# CLASS-10(X)

# MATHEMATICS

# CASE STUDY BASED QUESTIONS

# (BASED ON NEW QUESTION PAPER PATTERN)

# BASIC AND STANDARD
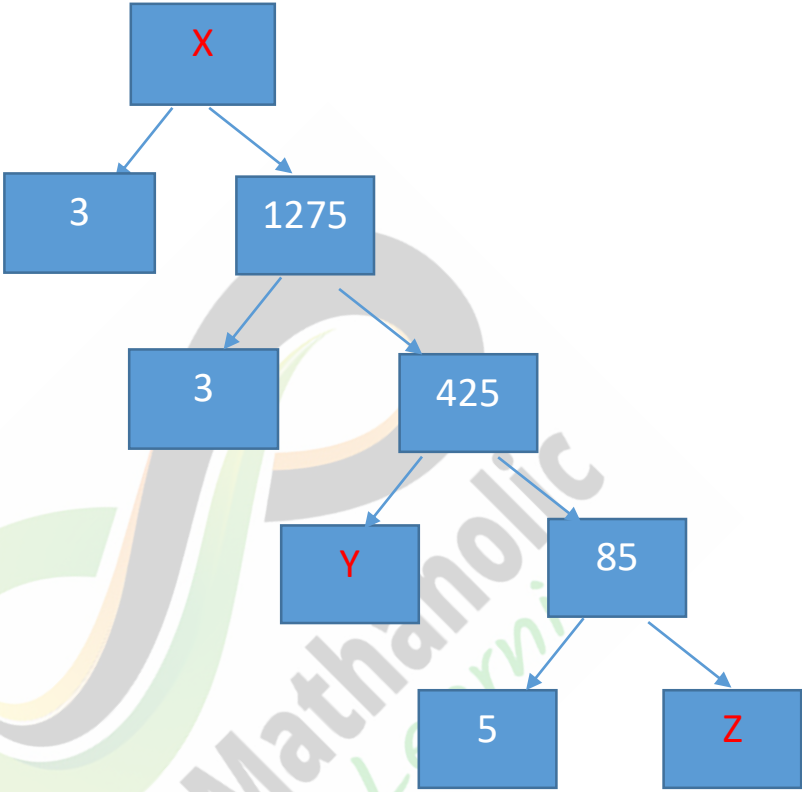
# 2020-21



**Be Mathaholic**
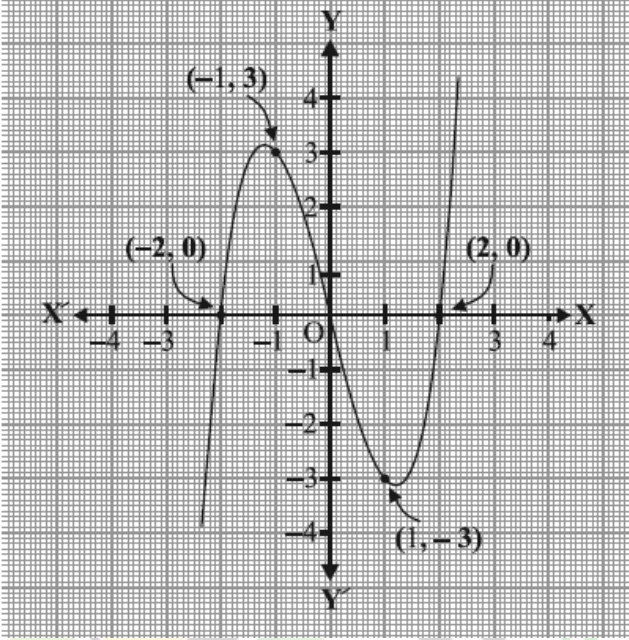*Easy Learning*

## BY SHIVANI KOTWAL

# CASE STUDY BASED QUESTIONS-X-2020-21

## Chapter-1 -Real Numbers

| 1 | Observe the factor tree below and answer the questions:- | |
|---|---|---|
| |  | |
| **i)** | What will be the value of X ?<br><br>a)8325　　　　　b)3825　　　c) 835　　　d) 3325 | **1** |
| **ii)** | What will be the value of Y ?<br>a)5　　　　　b)25　　　　c) 17　　　d) 3 | **1** |
| **iii)** | What will be the value of Z ?<br>a)3　　　　　b)17　　　c) 5　　d) 13 | **1** |

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# Chapter-2 –Polynomials

| 2 | Observe the graph $y = f(x)$ of a polynomial carefully and answer the following questions:- |  |
|---|---|---|
|  |  |  |
| **i)** | The number of zeroes of the polynomial $y = f(x)$ are ?<br><br>a) 2      b)3      c)4      d) 1 | **1** |
| **ii)** | The curve $y = f(x)$ represents a ………………….polynomial ?<br><br>a) Quadratic      b)linear      c)biquadratic      d) cubic | **1** |
| **iii)** | The coordinates where the curve intersects the x-axis are-<br>a)(2,0),(-2,0)      b) (2,0),(-2,0),(-1,3)<br>c) (2,0),(-2,0),(0,0)      d) (2,0),(-2,0),(1,-3) | **1** |

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# Chapter-2 –Polynomials

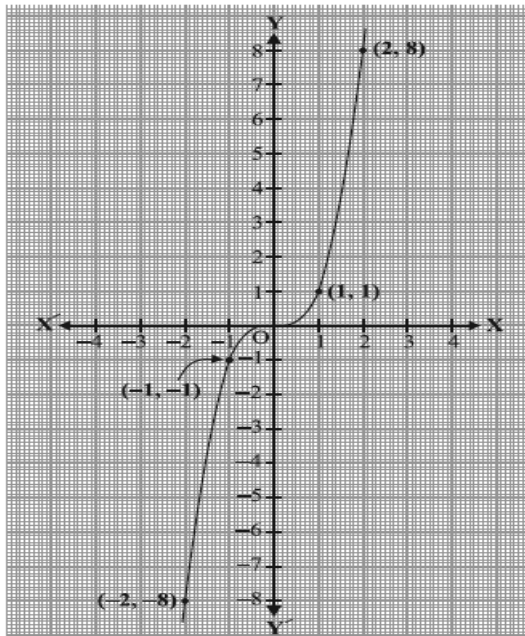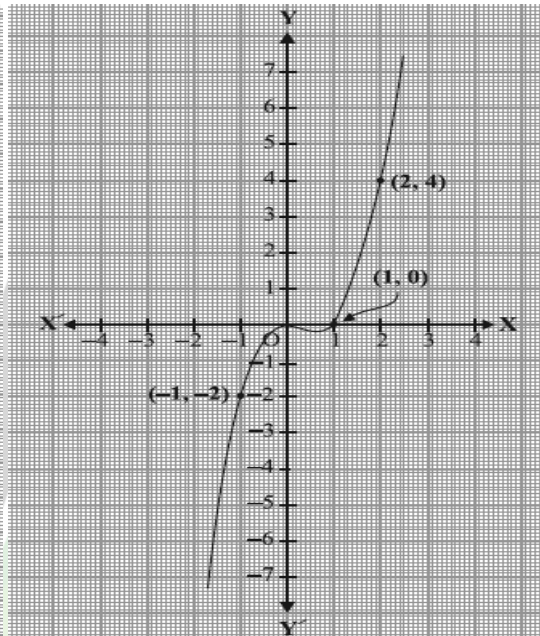| 3 | Observe the graphs $y = f(x)$ and $y = g(x)$ of a polynomial carefully and answer the following questions:- |  |
|---|---|---|
|  | FIGURE-A        FIGURE-B  |  |
| i) | The number of zeroes shown in the polynomial in Figure -A are ?<br>   a) 1        b)2           c) 0           d)3 | 1 |
| ii) | The number of zeroes shown in the polynomial in Figure -B are ?<br>a)2           b)1           c) 0           d) 3 | 1 |
| iii) | The graph in Figure-A represents the polynomial-<br>a) $y = x^2 + 2x + 3$        b) $y = x^3 + 3x + 2$<br>c) $y = x^3$        d) $y = x^3 - x$ | 1 |
| iv) | The graph in Figure-B represents the polynomial-<br>a) $y = x^2 + 2x + 3$        b) $y = x^3 + 3x + 2$<br>c) $y = x^3$        d) $y = x^3 - x^2$ | 1 |

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# Chapter-2 –Polynomials

| 4 |  | |
|---|---|---|
| | The figure shows a bridge with hanging wires showing a mathematical shape. Answer the questions given below- | |
| **i)** | Name the shape of the hanging wires ?<br>   a) Linear        b) Spiral             c) Parabola         d) Ellipse | **1** |
| **ii)** | What will be the expression of the polynomial shown in the figure ?<br>a) $y = ax + b$                                        b) $y = ax^2 + bx + c$<br>c) $y = ax^3 + bx^2 + cx + d$                       d)None of these | **1** |
| **iii)** | The hanging wires on the bridge is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial-<br> a) Intersects x-axis                          b) Intersects y-axis<br> c) Intersects y-axis or x-axis              d)None of the above | **1** |
| **iv)** | The representation of Hanging wires on the bridge whose sum of the zeroes is -3 and product of the zeroes is 5 is<br>a) $x^2 - 3x - 5$             b) $x^2 - 3x + 5$<br> c) $x^2 + 3x - 5$            d) $x^2 + 3x + 5$ | **1** |
| **v)** | Graph of a quadratic polynomial is -<br> a) straight line               b) circle    c)parabola          d)ellipse | **1** |

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# Chapter-5-Arithmetic Progression

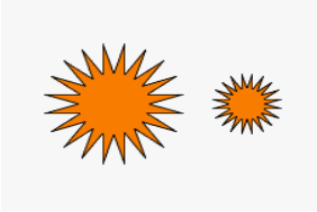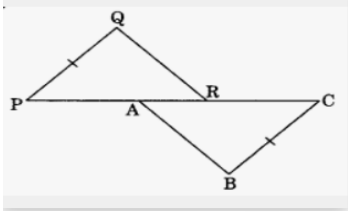| 5 |  | |
|---|---|---|
| | In a lemon race ,a bucket is placed at a starting point, which is 6m away from the first lemon and other lemons are placed 4 m apart from each other in a straight line. There are 10 lemons in a line. Riya starts from the bucket , picks up the nearest lemon ,runs back with it, drops it in the bucket ,runs back to pic the next lemon, runs to the bucket to drop it in and continues until all the lemons are in the bucket.<br>Now answer the following questions given below-: | |
| i) | The lemons are placed in a straight line depicts which part of sequence ?<br>a)Geometric        b) Arithmetic     c) Linear       d) Harmonic | 1 |
| ii) | The total distance covered by Riya is –<br>a)370 m        b)480 m       c)460 m        d)400m | 1 |
| iii) | The formula to find 'n' term of the Arithmetic sequence (Progression) is<br>a) $a_n = a - (n-1)d$           b) $a_n = a(n-1)d$<br><br>c) $a_n = a + (n-1)d$           d) $S_n = \dfrac{n}{2}(2a + (n-1)d)$ | 1 |
| iv) | The difference between the terms of arithmetic sequence is called as-<br>a) Common ratio       b) Common Difference<br>c) Common term       d) None of these | 1 |
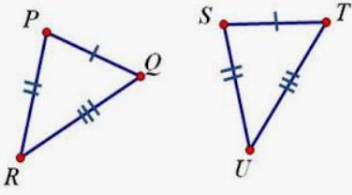
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# Chapter-5-Arithmetic Progression

| 6 | Figure shows playing cards stacked together in a following manner .  56 cards are stacked in this manner. 14 cards are in the bottom row,12 in the next row ,10 in the row next to it and so on. Based on the observation answer the questions below- | |
|---|---|---|
| i) | The total number of rows in which the cards are stacked – <br> a)7          b)6          c)8          d)9 | 1 |
| ii) | The number of cards in the top row is- <br> a)4     b)6     c)1     d)2 | 1 |
| iii) | The mathematical concept applied in solving the above problem is- <br> a)Linear equations          b) Probability <br> c) Arithmetic progression          d)   Coordinate geometry | 1 |

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# Chapter -6-Triangles

| 7 | Observe the below given figures carefully and answer the questions- | |
|---|---|---|
| | **Figure-A**　　　　　**Figure-B**　　　　　**Figure-C** | |
| | **Figure-D**　　　　　**Figure-E**　　　　　**Figure-F** | |
| **i)** | Which among the above shown figures are congruent figures ?<br>a)A and C　　　　b) E and F　　　　c) D and F　　　d) B and F | 1 |
| **ii)** | Tick the correct statement-<br>a) All similar figures are congruent.<br>b) All congruent figures are similar .<br>c) The criterian for similarity and congruency is same.<br>d) Similar figures have same size and shape. | 1 |
| **iii)** | If a line divides any two sides of the triangle in the same ratio,then the line is  parallel to the third side.The statement depicts which theorem-<br>a)Pythagorus　　　　　　　　b) Thales Theorem<br>c) Converse of Thales theorem　　　d)Converse of Pythagorus theorem. | 1 |
| **iv)** | Using the concept of similarity ,the height of the tree is | 1 |

a)  12 ft    b) 10 ft    c) 15 ft    d) 7 ft

| v) | The height of the tree ,when its shadow is 84 m long and at the same time a girl 2m high standing in the same straight line casts a shadow 12 m is   a)  14m    b) 24 m    c) 6m    d) 12 m | |
|---|---|---|
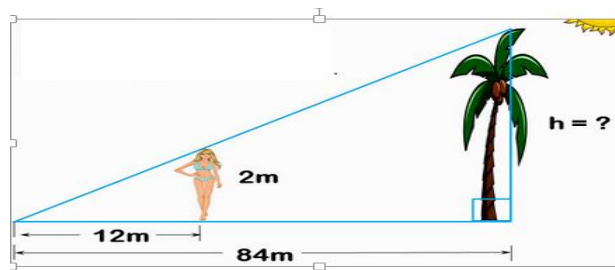
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# Chapter 7-Coordinate Geometry

| 8 | A City school is organizing Annual sports event in a rectangular shaped ground ABCD The tracks are being marked with a gap of I m each in the form of straight lines. 120 flower pots are placed with a distance of 1 m each along AD. Shruti runs $\frac{1}{3}rd$ of the distance in the second line along AD and post her flag. Saanvi runs $\frac{1}{5}rd$ the distance AD in the eighth line and posts her flag. <br><br>  | |
|---|---|---|
| i) | The distance between the two flags is- <br> a) $2\sqrt{73}$      b) $3\sqrt{73}$      c) $\sqrt{273}$      d) $\sqrt{73}$ | 1 |
| ii) | If Reena has to post the flag exactly halfway between the line segment joining the two flags, the coordinates where she should post her flag are- <br><br> a)$(2,40)$      b) $(2,30)$      c) $(5,32)$      d) $(10,64)$ | 1 |
| iii) | The coordinates where Shruti posts her flag are- <br> a) $(2,40)$      b) $(40,2)$      c) $(2,30)$      d) $(3,40)$ | 1 |
| iv) | The coordinates where Saanvi posts her flag are- <br> a)    $(3,40)$      b) $(24,8)$      c) $(5,32)$      d) $(8,24)$ | 1 |
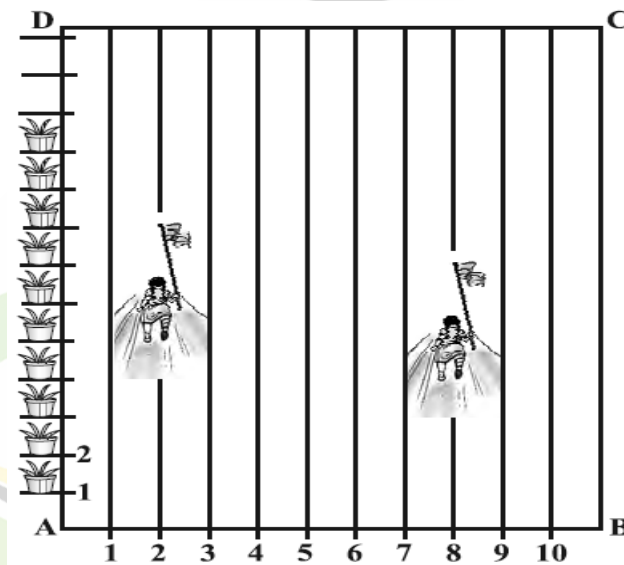
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| 9 | The Figure shown below is a depiction of a house forming some mathematical polygons   called a TANGRAM . The *tangram* is a dissection puzzle consisting of seven flat polygons, called tans, which are put together to form   shapes. It is a   simple  set of seven geometric shapes made up of five **triangles** (two small **triangles**, one medium **triangle**, and two large **triangles**), **a square**, and  a **parallelogram**. When the pieces are arranged together they suggest an amazing variety of forms, embodying many numerical   and geometric concepts.<br><br>Answer the below given questions<br><br> | |
|---|---|---|
| **i)** | Given two triangles (blue and yellow) as congruent triangles and the base and height  of the parallelogram as 8cm and 6cm , the area of the combined figure (house)  is-<br>a)525 sq.cm                 b) 300 sq.cm        c) 325 sq.cm        d) 400 sq.cm | 1 |
| **ii)** | The area of parallelogram is given by-<br>a) $\dfrac{1}{2} b \times h$                 b) $\dfrac{1}{2} b (h_1 + h_2)$    c) $a^2$        d) $b \times h$ | 1 |

| 10 | A mathematical model of a farmhouse is framed.The base ABCD is a square.The beams that supports the roof are the edges of a rectangular prism EFGHKLMN.Point E is the midpoint of AT,F is the midpoint of BT similarly G and H denotes the midpoint of CT and DT.The edges of the pyramid are of length 12 cm. | |
| --- | --- | --- |
| |  | |
| i) | What is the length of FG , where FG is one of the horizontal edges of the block-<br>    a) 12m                b) 24 m                c) 6 m                d) 10 m | 1 |
| ii) | The area of the triangular faces is-<br>a) $36\sqrt{3}m^2$        b) $72\sqrt{3}m^2$        c) $108\sqrt{3}m^2$        d) $100\sqrt{3}m^2$ | 1 |
| iii) | The length of the diagonal drawn on the square base is –<br>a)$12\sqrt{2}m$        b) $10\sqrt{2}m$        c) $288m$    d) $144m$ | |
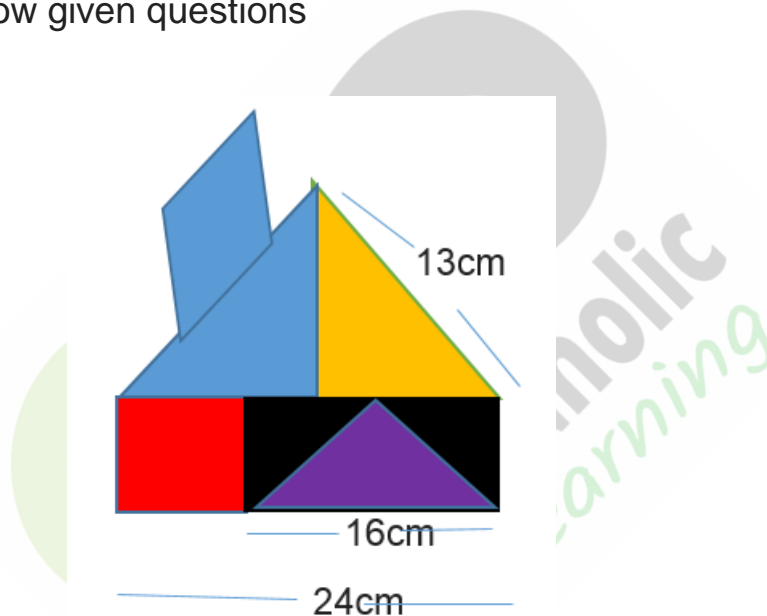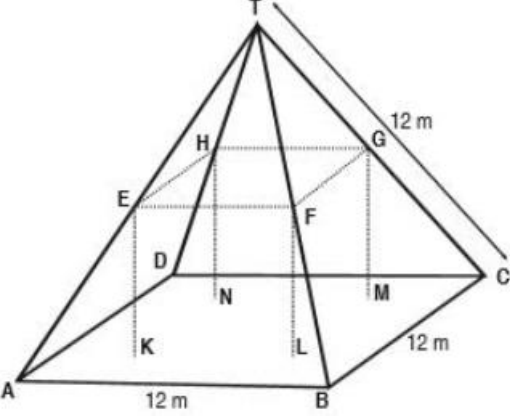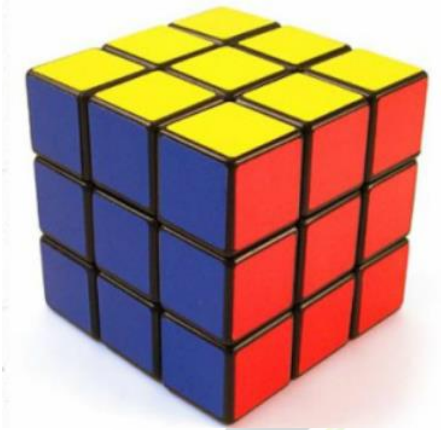
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# Chapter -13-Surface Area and Volumes

| | | |
|---|---|---|
| **11** | Observe the figure and answer the questions-: <br><br>  | |
| **i)** | Name the shape of the figure shown above ? <br> a)Cube     b) Cuboid        c) Square      d) Sphere | **1** |
| **ii)** | The length of the diagonal if each edge measures 6cm is <br> a) $3\sqrt{3}$      b) $3\sqrt{6}$      c) $\sqrt{12}$      d) $6\sqrt{3}$ | **1** |
| **iii)** | Volume of the solid figure if the length of the edge is 7cm is- <br> a)256 cu.cm     b)196 cu.cm      c) 343 cu.cm      d)434 cu.cm | **1** |

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| 12 |  | |
|---|---|---|
| | The Great **Stupa** at **Sanchi** is one of the oldest stone structures in India, and an important monument of Indian Architecture. It was originally commissioned by the emperor Ashoka in the 3rd century BCE. Its nucleus was a simple hemispherical brick structure built over the relics of the Buddha. .It Is a perfect example of combination of solid figures. A big hemispherical dome with a cuboidal structure mounted on it. | |
| **i)** | Calculate the volume of the hemispherical dome if the height of the dome is 21 m – (Take $\pi = \dfrac{22}{7}$) <br> a) 19404 cu. m    b)2000 cu .m    c) 15000 cu. m    d) 19000 cu. m | **1** |
| **ii)** | The formula to find the Volume of Sphere is- <br> a) $\dfrac{2}{3}\pi r^{3}$    b) $\dfrac{4}{3}\pi r^{3}$    c) $4\pi r^{2}$    d) $2\pi r^{2}$ | **1** |
| **iii)** | The cloth require to cover the hemispherical dome if the radius of its base is 14m is (Take $\pi = \dfrac{22}{7}$ )- <br> a) 1222 sq .m    b)1232 sq m    c) 1200 sq. m    d) 1400 sq.m | **1** |
| **iv)** | The total surface area of the combined figure i.e. hemispherical dome with radius 14m and cuboidal shaped top with dimensions 8m x 6m x 4m is- <br> a)1200 sq. m    b)1232 sq. m    c) 1392 sq.m    d) 1932 sq. m | **1** |

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## Chapter-14-Statistics

| 13 | A 100 m Race was organized in a school sports meet. The time was recorded with the help of a stopwatch. | |
|---|---|---|
| | A table shown below describes the time in which the race was finished by the number of students - | |

| Time (in sec.) | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|---|---|---|---|---|---|
| No. of students | 6 | 13 | 10 | 3 | 8 |

Based on the above data answer the questions-:

| i) | What will be the lower limit of the modal class ? <br> a)30     b) 40     c) 60     d) 20 | 1 |
|---|---|---|
| ii) | The average time taken by the student to finish the race is – <br> a)40     b)47     c) 50     d)30 | 1 |
| iii) | The cumulative frequency table is constructed to determine- <br> a)Mean     b)Mode     c) Median     d)All of the above | 1 |
| iv) | How many students finished the race within 1 minute- <br> a)30     b) 40     c)19     d)29 | 1 |

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# Chapter-15-Probability

| 14 | A die is numbered in such a way that its faces show the numbers 1,3,3,4,2,6. It is thrown twice and the product of the score is noted. Complete the table and answer the questions below |  |
|---|---|---|

**Number in the first column**

**Number in the first Row**

| × | 1 | 3 | 3 | 4 | 2 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1 | 3 | 3 | 4 | 2 | 6 |
| 2 |  |  |  |  |  |  |
| 3 | 3 |  | 9 |  |  |  |
| 4 |  |  |  |  |  |  |
| 6 |  | 18 |  |  | 12 |  |
| 5 |  |  |  |  |  |  |

| i) | **What is the probability if the product is 18 ?**<br><br>a)1/6    b) 1/36    c) 1/18    d) 1/12 | 1 |
|---|---|---|
| ii) | **What is the probability if the product of the numbers is odd ?**<br><br>a)1/4    b) 1/6    c) 2/9    d) 1/18 | 1 |
| iii) | **What is the probability if the product of the numbers is atleast 10 ?**<br><br>a)1/6    b) 18/36    c) 17/36    d) 2/3 | 1 |
| iv) | **The probability of getting the only even prime number is-**<br><br>a)1/4    b) 1/36    c) 1/9    d) 1/18 | 1 |

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| 15 | An helicopter is found missing in a rectangular region in the area shown below . | |
|---|---|---|
| | 6 km, 4.5 km, Lake, 2 km, 9 km | |
| i) | The probability that the helicopter crashed inside the lake is- a) $\dfrac{1}{2}$    b) $\dfrac{5}{27}$    c) $\dfrac{27}{5}$    d) $\dfrac{7}{25}$ | 1 |
| ii) | The Probability of an event always lie between- a) $0 < P(E) < 1$   b) $1 < P(E) < 0$   c) $0 \le P(E) \le 1$   d) $P(E) = 1$ | 1 |
| iii) | The Probability of an event can never be- a)Negative    b) positive    c) lies between 0 and 1    d) None of these | 1 |
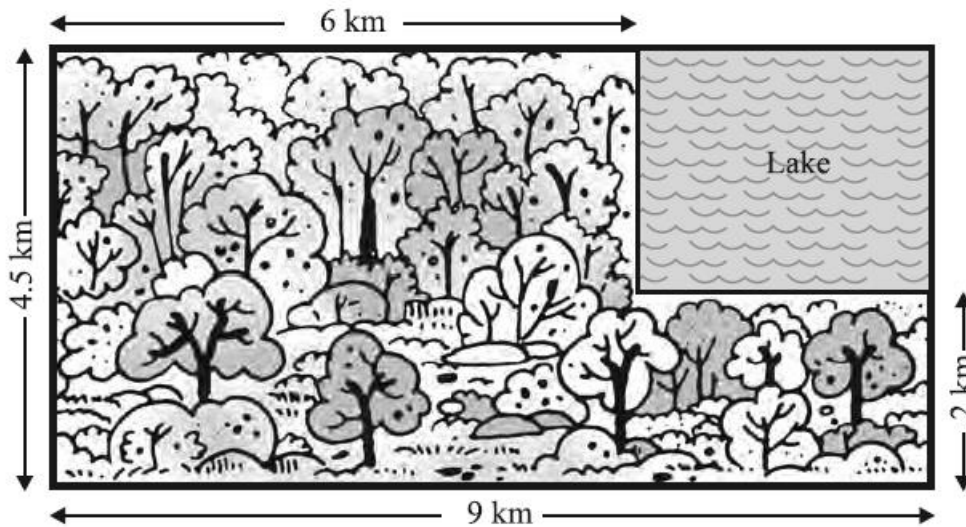
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# CBSE SAMPLE PAPER CASE STUDY BASED QUESTIONS-X

# (BASIC)

| | |
|---|---|
| **1** | <br><br>Mathematics teacher of a school took her 10<sup>th</sup> standard students to show Red fort. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Red fort to students. Then the teacher said in this monument one can find combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical.7 smaller domes at the centre.  Flag hoisting ceremony on Independence Day takes place near these domes. |

| | | |
|---|---|---|
| i) | How much cloth material will be required to cover 2 big domes each of radius 2.5 metres? (Take $\pi$ = 22/7)<br><br>    a) 75m$^2$    b) 78.57m$^2$    c) 87.47m$^2$    d) 25.8m$^2$<br>    b) | 1 |
| ii) | Write the formula to find the volume of a cylindrical pillar.<br><br>    a) $\Pi r^2 h$    b) $\Pi r l$    c) $\Pi r(l + r)$    d) $2\Pi r$ | 1 |
| iii) | Find the lateral surface area of two pillars if height of the pillar is 7m and radius of the base is 1.4m.<br><br>    a) 112.3cm$^2$    b) 123.2m$^2$    c) 90m$^2$    d) 345.2cm$^2$ | 1 |
| iv) | How much is the volume of a hemisphere if the radius of the base is 3.5m?<br><br>    a) 85.9 m$^3$    b) 80 m$^3$    c) 98 m$^3$    d) 89.83 m$^3$ | 1 |

| | | |
|---|---|---|
| v) | What is the ratio of sum of volumes of two hemispheres of radius 1cm each to the volume of a sphere of radius 2 cm?<br>a) 1:1   b) 1:8   c) 8 :1   d) 1:16 | 1 |

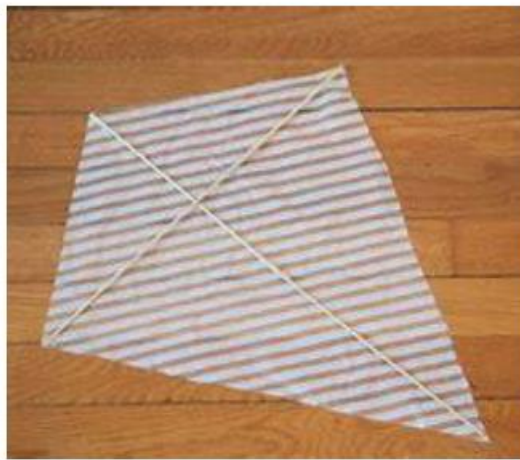| 2 | Class X students of a secondary school in Krishnagar have been allotted a rectangular plot of a land for gardening activity. Saplings of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the fig. The students are to sow seeds of flowering plants on the remaining area of the plot. | |
|---|---|---|
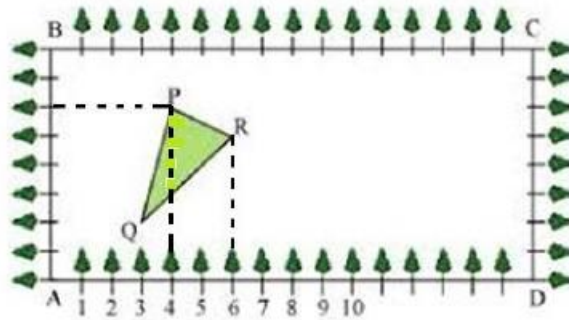


Considering A as origin, answer question (i) to (v)

| i) | Considering A as the origin, what are the coordinates of A?

a)  (0,1)       b) (1,0)       c) (0,0)       d)(-1,-1) | 1 |
|---|---|---|
| ii) | What are the coordinates of P?

a)  (4,6)     b)( 6,4)       c) (4,5)       d) (5,4) | 1 |

| iii) | What are the coordinates of R?

a)  (6,5)     b) (5,6)       c) ( 6,0)       d) (7,4) | 1 |
|---|---|---|

| iv) | What are the coordinates of D? | 1 |
| --- | --- | --- |
| | a) (16,0)    b) (0,0)     c) (0,16)     d) (16,1) | |
| v) | What are the coordinate of P if D is taken as the origin? | 1 |
| | a) ( 12,2)      b ) (-12,6)  c) (12,3)      d) (6,10) | |

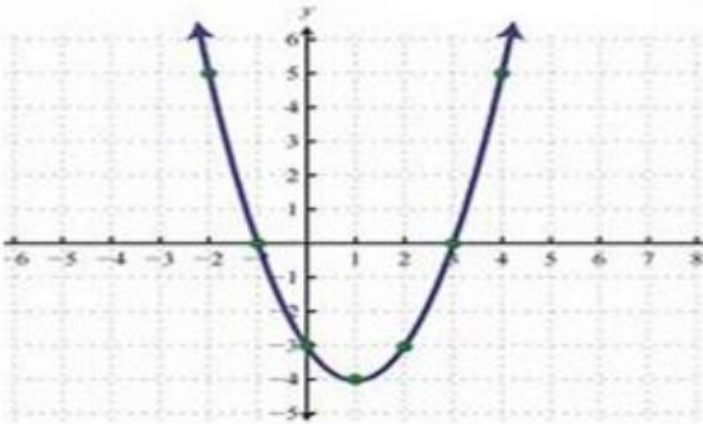| 3 |  | |
| --- | --- | --- |
| | Rahul is studying in X Standard. He is making a kite to fly it on a Sunday. Few questions came to his mind while making the kite. Give answers to his questions by looking at the figure. | |

| i) | Rahul tied the sticks at what angles to each other?<br>a) 30°      b) 60°      c) 90°       d) 60° | 1 |
| --- | --- | --- |
| ii) | Which is the correct similarity criteria applicable for smaller triangles at the upper part of this kite?<br><br>    a) RHS     b) SAS    c) SSA    d) AAS | 1 |
| iii) | Sides of two similar triangles are in the ratio 4:9. Corresponding medians of these triangles are in the ratio,<br><br>    a) 2:3     b) 4:9      c) 81:16     d) 16:81 | 1 |

| iv) | In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle. This theorem is called as,<br><br>a) Pythagoras theorem      b) Thales theorem<br>c) Converse of Thales theorem    d) Converse of Pythagoras theorem | 1 |
| --- | --- | --- |
| v) | What is the area of the kite, formed by two perpendicular sticks of length 6 cm and 8 cm?<br><br>     a) 48 cm$^2$        b) 14 cm$^2$        c) 24 cm$^2$        d) 96 cm$^2$ | 1 |

| 4 | Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape. Answer the following questions below.<br><br> | |
| --- | --- | --- |

| i) | Name the shape in which the wire is bent<br><br>a)  Spiral      b) ellipse      c) linear      d) Parabola | 1 |
|---|---|---|
| ii) | How many zeroes are there for the polynomial (shape of the wire)<br><br>a)  2          b) 3                    d) 1                         d) 0 | 1 |
| iii) | The zeroes of the polynomial are<br><br>a)  -1, 5      b) -1, 3      c) 3, 5      d) -4, 2 | 1 |

| iv) | What will be the expression of the polynomial?<br><br>a) $x^2+2x -3$      b) $x^2 -2x +3$      c) $x^2 - 2x -3$      d) $x^2 +2x+3$ | 1 |
|---|---|---|
| v) | What is the value of the polynomial if x =   -1?<br><br>a)  6        b) -18        c)) 18        d) 0 | 1 |

## STANDARD

## (CASE STUDY BASED QUESTIONS FROM SAMPLE PAPER)

| | |
|---|---|
| **1** | **Case Study based-1**<br>**SUN ROOM**<br><br>The diagrams show the plans for a sun room. It will be built onto the wall of a house. The four walls of the sunroom are square clear glass panels. The roof is made using<br>   • Four clear glass panels, trapezium in shape, all the same size<br>   • One tinted glass panel, half a regular octagon in shape |



Not to scale

Top view

Fron view

Scale 1 cm = 1m
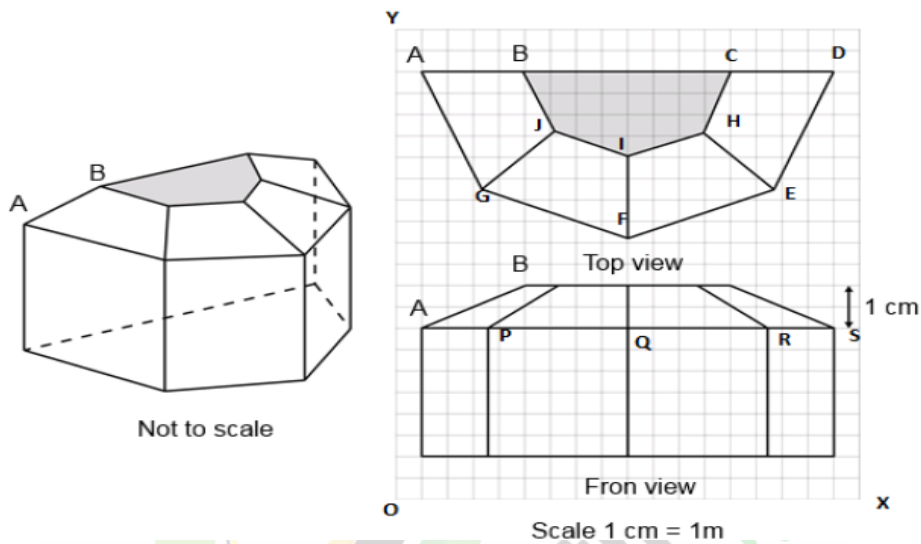
| (a) | **Refer to Top View**<br>Find the mid-point of the segment joining the points J (6, 17) and I (9, 16).<br>(i) (33/2,15/2)<br>(ii) (3/2,1/2)<br>(iii)(15/2,33/2)<br>(iv) (1/2,3/2) | 1 |
|---|---|---|

| (b) | **Refer to Top View**<br>The distance of the point P from the y-axis is<br>(i) 4<br>(ii) 15<br>(iii) 19<br>(iv) 25 | 1 |
|---|---|---|

| (c) | **Refer to Front View**<br>The distance between the points A and S is<br>(i) 4<br>(ii) 8<br>(iii)16<br>(iv)20 | 1 |
|---|---|---|
| (d) | **Refer to Front View**<br>Find the co-ordinates of the point which divides the line segment joining the points A and B in the ratio 1:3 internally.<br>(i) (8.5,2.0)<br>(ii) (2.0,9.5)<br>(iii) (3.0,7.5)<br>(iv) (2.0,8.5) | 1 |

| (e) | **Refer to Front View**<br>If a point (x,y) is equidistant from the Q(9,8) and S(17,8),then<br>(i) x+y=13<br>(ii) x-13=0<br>(iii) y-13=0<br>(iv)x-y=13 | 1 |
|---|---|---|

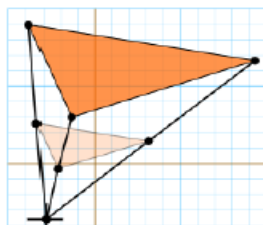| 2 | **Case Study Based- 2**<br>**SCALE FACTOR AND SIMILARITY**<br>**SCALE FACTOR**<br>A scale drawing of an object is the same shape as the object but a different size.<br>The scale of a drawing is a comparison of the length used on a drawing to the length it represents. The scale is written as a ratio.<br>**SIMILAR FIGURES**<br>The ratio of two corresponding sides in similar figures is called the scale factor.<br><br>Scale factor $= \dfrac{length\ in\ image}{corresponding\ length\ in\ object}$<br><br>If one shape can become another using Resizing then the<br><br>shapes are **Similar** | |
|---|---|---|
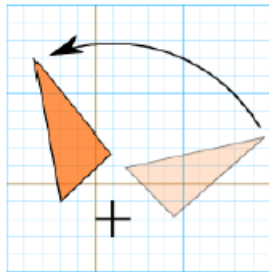
Rotation or Turn
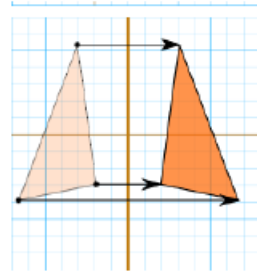
Reflection or Flip
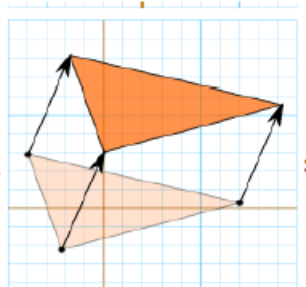
Translation or Slide

Hence, two shapes are **Similar** when one can become the other after a resize, flip, slide or turn.

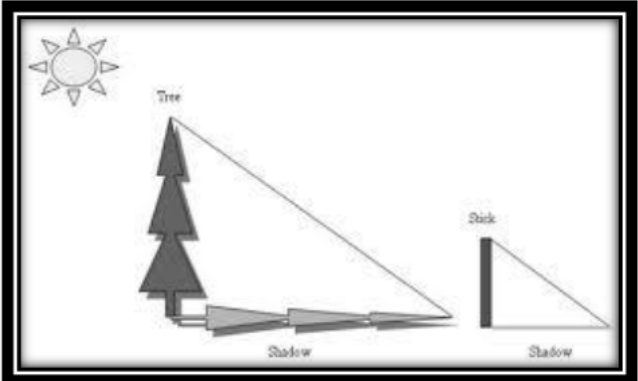| (a) | A model of a boat is made on the scale of 1:4. The model is 120cm long. The full size of the boat has a width of 60cm. What is the width of the scale model?  (i) 20 cm<br>(ii) 25 cm<br>(iii) 15 cm<br>(iv)240 cm | 1 |
|---|---|---|

| (b) | What will effect the similarity of any two polygons?<br>(i) They are flipped horizontally<br>(ii)They are dilated by a scale factor<br>(iii)They are translated down<br>(iv)They are not the mirror image of one another | 1 |
|---|---|---|

| (c) | If two similar triangles have a scale factor of a: b. Which statement regarding the two triangles is true? | 1 |
| --- | --- | --- |
| | (i)The ratio of their perimeters is 3a : b | |
| | (ii)Their altitudes have a ratio a:b | |
| | (iii)Their medians have a ratio $\frac{a}{2}$ : b | |
| | (iv)Their angle bisectors have a ratio $a^2 : b^2$ | |

| (d) | The shadow of a stick 5m long is 2m. At the same time the shadow of a tree 12.5m high is | 1 |
| --- | --- | --- |
| |  | |
| | (i)3m | |
| | (ii)3.5m | |
| | (iii)4.5m | |
| | (iv)5m | |

| (e) | Below you see a student's mathematical model of a farmhouse roof with measurements. The attic floor, ABCD in the model, is a square. The beams that support the roof are the edges of a rectangular prism, EFGHKLMN. E is the middle of AT, F is the middle of BT, G is the middle of CT, and H is the middle of DT. All the edges of the pyramid in the model have length of 12 m. | 1 |
| --- | --- | --- |
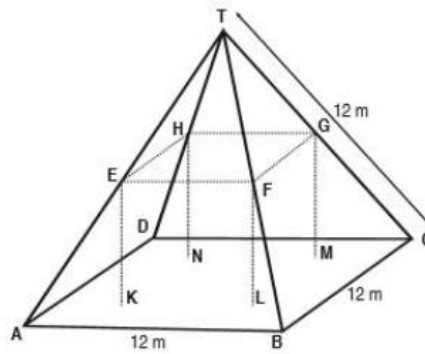
What is the length of EF, where EF is one of the horizontal edges of the block?
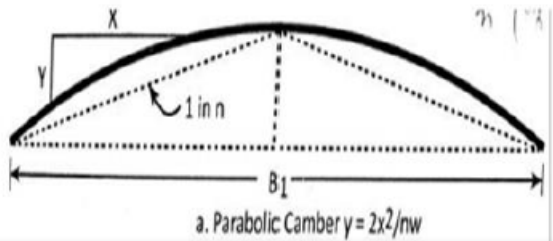
(i)24m

(ii)3m

(iii)6m

(iv)10m

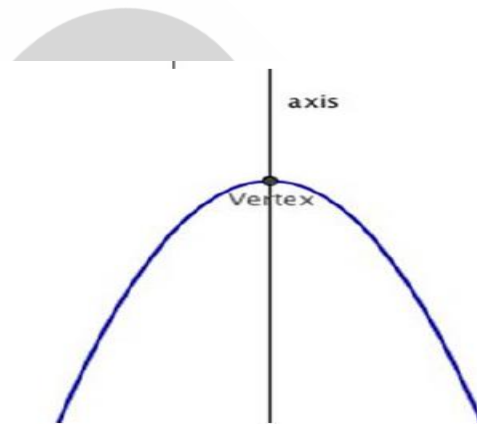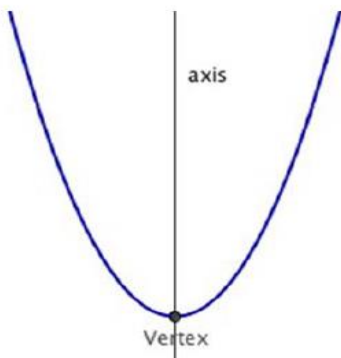| 3 | **Case Study Based- 3**<br>**Applications of Parabolas-Highway Overpasses/Underpasses**<br>**A highway underpass is parabolic in shape.**<br><br> |

**Parabola**

A parabola is the graph that results from $p(x)=ax^2+bx+c$

Parabolas are symmetric about a vertical line known as the *Axis of Symmetry*. The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the

**Vertex**



| (a) | If the highway overpass is represented by $x^2-2x-8$. Then its zeroes are <br> (i) (2,-4) <br> (ii) (4,-2) <br> (iii) (-2,-2) <br> (iv) (-4,-4) | |
|-----|---|---|
| (b) | The highway overpass is represented graphically. <br> Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial <br> (i) Intersects x-axis <br> (ii) Intersects y-axis <br> (iii) Intersects y-axis or x-axis <br> (iv)None of the above | |

| | | |
|---|---|---|
| (c) | Graph of a quadratic polynomial is a<br>(i) straight line<br>(ii) circle<br>(iii)parabola<br>(iv)ellipse | |
| (d) | The representation of Highway Underpass whose one zero is 6 and sum of the zeroes is 0, is<br>(i)$x^2 - 6x + 2$<br>(ii) $x^2 - 36$<br>(iii)$x^2 - 6$<br>(iv)$x^2 - 3$ | |
| (e) | The number of zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can have is:<br>(i)1<br>(ii) 2<br>(iii) 0<br>(iv) 3 | |

## ANSWERS

1-    i)b       ii) a       iii)b
2-    i)b       ii) d       iii)c
3-    i)c       ii) a       iii)c       iv)d
4-    i)b       ii) a       iii)b
5-    i)b       ii) b       iii)c       iv)b
6-    i)a       ii) d       iii)c
7-    i)d       ii) b       iii)c       iv)b       v)a
8-    i)a       ii) c       iii)a       iv)d
9-    i)b       ii) d

| 10- | i)c | ii) c | iii)a | |
| 11- | i)a | ii)d | iii)c | |
| 12- | i)a | ii) b | iii)b | iv)c |
| 13- | i)d | ii) b | iii)c | iv)d |
| 14- | i)d | ii) a | iii)c | iv)d |
| 15- | i)b | ii) c | iii)a | |

## CBSE CASE STUDY BASED (BASIC)

| 1- | i)b | ii) a | iii)b | iv)d | v)b |
| 2- | i)c | ii) a | iii)a | iv)a | v)b |
| 3- | i)c | ii) b | iii)b | iv)d | v)a |
| 4- | i)d | ii) a | iii)b | iv)c | v)d |

## CBSE CASE STUDY BASED (STANDARD)

| 1- | a)iii | b)i | c)iii | d)iv | e)ii |
| 2- | a)iii | b)iv | c)ii | d)iv | e)iii |
| 3- | a)ii | b)i | c)iii | d)ii | e)iii |

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BE  MATHAHOLIC

BY-SHIVANI KOTWAL