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## MATHS

## BOOKS - NCERT EXEMPLAR

## INTRODUCTION TO GRAPHS

## Solved Examples

1. Every point on the $x$ axis is of the form.
A. $(0, y)$
B. $(x, 0)$
C. $(x, y)$
D. $(x, 1)$

Answer: B

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2. The given graph shows Nisha's trip to a mall
by a car. Observe the graph carefully and find
what was she doing between 5 pm and 7 pm ?
A. Driving to the mall.
B. Driving back home.
C. Was not driving.
D. Not enough data to answer

## Answer: C

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3. In a ___ graph, all the points on the graph lie on the same straight line.
4. The coordinates of the origin are

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5. Points $(3,4)$ and $(4,3)$ represent the same point on the graph.

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6. State True or False : The y coordinate of any point lying on the $x$ axis will be 0 .

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7. Plot the points $(4,4),(1,3),(4,2)$ and $(7,3)$ on a graph paper and connect them with line segments. Name the shape formed by these points.
8. Write the coordinates of all the points in
the given graph.


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9. The following is a conversion graph of temperature in ${ }^{\circ} C$ and ${ }^{\circ} F$.

Use the graph to answer the following questions.
(a0 Convert $140^{\circ} \mathrm{F}$ to ${ }^{\circ} \mathrm{C}$.
(b) Convert $20^{\circ} \mathrm{C}$ to ${ }^{\circ} \mathrm{F}$


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10. Following graph shows a comparison of the approximate sale of items manufactured by a company for the first two years of its operation.
(a) In which months there was maximum difference in the sale of items of two years?
(b) In which year was there more stability in the sale of items?
(c) In which month the sale remains the same in both the years?
(d) In which month was the sales of first year less than that of second year?


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11. The given graphs show the progress of two different cyclists during a ride. For each graph, describe the rider's progress over the period


Time-.


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12. A double bar graph is useful for the of two sets of data.

Data represented in a circular form is called a chart.

The graph of a linear equation is always a
line.

The cartesian system used two axes which are to each other.

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## Think And Discuss

1. Draw the graph of the linear equation
$y=m x+c$ for $m=\frac{1}{2}$ and $C=\frac{3}{2}$ Read
from the graph, the value of x when $\mathrm{y}=4.5$.
2. How would the graph change when the equation changes to $y=3 x$ from $y=x$ ?

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3. Give the coordinates of a point on the x-axis and a point on the $y$-axis.
4. Give the missing $y$-coordinates for the solutions
$y=5 x+2,(1, y),(3, y),(10, y)$.

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## Exercise

1. Comparison of parts of a whole may be done
by a
A. bar graph

## B. pie chart

C. linear graph
D. line graph

## Answer: B

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2. A graph that displays data that changes continuously over periods of time is
A. bar graph

## B. pie chart

C. histogram
D. line graph

## Answer: D

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3. In the given graph the coordinates of point x are

A. $(0,2)$
B. $(2,3)$
C. $(3,2)$
D. $(3,0)$

## Answer:

## D Watch Video Solution

4. In the given graph the letter that indicates
the point $(0,3)$ is

A. $P$
B. Q
C. R
D. S

## Answer:

## - Watch Video Solution

5. The point $(3,4)$ is at a distance of
A. 3 from both the axis
B. 4 from both the axis
C. 4 from the $x$ axis
D. 3 from $x$ axis
6. A point which lies on both the axis is
A. $(0,0)$
B. $(0,1)$
C. $(1,0)$
D. $(1,1)$

Answer:

# 7. The coordinates of a point at a distance of 3 

units from the $x$ axis and 6 units from the $y$ axis is
A. $(0,3)$
B. $(6,0)$
C. $(3,6)$
D. $(6,3)$

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## 8. In the given figure the position of the book

 on the table may be given by
A. $(7,3)$
B. $(3,7)$
C. $(3,3)$
D. $(7,7)$

## Answer:

## D Watch Video Solution

9. Data was collected on a student's typing
rate and graph was drawn as shown below.
Approximately how many words had this
student typed in 30 seconds?

A. 20
B. 34
C. 28
D. 34

## Answer:

## D Watch Video Solution

10. Which graphs of the following represent
the table below?




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11. displays data that changes continuously over periods of time.

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12. The relation between dependent and independent variables is shown through a

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13. We need coordinates for representing a point on the graph sheet.

14．A point in which the $x$－coordinate is zero and $y$－coordinate is non zero will lie on the

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15．The horizontal and vertical line in a line graph are usually called＿＿＿＿－＿－＿and ーーーーーーーーー・•
－Watch Video Solution
16. The process of fixing a point with the help of the coordinates is known as _____ of the point.

## D Watch Video Solution

17. The distance of any point from the $y$-axis is
the coordinate.

## D Watch Video Solution

# 18. All points with $y$-coordinate as zero lie on 

the

D Watch Video Solution
19. For the point $(5,2)$, the distance from the $x$ axis is _____ units.

D Watch Video Solution
20. The x-coordinate of any point lying on the
$y$-axis will be

D Watch Video Solution
21. The $y$-coordinate of the point $(2,4)$ is

## - Watch Video Solution

22. In the point (4, 7), 4 denotes the

## - Watch Video Solution

23. A point has 5 as its $x$-coordinate and 4 as its $y$-coordinate. Then the coordinates of the point are given by

## - Watch Video Solution

24. In the coordinates of a point, the second number denotes the $\qquad$
25. The point where the two axes intersect is called the $\qquad$

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26. For fixing a point on the graph sheet we need two coordinates.

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27. State True or False

A line graph can also be a whole unbroken line.

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28. The distance of any point from the $x$-axis is
called the $x$-coordinate.

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29. The distance of the point $(3,5)$ from the $y$ axis is 5 .

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30. State True or False

The ordinate of a point is its distance from the
$y$-axis.

- Watch Video Solution

31. In the point (2, 3), 3 denotes the $y$ coordinate.

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32. The coordinates of the origin are ( 0,0 ).

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33. The points $(3,5)$ and $(5,3)$ represent the same point.

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34. The $y$-coordinate of any point lying on the $x$-axis will be zero.

## - Watch Video Solution

35. Match the coordinates given in Column A with the items mentioned in Column B.

## Column B

(1) $(0,5)$
(a) $y$ coordinate is $2 \times x$-coordinate +1 .
(2) $(2,3)$
(b) Coordinates of origin.
(3) $(4,8)$
(c) Only $y$-coordinate is zero.
(4) $(3,7)$
(d) The distance from $x$-axis is 5 .
(5) $(0,0)$
(e) $y$ coordinate is double of $x$-coordinate.
(6) $(5,0)$
(f) The distance from $y$-axis is 2 .

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## 36. Match the ordinates of the points given in

## Column A with the items mentioned in Column

## B.

Column A
(a) $(7,0)$
(b) $(11,11)$
(c) $(4,8)$
(d) $(6,2)$
(e) $(0,9)$
(1) $(6,3)$
(Iv) The abscissa is double the ordinate.
(v) The abscissa is triple the ordinate.

Column B
(i) The ordinate is double the abscissa.
(II) The ordinate is zero.
(III) The ordinate is equal to the abscissa.
(vi) The abscissa is zero.

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37. From the given graph, choose the letters
that indicate the location of the points given
below.

A. $(2,0)$
B. $(0,4)$
C. $(2,6)$
D. $(3,3)$

Answer:

## D Watch Video Solution

38. Find the coordinates of all letters in the graph given below.


## D Watch Video Solution

39. Plot the given points on a graph sheet.
(i) $(5,4)$
(ii) $(2,0)$
(iii) $(3,1)$
(iv) $(0,4)$
(v) $(4,5)$

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40. Study the given map of a zoo and answer
the following questions.

A. Give the location of lions in the zoo.
B. (D, f ) and (C, d) represent locations of
which animals in the zoo?
C. Where are the toilets located?
D. Give the location of canteen.

## Answer:

## - Watch Video Solution

41. Write the $x$-coordinate (abscissa) of each of
the given points.
(a) $(7,3)$
(b) $(5,7)$
(c) $(0,5)$

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42. Write the $y$-coordinate (ordinate) of each of the given points.
(a) $(3,5)$
(b) $(4,0)$
(c) $(2,7)$

- Watch Video Solution

43. Plot the given points on a graph sheet and check if the points lie on a straight line. If not, name the shape they form when joined in the
given order.
(a) $(1,2),(2,4),(3,6),(4,8)$.
(b) $(1,1),(1,2),(2,1),(2,2)$.
(c) $(4,2),(2,4),(3,3),(5,4)$.

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44. If $y$-coordinate is 3 times $x$-coordinate,
form a table for it and draw a graph.

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45. Make a line graph for the area of a square as per the given table.

| Stde $(\mathrm{m} \mathrm{ncm})$ | 1 | 2 | 3 | 4 |
| :--- | :--- | :--- | :--- | :---: |
| Area $\left(\mathrm{m} \mathrm{cm}^{2}\right)$ | 1 | 4 | 9 | 16 |

Is it a linear graph?

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46. The cost of a note book is Rs 10. Draw a
graph after making a table showing cost of 2 ,
$3,4, \ldots$. note books. Use it to find
(a) the cost of 7 notebooks.
(b) The number of note books that can be purchased with Rs 50.

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47. Explain the situations represented by the
following distance-time graphs.

(a)

(b)

(c)
48. Complete the given tables and draw a graph for each.

| $x$ | 0 | 1 | 2 | 3 |
| :--- | :--- | :--- | :--- | :--- |
| $y=3 x+1$ | 1 | 4 |  |  |


| $x$ | 1 | 2 | 4 | 6 |
| :--- | :--- | :--- | :--- | :--- |
| $y=x-1$ | 0 |  |  |  |

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49. Study the given graphs (a) and (b) and complete the corresponding tables below.

(a)


b)


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50. Draw a graph for the radius and circumference of circle using a suitable scale.
(Hint : Take radius $=7,14,21$ units and so on)

From the graph,
a) Find the circumference of the circle when
radius is 42 units.
(b) At what radius will the circumference of the circle be 220 units?

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51. The graph shows the maximum temperatures recorded for two consecutive
weeks of a town. Study the graph and answer
the questions that follow.

(a) What information is given by the two axes?
(b) In which week was the temperature higher on most of the days?
(c) On which day was the temperature same in both the weeks?
(d) On which day was the difference in temperatures the maximum for both the weeks?
(e) What were the temperatures for both the
weeks on Thursday?
(f) On which day was the temperature $35^{\circ} \mathrm{C}$ for the first week?
(g) On which day was the temperature highest for the second week?

## D Watch Video Solution

52. The graph given below gives the actual and expected sales of cars of a company for 6 months. Study the graph and answer the questions that follow.
(a) In which month was the actual sales same as the expected sales?
(b) For which month(s) was (were) the difference in actual and expected sales the maximum?
(c) For which month(s) was (were) the difference in actual and expected sales the least?
(d) What was the total sales of cars in the
months-Jan, Feb. and March?
(e) What is the average sales of cars in the last three months?
(f) Find the ratio of sales in the first three months to the last three months.

## D Watch Video Solution

53. The graph given below shows the marks obtained out of 10 by Sonia in two different tests. Study the graph and answer the questions that follow.

(a) What information is represented by the axes?
(b) In which subject did she score the highest in Test I?
(c) In which subject did she score the least in

Test II?
(d) In which subject did she score the same marks in both the Tests?
(e) What are the marks scored by her in

English in Test II?
(f) In which test was the performance better?
(g) In which subject and which test did she score full marks?

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54. Find the coordinates of the vertices of the given figures.


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55. Study the graph given below of a person
who started from his home and returned at
the end of the day. Answer the questions that follow.

(a) At what time did the person start from his

## home?

(b) How much distance did he travel in the first
four hours of his journey?
(c) What was he doing from 3 pm to 5 pm?
(d) What was the total distance travelled by him throughout the day?
(e) Calculate the distance covered by him in
the first 8 hours of his journey.
(f) At what time did he cover 16 km of his journey?
(g) Calculate the average speed of the man from (a) A to B (b) B to C (c) (h)At what time did he return home?
56. Plot a line graph for the variables $p$ and $q$ where $p$ is two times $q$ i.e, the equation is $p=$ $2 q$.

## D Watch Video Solution

57. Study the graph and answer the questions
that follow.
(a) What information does the graph give?
(b) On which day was the temperature the least?
(c) On which day was the temperature $31^{\circ} C$ ?
(d) Which was the hottest day?


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58. Study the distance-time graph given below
for a car to travel to certain places and answer
the questions that follow.
(a) How far does the car travel in 2 hours?
(b) How much time does the car take to reach

R?
(c) How long does the car take to cover 80 km ?
(d) How far is $Q$ from the starting point?
(e) When does the car reach the place $S$ after
starting?


## D Watch Video Solution

59. Locate the points $A(1,2), B(4,2)$ and $C(1,4)$
the coordinates of the fourth point $D$ to complete the rectangle ABCD.

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60. Locate the points $A(1,2), B(3,4)$ and $C(5,2)$
on a graph sheet taking suitable axes. Write
the coordinates of the fourth point $D$ to complete the rhombus $A B C D$. Measure the diagonals of this rhombus and find whether they are equal or not.
61. Locate the points $P(3,4), Q(1,0), R(0,4), S$
$(4,1)$ on a graph sheet.

## D Watch Video Solution

62. The graph given below compares the sales of ice creams of two vendors for a week.


\section*{| $-\ldots \ldots . . . .$. |
| :--- |}

Observe the graph and answer the following questions.
(a) Which vendor has sold more icecreams on

Friday?
(b) For which day was the sales same for both the vendors?
(c) On which day did the sale of vendor $A$
increase the most as compared to the
previous day?
(d) On which day was the difference in sales
the maximum?
(e) On which two days was the sales same for vendor B ?

## D Watch Video Solution

63. The table given below shows the temperatures recorded on a day at different times.


Observe the table and answer the following questions.
(a) What is the temperature at 8 am ?
(b) At what time is the temperature $3^{\circ} C$ ?
(c) During which hour did the temperature fall?
(d) What is the change in temperature between 7 am and 10 am ?
(e) During which hour was there a constant temperature?

## D Watch Video Solution

64. The following table gives the growth chart of a child.

| Hetght (in cm) | 75 | 90 | 110 | 120 | 130 |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Age (In years) | 2 | 4 | 6 | 8 | 10 |

Draw a line graph for the table and answer the questions that follow.
(a) What is the height at the age of 5 years?
(b) How much taller was the child at the age of

10 than at the age of 6 ?
(c) Between which two consecutive periods did the child grow more faster ?

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65. The following is the time-distance graph of Sneha's walking.

(a) When does Sneha make the least progress?

Explain your reasoning.
(b) Find her average speed in $\mathrm{km} /$ hour.

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66. Draw a parallelogram $A B C D$ on a graph paper with the coordinates given in Table $I$. Use this table to complete Tables II and III to get the coordinates of $E, F, G, H$ and $J, K, L, M$.

| Point | $(x, y)$ |
| :---: | :---: |
| A | $(1,1)$ |
| B | $(4,4)$ |
| C | $(8,4)$ |
| D | $(5,1)$ |

Table I

| Point | $(0.5 x, 0.5 y)$ |
| :---: | :---: |
| E | $(0.5,0.5)$ |
| F |  |
| G |  |
| H |  |

Table II

| Point | $(2 x, 1.5 y)$ |
| :---: | :---: |
| J | $(2,1.5)$ |
| K |  |
| L |  |
| M |  |

Table III

Draw parallelograms EFGH and JKLM on the same graph paper. Plot the points $(2,4)$ and (4,
2) on a graph paper, then draw a line segment joining these two points.
67. Draw the line passing through $(2,3)$ and ( 3 ,
2). Find the coordinates of the points at which this line meets the $x$-axis and $y$-axis.

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68. The following graph shows the change in temperature of a block of ice when heated.

Use the graph to answer the following questions:
(a) For how many seconds did the ice block have no change in temperature?
(b) For how long was there a change in temperature?
(c) After how many seconds of heating did the temperature become constant at $0^{\circ} C$ ?
(d) What was the temperature after 25 seconds?
(e) What will be the temperature after 1.5
minutes? Justify your answer.


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69. The following graph shows the number of
people present at a certain shop at different
times. Observe the graph and answer the following questions.


Time $\longrightarrow$
(a) What type of a graph is this?
(b) What information does the graph give?
(c) What is the busiest time of day at the shop?
(d) How many people enter the shop when it opens?
(e) About how many people are there in the shop at $1: 30 \mathrm{pm}$ ?
70. A man started his journey on his car from location A and came back. The given graph shows his position at different times during the whole journey.
(a) At what time did he start and end his journey?
(b) What was the total duration of journey?
(c) Which journey, forward or return, was of longer duration?
(d) For how many hours did he not move?
(e) At what time did he have the fastest

## speed?



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71. The following graph shows the journey made by two cyclists, one from town $A$ to $B$ and the other from town $B$ to $A$.
(a) At what time did cyclist II rest? How long
did the cyclist rest?
(b) Was cyclist II cycling faster or slower after the rest?
(c) At what time did the two cyclists meet?
(d) How far had cyclist II travelled when he met
cyclist I?
(e) When cyclist II reached town A, how far was
cyclist I from town B?

$\qquad$

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72. Ajita starts off from home at 07.00 hours with her father on a scooter that goes at a uniform speed of $30 \mathrm{~km} / \mathrm{h}$ and drops her at
her school after half an hour. She stays in the school till 13.30 hours and takes an auto rickshaw to return home. The rickshaw has a uniform speed of $10 \mathrm{~km} / \mathrm{h}$. Draw the graph for the above situation and also determine the distance of Ajita's school from her house.

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73. Draw the line graph using suitable scale to
show the annual gross profit of a company for
a period of five years.

| Year | Ist | 2nd | 3rd | 4th | 5th |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Gross Pront <br> (In Rs) | $17,00.000$ | $15,50,000$ | $11,40.000$ | $12,10,000$ | $14,90,000$ |

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74. The following chart gives the growth in
height in terms of percentage of full height of boys and girls with their respective ages.

| Age (in years) | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Boys | $72 \%$ | $75 \%$ | $78 \%$ | $81 \%$ | $84 \%$ | $88 \%$ | $92 \%$ | $95 \%$ | $98 \%$ | $99 \%$ | $100 \%$ |
| Girls | $77 \%$ | $81 \%$ | $84 \%$ | $88 \%$ | $91 \%$ | $95 \%$ | $98 \%$ | $99 \%$ | $99.5 \%$ | $100 \%$ | $100 \%$ |

Draw the line graph of above data on the same sheet and answer the following
questions.
(a) In which year both the boys and the girls achieve their maximum height?
(b) Who grows faster at puberty (14 years to 16 years of age)?

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75. The table shows the data collected for Dhruv's walking on a road.

| Time <br> (mn minutes) | 0 | 5 | 10 | 15 | 20 | 25 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Distance <br> (in km) | 0 | 0.5 | 1 | 1.25 | 1.5 | 1.75 |

(a) Plot a line graph for the given data using a suitable scale.
(b) In what time periods did Dhruv make the most progress?

## D Watch Video Solution

76. Observe the given graph carefully and complete the table given below.



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77. This graph shows the per cent of students who dropped out of school after completing High School. The point labelled A shows that,
in 1996, about $4.7 \%$ of students dropped out.

(a) In which year was the dropout the rate highest? In which year was it the lowest?
(b) When did the per cent of students who dropped out of high school first fall below $5 \%$ ?
(c) About what per cent of students dropped out of high school in 2007? About what per cent of students stayed in high school in 2008?

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78. Observe the toothpick pattern given below:


Pattern I


Pattern 2


Pattern 3


Patterm 4
(a) Imagine that this pattern continues.

Complete the table to show the number of toothpicks in the first six terms.

| Pattern | 1 | 2 | 3 | 4 | 5 | 6 |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: |
| Toothplcks | 4 |  |  | 13 |  |  |

(b) Make a graph by taking the pattern numbers on the horizontal axis and the
number of toothpicks on the vertical axis.

Make the horizontal axis from 0 to 10 and the vertical axis from 0 to 30 .
(c) Use your graph to predict the number of toothpicks in patterns 7 and 8. Check your answers by actually drawing them.
(d) Would it make sense to join the points on this graph? Explain.

## D Watch Video Solution

79. Consider this input/output table.

| Input | 1 | 2 | 4 | 5 | 7 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Output | 2 | 5 | 11 | 14 | 20 |

(a) Graph the values from the table by taking Input along horizontal axis from 0 to 8 and

Output along vertical axis from 0 to 24.
(b) Use your graph to predict the outputs for inputs of 3 and 8.

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80. This graph shows a map of an island just off the coast of a continent. The point labelled $B$ represents a major city on the coast. The distance between grid lines represents 1 km .


Point A represents a resort that is located 5
km East and 3 km North of Point B. The values

5 and 3 are the coordinates of Point $A$. The coordinates can be given as the ordered pair
$(5,3)$, where 5 is the horizontal coordinate and 3 is the vertical coordinate.
(i) On a copy of the map, mark the point that is

3 km East and 5 km North of Point B and label
it S . Is Point S in the water or on the island? Is

Point $S$ in the same place as Point $A$ ?
(ii) Mark the point that is 7 km east and 5 km north of Point B and label it C. Then mark the point that is 5 km east and 7 km north of Point $B$ and label it D. Are Points $C$ and $D$ in the same place? Give the coordinates of Points C and D.
(iii) Which point is in the water, $(2,7)$ or $(7,2)$ ?

Mark the point which is in water on your map and label it E .
(iv) Give the coordinates of two points on the island that are exactly 2 km from Point A .
(v) Give the coordinates of the point that is halfway between Points $L$ and $P$.
(vi) List three points on the island with their $x$ coordinates greater than 8.
(vii) List three points on the island with a $y$ coordinate less than 4.
81. As part of his science project, Prithvi was
supposed to record the temperature every
hour one Saturday from 6 am to midnight. At
noon, he was taking lunch and forgot to
record the temperature. At 8:00 pm, his
favourite show came on and so forgot again.
He recorded the data so collected on a graph
sheet as shown below.

(a) Why does it make sense to connect the points in this situation?
(b) Describe the overall trend, or pattern, in
the way the temperature changes over the time period shown on the graph.
(c) Estimate the temperature at noon and 8
pm.
82. The graph given below compares the price
(in Rs) and weight of 6 bags (in kg ) of sugar of different brands A, B, C, D, E, F.


## Weight of

Brands
(a) Which brand(s) costs/cost more than Brand D?
(b) Bag of which brand of sugar is the heaviest?
(c) Which brands weigh the same?
(d) Which brands are heavier than brand B?
(e) Which bag is the lightest?
(f) Which bags are of the same price?

## Watch Video Solution

83. The points on the graph below represent
the height and weight of the donkey, dog, crocodile, and ostrich shown in the drawing.


Height $\longrightarrow$
(a) What are the two variables represented in
the graph?
(b) Which point represents each animals?

Explain.

## D Watch Video Solution

84. The two graphs below compare Car A and

Car B. The left graph shows the relationship
between age and value. The right graph shows
the relationship between size and maximum speed.


Use the graphs to determine whether each
statement is true or false, and explain your answer.
(a) The older car is less valuable.
(b) The faster car is larger.
(c) The larger car is older.
(d) The faster car is older.
(e) The more valuable car is slower.
85. Sonal and Anmol made a sequence of tile designs from square white tiles surrounding one square purple tile. The purple tiles come in many sizes. Three of the designs are shown below.
(a) Copy and complete the table

| Side Length of Purple <br> Tiles | 1 | 2 | 3 | 4 | 5 | 10 | 100 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Number of white Tiles <br> in Border |  |  |  |  |  |  |  |



Side length 1


Side length 2


Side length 3
(b) Draw a graph using the first five pairs of
numbers in your table.
(c) Do the points lie on a line?

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86. Sonal and Anmol then made another sequence of the designs. Three of the designs are shown below.

(a) Complete the table.

| Rows, $r$ | 4 | 6 | 8 |
| :--- | :--- | :--- | :--- |
| Number of white Tiles, $w$ | 9 |  |  |
| Number of Purple Tiles, $p$ | 1 |  |  |

(b) Draw a graph of rows and number of white
tiles. Draw another graph of the number of rows and the number of purple tiles. Put the number of rows on the horizontal axis.
(c) Which graph is linear?

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