rd slip. The player X, who is not on the same line of slip fielders, throws a ball to the 3rd slip and the ball takes 5 seconds to reach the player at the 3rd slip. If he had thrown the ball at the same speed to the 1st slip or to the 2nd slip, it would have taken 3 seconds or 4 seconds, respectively. What is the distance between the 2nd slip and the player X?

1. The ball travels at a speed of 3.6 km/hour.

2. The distance between the 1st slip and the 3rd slip is 2 meters.

- A Statement 1 alone is sufficient to answer the question, but statement 2 alone is not sufficient.
- **B** Statement 2 alone is sufficient to answer the question, but statement 1 alone is not sufficien
- C Each statement alone is sufficient
- D Both statements together are sufficient, but neither of them alone is sufficient
- E Statements 1 & 2 together are not sufficient

55. Find the value of

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\frac{\sin^{6} 15^{\circ} + \sin^{6} 75^{\circ} + 6 \sin^{2} 15^{\circ} \sin^{2} 75^{\circ}}{\sin^{4} 15^{\circ} + \sin^{4} 75^{\circ} + 5 \sin^{2} 15^{\circ} \sin^{2} 75^{\circ}}
A \sin 15^{\circ} + \sin 75^{\circ}
B \frac{6}{5}
C 1
D \sin 15^{\circ} \cos 15^{\circ}
E None of the above
```

56. The problem below consists of a question and two statements numbered

1 & 2.

You have to decide whether the data provided in the statements are sufficient to answer the question.

Rahim is riding upstream on a boat, from point A to B, at a constant speed. The distance from A to B is 30 km. One minute after Rahim leaves from point A, a speedboat starts from point A to go to point B. It crosses Rahim's boat after 4 minutes. If the speed of the speedboat is constant from A to B, what is Rahim's speed in still water?

1. The speed of the speedboat in still water is 30 km/hour.

2. Rahim takes three hours to reach point B from point A.

- A Statement 1 alone is sufficient to answer the question, but statement 2 alone is not sufficient
- **B** Statement 2 alone is sufficient to answer the question, but statement 1 alone is not sufficient
- C Each statement alone is sufficient
- D Both statements together are sufficient, but neither of them alone is sufficient
- E Statements 1 & 2 together are not sufficient
- **57.** The Guava club has won 40% of their football matches in the Apple Cup that they have played so far. If they play another n matches and win all of them, their winning percentage will improve to 50. Further, if they play 15 more matches and win all of them, their winning percentage will improve from 50 to 60. How many matches has the Guava club played in the Apple Cup so far? In the Apple Cup matches, there are only two possible outcomes, win or loss; draw is not possible.
 - **A** 50
 - **B** 40

C 30

D Cannot be determined, as the value of n is not given

E 60

58. ABC is a triangle with BC=5. D is the foot of the perpendicular from A on BC. E is a point on CD such that BE=3. The value of $AB^2 - AE^2 + 6CD$ is:

A 5B 10

- **C** 14
- **D** 18
- **E** 21
- **59.** Jose borrowed some money from his friend at simple interest rate of 10% and invested the entire amount in stocks. At the end of the first year, he repaid 1/5th of the principal amount. At the end of the second year, he repaid half of the remaining principal amount. At the end of third year, he repaid the entire remaining principal amount. At the end of the last three years' interest amount. As there was no principal amount left, his friend did not charge any interest in the fourth year. At the end of fourth year, he sold out all his stocks. Later, he calculated that he gained Rs. 97500 after paying principal and interest amounts to his friend. If his invested amount in the stocks became double at the end of the fourth year, how much money did he borrow from his friend?
 - **A** 250000
 - **B** 200000
 - **C** 150000
 - **D** 125000
 - E None of the above
- **60.** Separately, Jack and Sristi invested the same amount of money in a stock market. Jack's invested amount kept getting reduced by 50% every month. Sristi's investment also reduced every month, but in an arithmetic progression with a common difference of Rs. 15000. They both withdrew their respective amounts at the end of the sixth month. They observed that if they had withdrawn their respective amounts at the end of the ratio of their amounts would have been the same as the ratio after the sixth month. What amount of money was invested by Jack in the stock market?
 - **A** Rs. 100000
 - **B** Rs. 120000
 - **C** Rs. 150000
 - **D** Rs. 180000
 - E None of the above

- **61.** Rajnish bought an item at 25% discount on the printed price. He sold it at 10% discount on the printed price. What is his profit in percentage?
 - **A** 10
 - **B** 15
 - **C** 17.5
 - **D** 20
 - E None of the above

62. Given A = |x+3| + |x-2| - |2x-8|. The maximum value of |A| is:

- **A** 111
- **B** 9
- **C** 6
- **D** 3
- E ∞
- **63.** ABC is a triangle and the coordinates of A, B and C are (a, b-2c), (a, b+4c) and (-2a,3c) respectively where a, b and c are positive numbers.

The area of the triangle ABC is:

- A 6abc
- **B** 9abc
- C 6bc
- D 9ac
- E None of the above
- **64.** Let x and y be two positive integers and p be a prime number. If x(x p) y(y + p) = 7p, what will be the minimum value of x y?
 - **A** 1
 - **B** 3
 - **C** 5
 - **D** 7
 - E None of the above

65. Consider $a_{n+1} = \frac{1}{1+\frac{1}{a_n}}$ for n = 1, 2,, 2008, 2009 where $a_1 = 1$. Find the value of $a_1a_2 + a_2a_3 + a_3a_4 + ... + a_{2008}a_{2009}$.

- **A** $\frac{2009}{1000}$ **B** $\frac{2009}{2008}$ **C** 2008
- **C** $\frac{2008}{2009}$
- **D** $\frac{6000}{2009}$
- E $\frac{2008}{6000}$
- **66.** A non-flying ant wants to travel from the bottom corner to the diagonally opposite top corner of a cubical room. The side of the room is 2 meters. What will be the minimum distance that the ant needs to travel?
 - A 6 meters
 - **B** $(2\sqrt{2}+2)$ meters
 - **C** $2\sqrt{3}$ meters
 - **D** $2\sqrt{6}$ meters
 - E $2\sqrt{5}$ meters
- **67.** Raju and Sarita play a number game. First, each one of them chooses a positive integer independently. Separately, they both multiply their chosen integers by 2, and then subtract 20 from their resultant numbers. Now, each of them has a new number. Then, they divide their respective new numbers by 5. Finally, they added their results and found that the sum is 16. What can be the maximum possible difference between the positive integers chosen by Raju and Sarita?
 - **A** 67
 - **B** 58
 - **C** 49
 - **D** 40
 - E None of the above
- **68.** ABCD is a trapezoid where BC is parallel to AD and perpendicular to AB. Kindly note that BC< AD. Pis a point on AD such that CPD is an equilateral triangle. Q is a point on BC such that AQ is parallel to PC. If the area of the triangle CPD is $4\sqrt{3}$, find the area of the triangle ABQ.
 - A $2\sqrt{3}$
 - B $4\sqrt{3}$
 - **C** 4
 - D $8\sqrt{3}$

- E None of the above
- **69.** A small jar contained water, lime and sugar in the ratio of 90:7:3. A glass contained only water and sugar in it. Contents of both (small jar and glass) were mixed in a bigger jar and the ratio of contents in the bigger jar was 85:5:10 (water, lime and sugar respectively). Find the percentage of water in the bigger jar?
 - **A** 70
 - **B** 75
 - **C** 80
 - **D** 72.5
 - **E** 85
- 70. There are three sections in a question paper and each section has 10 questions. First section only has multiple-choice questions, and 2 marks will be awarded for each correct answer. For each wrong answer, 0.5 marks will be deducted. Any unattempted question in this section will be treated as a wrong answer. Each question in the second section carries 3 marks, whereas each question in the third section carries 5 marks. For any wrong answer or un-attempted question in the second and third sections, no marks will be deducted. A student's score is the addition of marks obtained in all the three sections. What is the sixth highest possible score?
 - **A** 92.5
 - **B** 94
 - **C** 95.5
 - **D** 95
 - E None of the above

Instructions [71 - 73]

Go through the information given below, and answer the THREE questions that follow.Comprehension:The three graphs below capture relationship between economic (and social) activities and subjective well-being. The first graph (Graph-1) captures relationship between GDP (percapita) and Satisfaction with life, across different countries and four islands: Gizo, Roviana, Niijhum Dwip, and Chittagong. The Graph-2 captures three different measures of subjective well-being (Satisfaction with life, Affect Balance and Momentary Affect) across the four islands, which have different levels monetization (Index). The Graph-3 captures levels of thirteen different socio-economic activities across four islands.



71. Which of the following will BEST capture the relationship between GDP (x-axis) and Life Satisfaction (y-axis) of countries?

$$A \quad y = x$$

B
$$y = x^2$$

c $y = \log(x)$

D
$$y = \frac{1}{x^2}$$

 $\mathbf{E} \quad y = e^x$

72. Which of the following, about the four islands, can be BEST inferred from the graphs?

A Whenever affect balance increases, satisfaction with life decreases

- B Whenever Pleasant activities increase, satisfaction with life decreases
- C Whenever Religion increases, satisfaction with life decreases
- D Whenever satisfaction with life increases, family also increases
- E Index of monetization varies maximum in Niijhum Dwip

73. Which of the following site has the highest fishing to economic ratio?

- A Gizo
- B Chittagong
- **C** Roviana
- D Niijhum Dwip
- E All four islands have equal dependence

Instructions [74 - 76]

Go through the information given below, and answer the THREE questions that follow.

Comprehension:

The table captures Age and Gender distribution of Covid Positive Cases in a country. However, a part of data is missing, represented through unknown categories.

| | | | Gender | | |
|-----|---------|---|--------|--------|---------|
| | | Total Confirmed Covid Positive Cases | Female | Male | unknown |
| | All | 117,586* | 62,434 | 53,825 | 1,327 |
| | Unknown | 235 | | | |
| | 0-18 | 22,362 | 11,147 | 10,880 | |
| | 19-30 | 32,860 | 18,768 | 13,743 | |
| 1 | 31-40 | 24,110 | 12,693 | 11,118 | |
| Age | 41-50 | 14,120 | 7,264 | 6,688 | |
| | 51-60 | 11,174 | 5,567 | 5,523 | |
| | 61-70 | 7,300 | 3,756 | 3,513 | |
| | 71-80 | 3,429 | 1,875 | 1,534 | |
| | 81+ | 1,996 | 1,276 | 708 | |

*Includes <5 cases in age group 19-30 and 51 -60 who reported gender as Other/Transgender. * In unknown age category, the ratio of males (unknown age category) and females (unknown age catego1y) to total unknown cases (unknown age category) is same as the ratio of males (All) and females (All) to the total (Total Confirmed Covid Positive Cases).

- **74.** In unknown age category, the ratio of males (unknown age category) and females (unknown age category) to total unknown cases (unknown age category) is same as the ratio of males (All) and females (All) to the total (total confirmed covid positive cases). How many females were in the unknown age category (rounded to nearest integer)?
 - **A** 120
 - **B** 140
 - **C** 110

- **D** 125
- **E** 130

75. In which age category, the percentage of female covid patients is the HIGHEST?

- **A** 61-70
- **B** 31-40
- **C** 41-50
- **D** 51-60
- **E** 81+
- 76. Which of the following is true for "unknown gender Category"?

1. Unknown age group patients are less likely (percentage term) to provide information about gender than any other age category

2. Between 31 and 80, when age increases patients, in percentage terms, are less likely to provide information about gender

3. Elderly (81+) category patients are more likely to give information about gender than 0-18 age group

- A 3 only
- B 2 only
- **C** 1 and 2
- **D** 1 and 3
- **E** 2 and 3

Mock Keyboard Testing

Instructions [77]

Mock Keyboard Testing

77. Please type following sentence and symbols"The quick brown fox jumps over the lazy dog."

'(?,!;%:/)'

Answers

Quant

| 49. E | 50. A | 51. E | 52. A | 53. B | 54. A | 55. C | 56. D |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 57. A | 58. E | 59. D | 60. A | 61. D | 62. B | 63. D | 64. E |
| 65. C | 66. E | 67. B | 68. A | 69. E | 70. B | 71. C | 72. E |
| 73. C | 74. D | 75. E | 76. D | | | | |

Mock Keyboard Testing

77.**e**

Explanations

49.**E**

Let the 4-digit locker key be abcd , where $9 \geq \ a, b, c, d > 0$, and they are all unique. It is given that $a \leq \ 3 \ \& \ rac{b}{c} = a$ It is also given that 'd' is the smallest number. Case (i): a = 1Not possible, as 'd' is the smallest number, 'a' cannot be 1. Case (ii): a=2Then 'd' can take only one value, i.e. d = 1b = 2cif c = 3, then b = 6if c = 4, then b = 8for $c\geq~5$, 'b' will not be a single-digit number. Hence, two cases are possible, i.e. (2631, 2841). Case (iii): a = 3'd' can take two values, i.e. $d=1 \ or \ d=2$ b = 3cIf d = 1, then 'c' can take only one value. i.e. $\, c=2, \; then \; b=6$ If d = 2, then 'c' cannot take any value. Hence one case is possible, i.e. (3621) Amit has to try 3 different combinations. Option (E) is correct.

50.**A**

The first number Haruka entered is 1. From Rule-1, the series will be 2, 4, 8, 16 From Rule 2, 16 will be followed by 7 Like-wise, the series will be 1, 2, 4, 8, 16, 7, 14, 5, 10, 1, 2, 4,..... The series is repeating itself for every 9 iterations. Initially, input is 1 and after first iteration, result is 2. This implies,

9n = 1

9n + 1 = 2

```
.
.
9n + 7 = 5
9n + 8 = 10
In the question, it is given that key is pressed 68 times.
68 = 9(7) + 5
68 is in the form of 9n + 5
This implies, 7 is the output.
The answer is option A.
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51.**E**

Option A) False, as it is mentioned no-one scored exactly 40 marks.

Option B) False, as only 1 student or only 2 students can score above 40 and group average can be 40.

Case i:- 44, 39, 39, 39 & 39.

Case ii:- 42, 41, 39, 39 & 39.

Option C) False, student's scores could be 44, 39, 39, 39 & 39.

Option D) False, student's scores could be 44, 43, 42, 32 & 39.

Option E) True, if scores of all students are more than 40. The average will be more than 40.

52.**A**

From the given information, we get that it is $8\ inch imes\ 8\ inch$ square grid.

| | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 |
|----|----|----|----|----|----|----|----|----|
| R1 | | | | | | | | |
| R2 | | | | | | | | |
| R3 | | | | | | | | |
| R4 | | | | | | | | |
| R5 | | | | | | | | |
| R6 | | | | | | | | |
| R7 | | | | | | | | |
| R8 | | | | | | | | |

Total ways of selecting 2 squares out of 64 in ${}^{64}C_2$.

Two squares with a common side can be selected in the following ways.

(i) Horizontal Pairs.

In the first row, R1, we can select 7 pairs of squares with a common side.

They are (R1C1,R1C2), (R1C2,R1C3),.....(R1C7,R1C8).

It applies to other rows as well.

Hence the total number of squares = 7 imes~8=56

(ii) Vertical Pairs.

In the first column, C1, we can select 7 pairs of squares with a common side.

They are (R1C1,R2C1), (R2C1,R3C1),.....(R7C1,R8C1).

It applies to other columns as well.

Hence the total number of squares = 7 imes~8=56

The probability of two painted squares having a common side = $\frac{56+56}{64C_2} = \frac{112}{2016}$.

Option (A) is correct.

53.**B**

Let 'm' be the Greatest common divisor and A, B, C, D, E, F & G be the 7 unique numbers.

When 'm' divides A, B,& G, we get seven unique quotients. Let the quotients be a, b, c, d, e, f, and g.

lt is given,

A + B + C + D + E + F + G = 1740

m(a + b + c + d + e + f + g) = 1740

 $1740 = 2^2 imes 3 imes 5 imes 29$

m(a + b + c + d + e + f + g) = $1740 = 2^2 \times 3 \times 5 \times 29$

29 is a prime number and cannot be factorised further.

Therefore, largest possible value m can take is 60.

Least possible sum of 7 unique numbers is 1 + 2 + 3 +...+ 7 = 28

Replacing 7 with 8, we will get 29.

This implies 60(1 + 2 + 3+ 6 + 8) = 1740

Largest possible G.C.D is 60.

The answer is option B.

54.**A**

Let players at slips 1, 2 and 3 be a, b, and c, respectively.

Let the speed of the ball be m.

The trajectory of the ball is not specified in the question. But let's take it as straight line.



The distance between the 1st and 2nd slips is the same as the distance between the 2nd and 3rd slips.

The length of 'ab' = The length of 'bc'. It implies Xb is the median of triangle Xac.

It takes 3 sec, 4 sec and 5 sec for the ball to reach a, b and c, respectively.

Hence, Xa = 3m, Xb = 4m and Xc = 5m.

Using Apollonius's theorem,

$$egin{aligned} &2 imes \left((4m)^2+(ab)^2
ight)=(3m)^2+(5m)^2\ &16m^2+(ab)^2=17m^2\ &ab=m \end{aligned}$$

Hence, ac=2m

Using the properties of triangle, the sum of two sides should be greater than the third side,

But, Xa + ac = Xc

3m + 2m = 5m.

Hence, this arrangement is not possible.

As this question has ambiguity, XAT officials awarded full marks to all candidates for this question. 55. ${\bf C}$

Let $\sin^2 15^\circ = a$ and $\sin^2 75^\circ = b$

Then the given equation becomes,

 $\begin{array}{l} \frac{a^3+b^3+6ab}{a^2+b^2+5ab} \\ = \frac{(a+b)^3-3ab(a+b)+6ab}{(a+b)^2-2ab+5ab} \quad \therefore \ a^3+b^3 = (a+b)^3 - 3ab\,(a+b)\,, \ \therefore \ a^2+b^2 = (a+b)^2 - 2ab\, \\ \text{Using } \sin(\theta) \ = \cos(90-\theta \) \\ \text{we get, } \sin^2 75^\circ \ = \cos^2 15^\circ \\ \text{now, } a+b = \sin^2 15^\circ \ + \sin^2 75^\circ \ = \sin^2 15^\circ \ + \cos^2 15^\circ \ = 1. \\ \text{The equation becomes, } = \ \frac{1-3ab+6ab}{1-2ab+5ab} \ = \ \frac{1+3ab}{1+3ab} \ = 1 \end{array}$

56. **D**

Let 'a' and 'b' be the speeds of Rahim and the speed boat in still water, respectively

Let 'c' be the speed of the stream.

Speed boat starts after 1 minute of Rahim's departure and crosses him after 4 minutes.

It implies that the speed boat covered the same distance in 4 minutes that Rahim took 5 minutes.

Hence, the ratio of upstream speeds of Rahim and Speed boat = $\frac{a-c}{b-c} = \frac{4}{5}$

Using Statement 1, we get b=30~kmph. But, it's not sufficient to get the value of 'a'.

Using Statement 2, we get $a - c = \frac{30}{3} = 10 \ kmph$. But it's also not sufficient to get the value of 'a'. using both statements, we get

$$\frac{a-c}{b-c} = \frac{4}{5}$$

$$\frac{10}{30-c} = \frac{4}{5}$$

$$50 = 120 - 4c$$

$$c = 17.5$$

$$a = 17.5 + 10 = 27.5 \ kmph$$

57.**A**

Let 'm' be the number of matches Guava played till now. They won '0.4m' matches.

After playing another 'n' matches and wining all of them, their winning percentage will improve to 50.

i.e,

 $rac{0.4m+n}{m+n}=0.5$

m = 5n

Playing 15 more matches and wining all of them, their winning percentage will improve from 50 to 60.

i.e $rac{0.4m+n+15}{m+n+15}=0.6$ Solving, we get 6+0.4n~=~0.2m

Substituting m=5n,

we get $6+0.4n\ =\ n$

 $n = 10 \ \& \ m \ = 50$

Hence, Guava club played 50 matches so far.

The answer is option A. 58. **E**

Given that, $AD \bot \ BC$

$$BE = 3$$

 $BC = 5$



Using Pythagoras' theorem,

$$AD^{2} + BD^{2} = AB^{2} \dots (1)$$

$$AD^{2} + DE^{2} = AE^{2} \dots (2)$$

$$AD^{2} + DC^{2} = AC^{2} \dots (3)$$
(1) - (2) gives
$$BD^{2} + DE^{2} = AB^{2} - AE^{2}$$

$$x^{2} - (3 - x)^{2} = AB^{2} - AE^{2}$$

$$AB^{2} - AE^{2} = 6x - 9$$

$$AB^{2} - AE^{2} + 6CD = 6x - 9 + 6(5 - x) \quad (CD = (5 - x))$$

$$AB^{2} - AE^{2} + 6CD = 6x - 9 + 30 - 6x$$

$$AB^{2} - AE^{2} + 6CD = 21$$

59.**D**

Let the amount Jose borrowed be 'x'. The rate of interest is 10%

Interest occurred on 'x' is =
$$\frac{x \times 1 \times 0.1}{5} + \frac{2x \times 2 \times 0.1}{5} + \frac{2x \times 3 \times 0.1}{5}$$

= $\frac{1.1x}{5}$

The invested amount doubled at the end of the fourth year, i.e. 2x.

Jose's profit after paying principal and interest amounts to his friend at the end of the fourth year is Rs 97500.

i.e.,
$$2x - x - \frac{1.1x}{5} = 97500$$

 $\frac{3.9x}{5} = 97500$

x = 125000

The amount that Jose borrowed is Rs 1,25,000.

Option (D) is correct.

60.**A**

Let the amount invested by Jack and Sristi be 'x'.

Jack's amount after four months will become $\frac{x}{2^4}$ and after six months it will become $\frac{x}{2^6}$.

Sristi's amount after four months will become x-(4 imes 15000) and after six months it will become x-(6 imes 15000)

From the given information,

 $\frac{\frac{x}{2^4}}{x - (4 \times 15000)} = \frac{\frac{x}{2^6}}{x - (6 \times 15000)}$ (x - (4 × 15000)) × 2² = x - (6 × 15000) 3x = 300000

x = 100000.

The amount invested by Jack and Sristi is 100000.

Option 'A' is correct.

61.**D**

Let printed price be 100.

Rajnish bought it at 25% discount, C.P of Rajnish = 75% of 100 = 75. He sold it at 10% discount on printed price, S.P of Rajnish = 90% of 100 = 90 Hence, Rajnish, profit% = $\frac{90-75}{75} \times 100 = 20$. The answer is option D. 62. **B** Given equation, A = |x + 3| + |x - 2| - |2x - 8|. Case (i):- $x + 3 \ge 0$, $x - 2 \ge 0$ & $2x - 8 \ge 0$ then, A = x + 3 + x - 2 - 2x + 8 = 9.

The maximum value of |A| = 9

Case (ii):- $x + 3 \ge 0, \ x - 2 \ge 0 \ \& \ 2x - 8 < 0$

 $x > -3, \ x > \ 2 \ \& \ x < 4$

then A = x + 3 + x - 2 + 2x - 8 = 4x - 7.

The range of x is [2,4). Hence the value of A varies from [1,9).

The maximum value of |A| < 9

Case (iii):- $x + 3 \ge 0, \ x - 2 < 0 \ \& \ 2x - 8 < 0$

 $x \geq -3, \ x < 2 \ \& \ x < 4$

then A = x + 3 - x + 2 + 2x - 8 = 2x - 3.

The range of x is [-3, 2). Hence the value of A varies from [-9,1).

The maximum value of |A| = 9

Case (iv):- $x + 3 < 0, \ x - 2 < 0 \ \& \ 2x - 8 < 0$

 $x < \ 3, \ x < 2 \ \& \ x < 4$ then A = -x - 3 - x + 2 + 2x - 8 = -9.

The maximum value of |A| = 9

From the above cases, The maximum value of |A| = 9. Option (B) is correct. 63. **D**



The length of AB =
$$(b+4c)-(b-2c)=6c\,$$
 (X-coordinates of A&B are same).

The altitude of triangle ABC, CD = a-(-2a)=3a.
Area of triangle ABC =
$$\frac{AB \times CD}{2}$$
 = $\frac{6c \times 3a}{2} = 9ac$
Option (D) is correct.

64.**E**

The given equation is,

$$x (x - p) - y (y + p) = 7p$$

$$x^{2} - px - y^{2} - py = 7p$$

$$x^{2} - y^{2} - px - py = 7p$$

$$(x + y) (x - y) - p (x + y) = 7p$$

$$(x - y - p) (x + y) = 7p$$
As '7' & 'p' both are prime numbers
$$(x - y - p) (x + y) \text{ can be expressed as } (7 \times p) \text{ or } (7p \times 1)$$
Case (i) - $(x + y) \times (x - y - p) = 7 \times p$

$$x + y + x - y - p = 7 + p$$

$$2x - p = 7 + p$$

$$x = \frac{7}{2} + p$$

But it's given that $\ensuremath{\mathsf{'x'}}$ is a positive integer. This case is not possible.

Case (ii) -
$$(x+y)$$
 $imes$ $(x-y-p)=7p$ $imes$ 1
 $x+y+x-y-p=7p+1$
 $2x-p=7p+1$
 $x=rac{1}{2}+4p$

But it's given that 'x' is a positive integer. This case is not possible.

The given equation is not possible with given conditions.

Option (E) is correct. 65. **C** Given that $a_1 = 1 \& a_{n+1} = \frac{1}{1 + \frac{1}{a_n}}$ $a_2 = \frac{1}{1 + \frac{1}{1}} = \frac{1}{2}, a_3 = \frac{1}{1 + \frac{1}{(\frac{1}{2})}} = \frac{1}{3}, \dots$ This implies, $a_n = \frac{1}{n}$. Required value= $a_1a_2 + a_2a_3 + \dots + a_{2008}a_{2009}$ $= \frac{1}{1} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{3} + \dots + \frac{1}{2008} \times \frac{1}{2009}$ $= (\frac{1}{1} - \frac{1}{2}) + (\frac{1}{2} - \frac{1}{3}) + \dots + (\frac{1}{2008} - \frac{1}{2009})$ $= 1 - \frac{1}{2009}$ $= \frac{2008}{2009}$ The answer is option C.

66. **E**

The shortest route ant takes to travel from the bottom corner to the diagonally opposite top corner is shown below.

The route goes through lateral faces (vertical faces) of the cubical room.



The length of route, r = $\sqrt{\left(2+2
ight)^2+2^2}$ = $\sqrt{20}$ = $2\sqrt{5}$

67.**B**

Let the positive integers Raju & Sarita chose be 'r' & 's'.

After doing the given operations, the final numbers they get are $rac{2r-20}{5}$ & $rac{2s-20}{5}$

Adding results we get,
$$\frac{2r-20}{5} + \frac{2s-20}{5} = 16$$

 $2r - 20 + 2s - 20 = 80$
 $2r + 2s = 80 + 40 + 40 = 120$
 $r + s = 60$

For maximum value of |r-s|, one of 'r' & 's' has to be maximum and other has to be minimum.

As r & s are positive integers minimum value they can take is "1".

If
$$r = 1$$
, then $s = 59$
 $|r - s| = |1 - 59| = 58$
If $s = 1$, then $r = 59$
 $|r - s| = |59 - 1| = 58$

Hence maximum value of |r-s| is 58. Option B is correct.

68.**A**

Given that, CPD is an equilateral triangle



The ratio of contents in the bigger jar was 85:5:10 (water, lime and sugar respectively).

Let volume of water be 85x

Percentage of water in bigger jar = $~{85x\over 85x+5x+10x} imes 100$ = 85%

Option E is correct.

70.**B**

From the given information we get the following table,

| | Section A | Section B | Section C |
|--------------------------------------|-----------|-----------|-----------|
| Total Questions | 10 | 10 | 10 |
| Marks for correct answers | 2 | 3 | 5 |
| Deduction for wrong answers | -0.5 | 0 | 0 |
| Deduction for Unattempted answers | -0.5 | 0 | 0 |

The possible maximum marks are shown below.

| S.No | Marks | Case | Explanation |
|------|-------|---|------------------------|
| 1 | 100 | All answers are correct | 10x2+10x3+10x5=100 |
| 2 | 97.5 | one answer in Sec-A is wrong. | 9x2+10x3+10x5-0.5=97.5 |
| 3 | 97 | one answer in Sec-B is wrong. | 10x2+9x3+10x5=97 |
| 4 | 95 | one answer in Sec-C is wrong. | 10x2+10x3+9x5=95 |
| 5 | 94.5 | one answer is wrong in each section A & B. | 9x2+9x3+10x5-0.5=94.5 |
| 6 | 94 | Two answers in Sec-C are wrong. | 10x2+8x3+10x5=94 |

Therefore, sixth highest possible score is 94.

Option B is correct.

71.**C**

From the graph, we can say that the graph is similar to y=log(x).

y = log(x) graph is given below-



The correct option is C

72.**E**

We will check the options and figure out which option is more suitable.

Option A is not correct since it is not evident from the figure that there is a direct correlation between life satisfaction and affect balance.

Options B, C, and D are not correct since we cannot definitely conclude the correlation between the two mentioned factors.

Option E is correct because from the figure, and the fish selling distribution we can conclude the randomness than the others.

The correct option is E

73.**C**

In this case, we need to calculate for which state (fish/economic) is the maximum. To get the answer, we need to check the maximum fish-selling state and the corresponding economic status.

From the figure, we can say that Roviana has the maximum ratio.

74. **D**

| | | | Gender | | | |
|-----|---------|---|--------|-------|---------|--|
| | | Total confirmed Covid positive cases | Female | Male | Unknown | |
| Age | All | 117586 | 62434 | 53825 | 1327 | |
| | Unknown | 235 | 88 | 118 | 29 | |
| | 0-18 | 22362 | 11147 | 10880 | 335 | |
| | 19-30 | 32860 | 18768 | 13743 | 349 | |
| | 31-40 | 24110 | 12693 | 11118 | 299 | |
| | 41-50 | 14120 | 7264 | 6688 | 168 | |
| | 51-60 | 11174 | 5567 | 5523 | 84 | |
| | 61-70 | 7300 | 3756 | 3513 | 31 | |
| | 71-80 | 3429 | 1875 | 1534 | 20 | |
| | 81+ | 1996 | 1276 | 708 | 12 | |

We get the above table after filling in the data from the given question.

This question has ambiguity and was deleted.

75.**E**

| | | | Gender | | |
|-----|---------|---|--------|-------|---------|
| | | Total confirmed Covid positive cases | Female | Male | Unknown |
| Age | All | 117586 | 62434 | 53825 | 1327 |
| | Unknown | 235 | 88 | 118 | 29 |
| | 0-18 | 22362 | 11147 | 10880 | 335 |
| | 19-30 | 32860 | 18768 | 13743 | 349 |
| | 31-40 | 24110 | 12693 | 11118 | 299 |
| | 41-50 | 14120 | 7264 | 6688 | 168 |
| | 51-60 | 11174 | 5567 | 5523 | 84 |
| | 61-70 | 7300 | 3756 | 3513 | 31 |
| | 71-80 | 3429 | 1875 | 1534 | 20 |
| | 81+ | 1996 | 1276 | 708 | 12 |

From the given table, we can say that the 81+ age group has the highest female-to-male ratio. The correct option is E

76.**D**

...

| | | | Gender | | | | |
|-----|---------|---|--------|-------|---------|--|--|
| | | Total confirmed Covid positive cases | Female | Male | Unknown | | |
| Age | All | 117586 | 62434 | 53825 | 1327 | | |
| | Unknown | 235 | 88 | 118 | 29 | | |
| | 0-18 | 22362 | 11147 | 10880 | 335 | | |
| | 19-30 | 32860 | 18768 | 13743 | 349 | | |
| | 31-40 | 24110 | 12693 | 11118 | 299 | | |
| | 41-50 | 14120 | 7264 | 6688 | 168 | | |
| | 51-60 | 11174 | 5567 | 5523 | 84 | | |
| | 61-70 | 7300 | 3756 | 3513 | 31 | | |
| | 71-80 | 3429 | 1875 | 1534 | 20 | | |
| | 81+ | 1996 | 1276 | 708 | 12 | | |

This question was deleted for ambiguous phrasing.