



Aakash

+ BYJU'S

KNOWLEDGE BYTES

MAY 2022

CLASS 10





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PREFACE

What is Knowledge Bytes ?

Knowledge Bytes is a collection of riddles, interesting facts, mnemonics and puzzles that will make your learning fun and engaging.

We want you to be delighted about studying. Knowledge Bytes helps you to know more about the subject in a fun, motivating and educational way and helps to implement what you learn in a creative way.

Benefits



Saves Time



Develops Learning Skills



Stimulates Interest



Leads to Increased Comprehension

EXPLORE

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Pair of Linear Equations in Two Variables, Quadratic Equations

Slope

Definition :- Slope of a line describes the direction and steepness of a line. It is also called gradient.

General form of linear equation in two variables :

$$ax + by + c = 0$$

\Rightarrow

$$by = -ax - c$$

$$m = \frac{-a}{b}$$

\Rightarrow

$$y = \frac{-a}{b}x - \frac{c}{b}$$

Slope of a line = $\frac{-a}{b}$; y-intercept = $-\frac{c}{b}$



What is y-intercept? (y-coordinate of intersection with y-axis)

y-intercept also called vertical intercept is a point where the graph of linear equation or any other function or equation intersects y-axis.

Slope is also denoted by 'm'. It is calculated by finding ratio of 'vertical change' to 'horizontal change' between any two distinct points on a line.

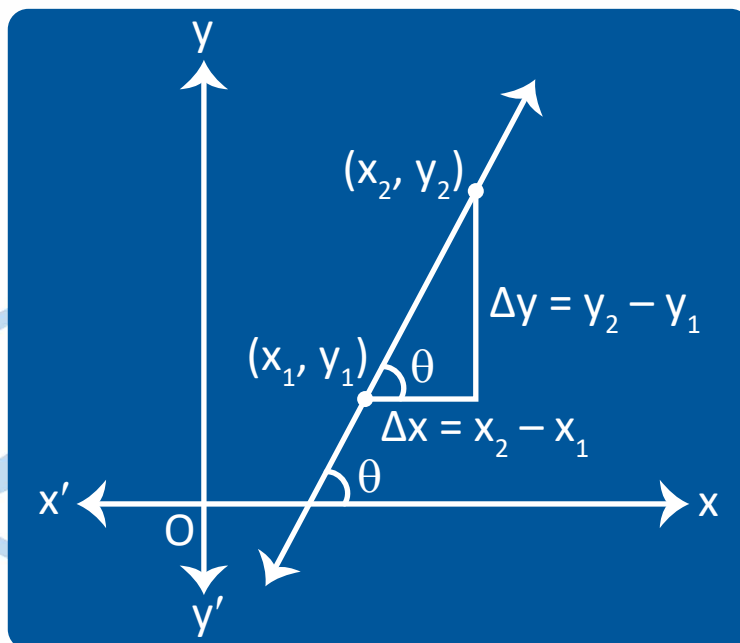
Mathematically,

It is also represented by $\Delta \rightarrow$ delta which represents change in a certain quantity.

$$m = \frac{\Delta y}{\Delta x}$$

$m = \frac{y_2 - y_1}{x_2 - x_1}$; where (x_1, y_1) and (x_2, y_2) are any two points on the line whose slope we have to calculate.

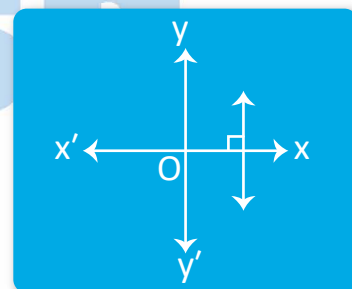
Also, the slope of a line, can be calculated by 'tan θ ', where ' θ ' is the angle of inclination which the line makes with x-axis.



1. Vertical line (line parallel to y-axis)

Angle made by vertical line with x-axis is 90° .

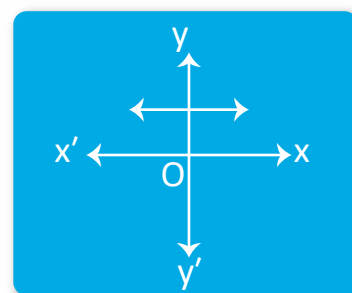
Slope = $\tan \theta = \tan 90^\circ =$ (Not defined)



2. Horizontal line (line parallel to x-axis)

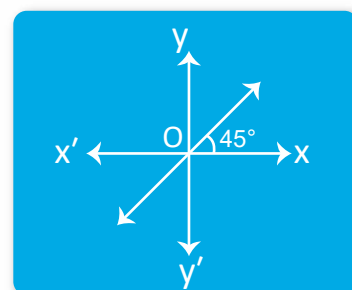
Angle made by horizontal line with x-axis is 0° .

Slope = $\tan \theta = \tan 0^\circ = 0$



3. A line has slope = 1; when it makes angle with x-axis = 45°

Slope = $\tan \theta = \tan 45^\circ = 1$



Solutions of Some Important Inequalities

If we are given with an equation like

$$(x - a)(x - b) = 0$$

To find the solution is quite easy, equating each term to zero.

i.e. $(x - a) = 0$ or $(x - b) = 0$

$\Rightarrow x = a$ or b is the solution.

Now,
if we change our equation to
inequality, then how to find
solution?



(i) $(x - a)(x - b) > 0$; $a < b$ (say)

To solve this inequality, we will learn **wavy curve method**.

Inequalities can be of the form < 0 , > 0 , ≤ 0 , ≥ 0

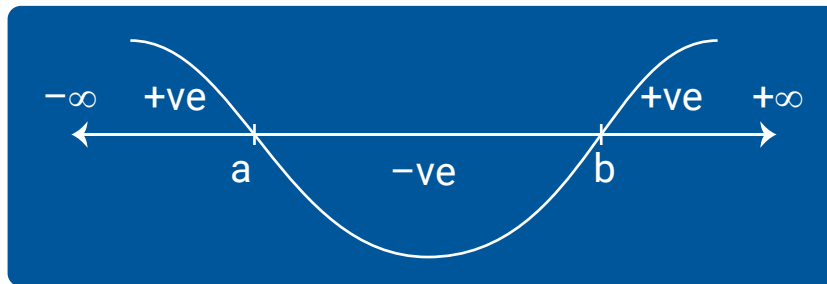
- First step is to find critical points i.e. points at which value of given inequality will become zero.

So, in the above equation critical points are 'a' and 'b'.

- Plot these points on the number line.



- Mark intervals and put +ve and -ve marks on alternate interval starting from right of b.



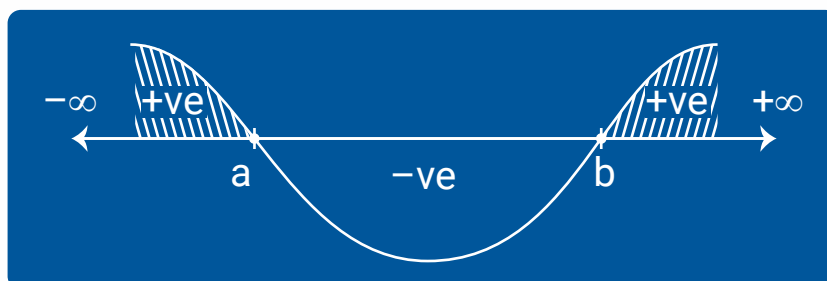
- Let us look at the given inequality $(x - a)(x - b) > 0$. It is greater than zero. So, we have to find the solution at which the value is greater than zero. Clearly, the intervals with the +ve sign gives positive value. Mark those intervals.



- Solution of $(x - a)(x - b) > 0, a < b$ is $x < a$ or $x > b$

(ii) $(x - a)(x - b) \geq 0, a < b$

To find the solution where the value is greater than equal to zero.

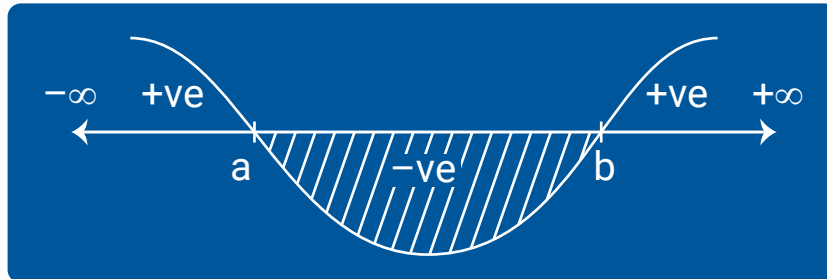


Solution will be $x \leq a$ or $x \geq b$, as the inequality is ≥ 0 , so critical points will also be included.

(iii) $(x - a)(x - b) < 0, a < b$

Now inequality given is less than zero, the solution which will give -ve value.

Same steps has to be followed, mark the critical points and intervals with the +ve & -ve sign alternatively starting from right of b.



Shaded part is the solution, which gives -ve value.

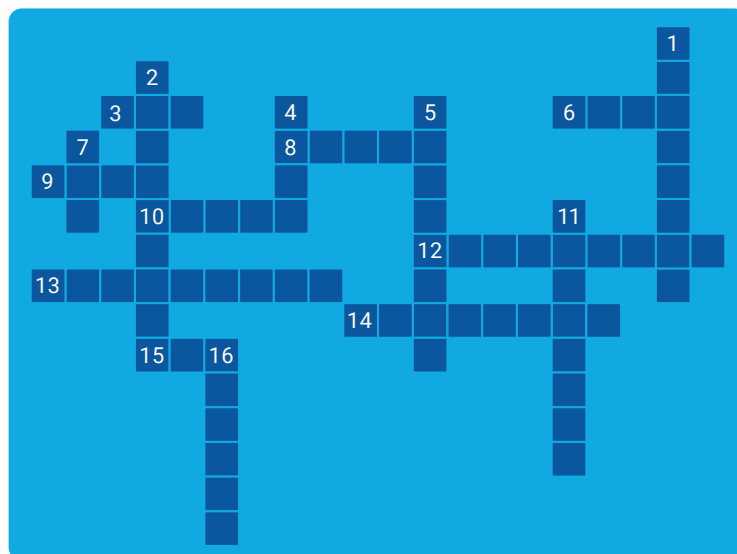
So, solution of $(x - a)(x - b) < 0, a < b$ is $a < x < b$



Do
It Yourself

$(x - a)(x - b) \leq 0, a < b$

Crossword



Across

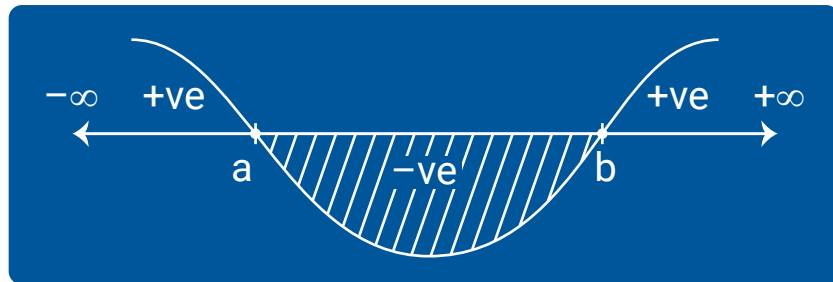
3. The product of the slopes of a pair of perpendicular lines is minus _____. [3]
6. The slope of the line with equation $y = 4x + 1$ is _____. [4]
8. The y-intercept of the line with equation $y = 3x + 8$ is _____. [5]
9. The slope of the line with equation $-10x + 2y = 14$ is _____. [4]
10. The slope of a line is the _____ of its rise and run. [5]
12. In the equation $y = -4x + 1$, as x increases, y _____ because slope is negative. [9]
13. The slope of a vertical line is _____. [9]
14. The line with equation $x = 3$ runs up and down. Therefore, it is a _____ line. [8]
15. The slope of line that passes through the points $(2, 4)$ & $(-1, -2)$ is _____. [3]

Down

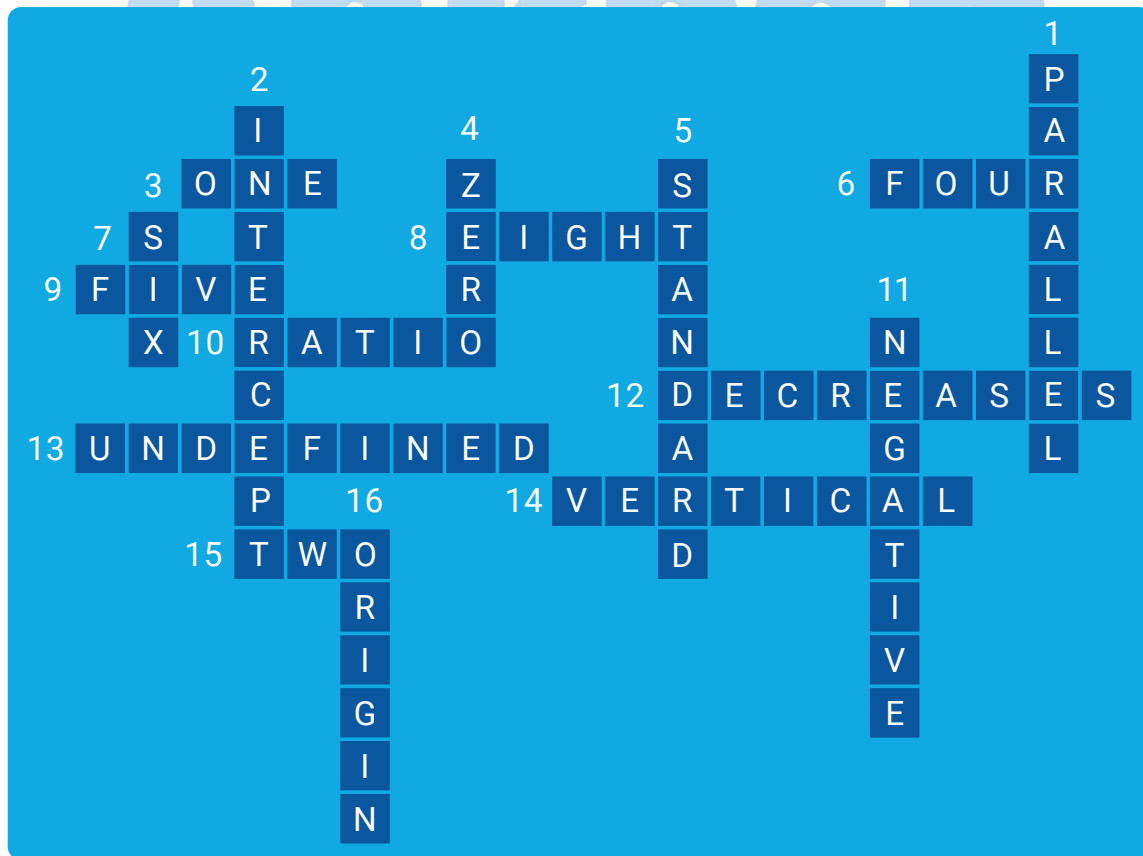
1. _____ lines have the same slope. [8]
2. The equation $y = 3x - 2$ is in slope _____ form. [9]
4. A horizontal line has a slope of _____. [4]
5. The equation $4x + 2y = 9$ is in _____ form. [8]
7. The y-intercept of the line in the equation $5x + 2y = 12$ is _____. [3]
11. A _____ slope indicates that the line falls from left to right. [8]
16. The line with equation $y = -2x$ passes through the _____. [6]

Answer (Do It Yourself)

$$a \leq x \leq b$$



Answer (Crossword)



Human Eye and Colourful World

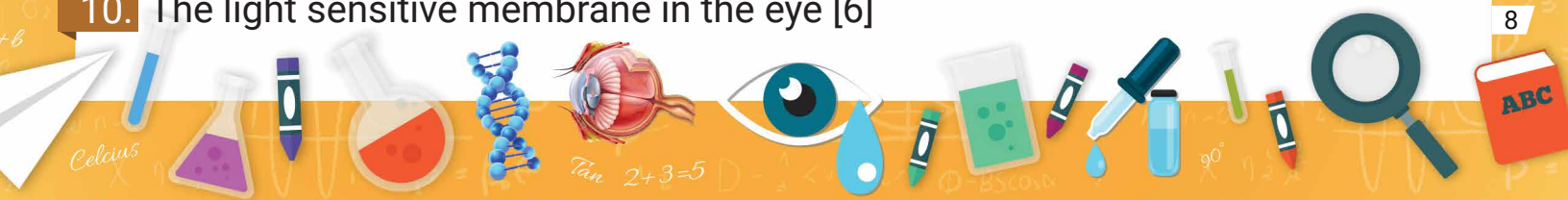
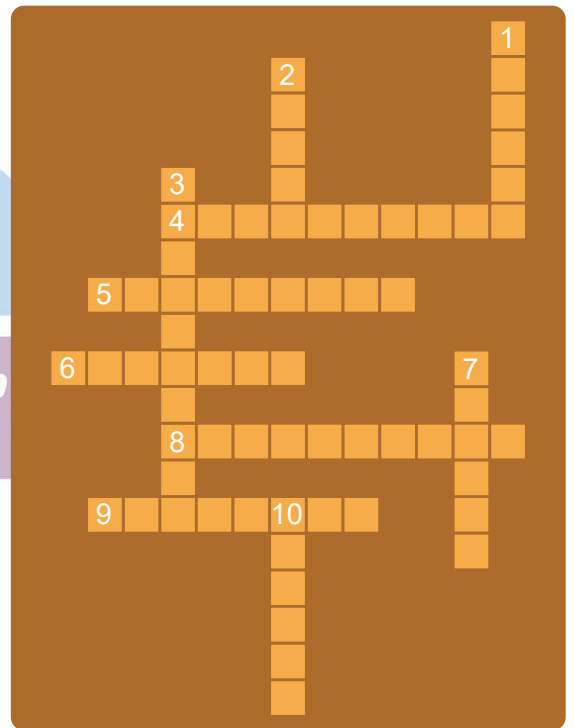
Crossword

Across

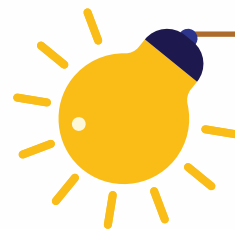
4. Arises due to gradual weakening of ciliary muscles. [10]
5. The area of the eye where there is no vision. [9]
6. A natural spectrum appearing in the sky after a rain shower. [7]
8. The twinkling of stars is due to atmospheric _____ of starlight. [10]
9. The band of colored components of a light beam. [8]

Down

1. Most of the refraction of light rays entering the eyes occurs at [6]
2. The sensory cells that detect color [5]
3. The nerve that takes impulses to the brain from the eye [10]
7. Near - sightedness is also known as [6]
10. The light sensitive membrane in the eye [6]



Interesting Facts



Human Eye

1. Your peripheral vision is low resolution.
2. On an average you blink 15 to 20 times per minute.
3. Resolution of Iphone 6 camera is about 8 megapixels and that of human eye is about 576 megapixels.
4. It is impossible to sneeze with your eyes open.
5. Eyes are the second most complex organ after brain.
6. The cornea is the only tissue in the human body which doesn't contain blood vessels.
7. Fingerprint has 40 unique characteristics and iris has 256. That's why retina scan are increasingly being used for security purposes.
8. New borns don't produce any tears and they are colour blind at birth.
9. The optic nerve that connects the eye to the brain is too sensitive to reconstruct successfully.
10. With over 55% of the world's population having brown eyes, it remains the most common colour.



Quiz

1

The term "power of accommodation" as applied to the eye, refers to its ability to:

- (A) Control the light intensity falling on the retina
- (B) Erect the inverted image formed on the retina
- (C) Vary the focal length of the lens
- (D) Vary the distance between the lens and retina

2

How do you think that the eye change in order to focus on near or distant objects?

- (A) The lens moves in or out
- (B) The retina moves in or out
- (C) The lens becomes thicker or thinner
- (D) The pupil gets larger or smaller

3

A person cannot see the distant objects clearly (though he can see the nearby objects clearly). He is suffering from the defect of vision called:

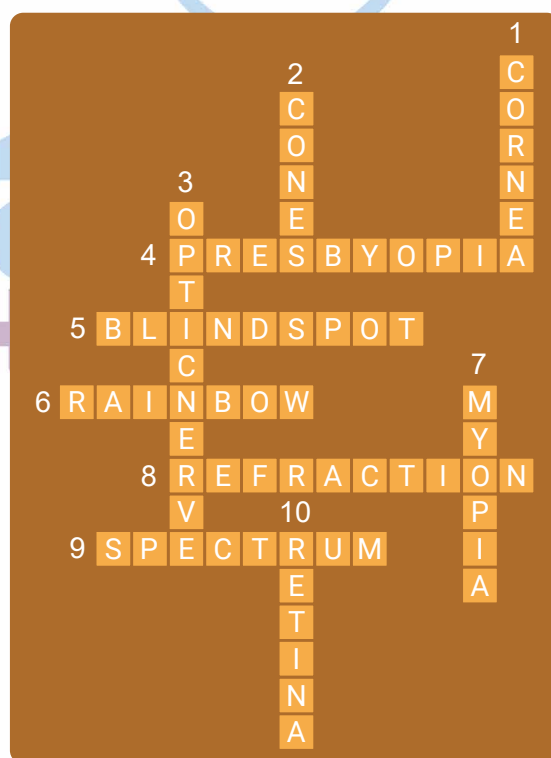
- (A) Cataract
- (B) Hypermetropia
- (C) Myopia
- (D) Presbyopia

4

A man finds it difficult to read the odometer on the dashboard of the car but is able to clearly read a distant road sign. Which of the following statement is correct about this man?

- (A) The near point of his eyes has receded away
- (B) The near point of his eyes has come closer to him.
- (C) The far point of his eyes has receded away.
- (D) The far point of his eyes has come closer to him.

Answer (Crossword)



Answer (Quiz)

Q.1 (C)

Q.2 (C)

Q.3 (C)

Q.4 (A)



Salts and Indicators

Common Salt and Us

Why is common salt important for our body?



- ✓ Keeps the body hydrated
- ✓ Essential for nerve and muscle function
- ✓ It regulates blood fluids and prevents low blood pressure.



Maintaining Salt Balance in Our Body

Excess salt causes health problems like kidney disease, hypertension, high blood pressure, cardiovascular disease and stroke.

Low salt presence in our body can cause vomiting, headache, confusion, loss of energy and muscle weakness.

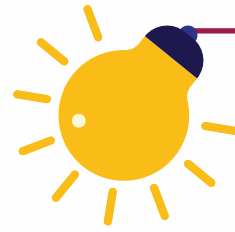


DID YOU KNOW?

Salt is present in each and every cell of our body. It is required to flush out toxins from the body.



Interesting Facts



1. In chemistry, soap is a type of salt. This is because it is formed from the mixing of an acid and a base.
2. Salt was so valuable in ancient Rome that soldiers were sometimes paid with it. In fact, the word 'salary' comes from the Latin word sal, for salt. If a soldier did a lousy job, his pay cheque might be cut, which is how we got the expression "not worth his salt".
3. Salt also took on a great deal of symbolic value. There is a reason it is mentioned so many times in the Bible ('salt of the earth', 'a pillar of salt', 'a covenant of salt'). Its preservative properties made it an apt metaphor for permanence and conviction.
4. Most people consume too much of salt. The World Health Organization (WHO) recommends less than 5 grams of salt per day, which is equal to one teaspoon. Do not keep salt shakers on the table in order to reduce the salt intake.



Extra salt may be lurking in your meals, even if you are very careful.

Cultivate Healthier Eating Habits

Avoid sprinkling salt on salads, fruits or yogurt. Condiments like salad dressings, pickles, papads and ketchup are high in sodium content.



Soap with high pH (too basic) will irritate or burn the skin and should not be used !!!



Don't have pH strips to test the soap before using it on the skin?

- **Don't Worry!** Luckily, there are plenty of ways to test the soap before using it on the skin.
- **Red cabbage (aka: purple cabbage)** is an effective pH indicator.

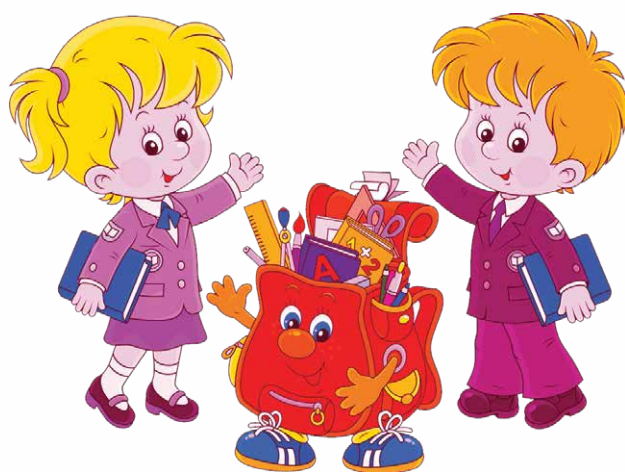


- Place a small amount of the juice directly onto your soap.
- Within seconds, the purple juice will begin to change color.
- Red cabbage contains a pigment molecule called flavin that changes color depending on the pH level of various substances.
- If the pH level which is safe level for soap is 8-10, then the purple liquid will quickly change from purple to blue.
- If soap is too basic, the purple cabbage juice will turn from purple to green or yellow.



? Have you ever ended up with a too basic batch of soap?

Now you can check and use what is best for you.



Control and Coordination

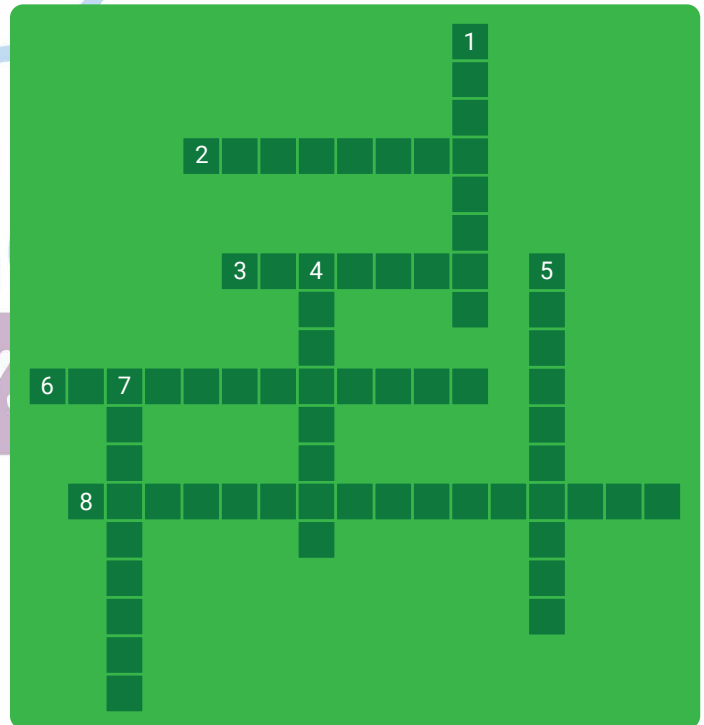
Crossword

Across

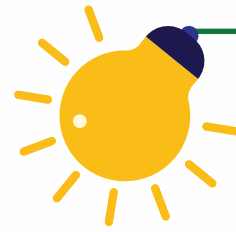
2. Largest part of the brain.
3. Self propagated current that runs along the surface of the nerve fibre for passage of information.
6. Automatic response to a stimulus which is not under the voluntary control of the brain.
8. Cardiac, respiratory and salivary centre.

Down

1. Non-nutrient chemical substances secreted by endocrine gland.
4. Works as both exocrine and endocrine gland.
5. Caused by over secretion of growth hormone after adult size is reached.
7. Part of the brain specialised for hearing, smell, sight, so on.



Interesting Facts



1. People who consume too much alcohol cannot coordinate movement with their senses (Example: cannot touch tip of nose with their fingers, have abnormal walking movements & staggers). This is because alcohol inhibits the activity of **cerebellum** which results in a loss of ability to coordinate muscular movements.



2. Injury to the vestibular branch of the **VIII Cranial Nerve** may cause **vertigo** (a subjective feeling that one's own body or the environment is rotating).



3. We cry when we are very happy because our hypothalamus in our brain can't distinguish the difference between strong happiness and strong sadness.



4. **Diabetes Mellitus (Type-I)**: It is insulin dependent diabetes mellitus (IDDM) and also known as juvenile onset diabetes because it most commonly develops in people younger than 20. It is an autoimmune disorder in which immune system destroys β cells.

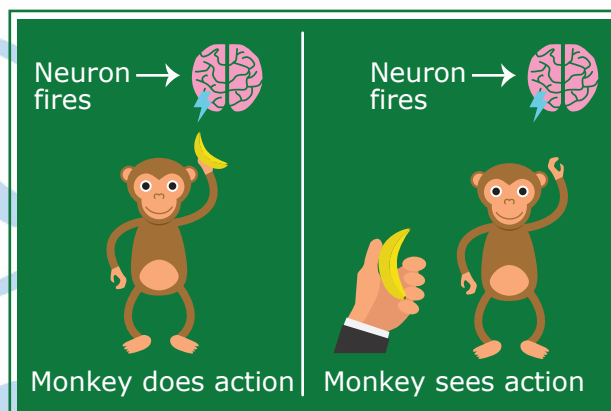
Diabetes Mellitus (Type-II): It is non-insulin dependent diabetes mellitus (NIDDM). It is also known as maturity onset diabetes because it occurs later in life. It arises not from shortage of insulin but because of target cells became less sensitive to insulin. Obesity may be a cause & insulin resistance occurs.



5. Babies are capable of reproducing facial expressions, and as adults, we imitate basic behaviour. Laughter can be spread, we can cry while watching a sad movie. It seems like we have the capacity to feel what others feel, empathize with them and understand their feelings. What happens in the brain for this to happen?

The answer is **mirror neurons**.

Mirror neurons can be defined as a group of neurons that activate when we perform an action or when we see an action being performed. For example, when a chimpanzee sees its mother opening a nut with a rock and then tries to imitate her with another nut. Mirror neurons are related with empathic, social and imitations behaviour. They are a fundamental tool for learning.



Mnemonics

1. Brain : 4 Lobes

Olive **P**asta **T**astes **F**abulous: Occipital, Parietal, Temporal, Frontal

2. Mnemonic on the neurotransmitters released:

SAD: **S**erotonin, **A**cetylcholine, **D**opamine



Choose the Correct Word From the Word Box



Word Box

- Somatic Neural System
- Cerebellum
- Cerebrospinal fluid
- 12 pairs
- Cranium
- Hypothalamus
- Autonomic Neural System

1

_____ present in the brain and spinal cord serves as a pad to cushion the central nervous system from shock.

2

_____ is called the thermoregulatory centre of the body.

3

_____ is the second largest part of the brain.

4

Brain is protected by the _____ in the skull.

5

_____ cranial nerves arise from the brain.

6

PNS is divided into two divisions called _____ & _____.



Q1

Which part of diencephalon is referred to as “relay centre” of the cerebral cortex ?

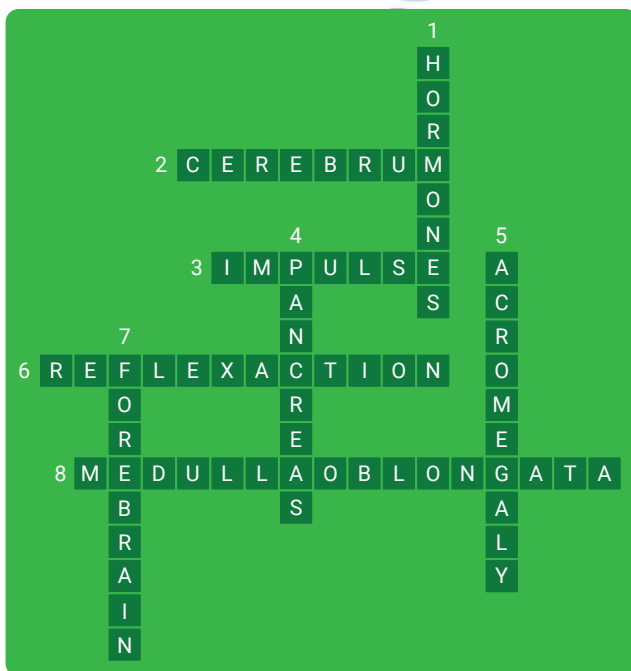
- (A) Hypothalamus
- (B) Epithalamus
- (C) Thalamus
- (D) Cerebellum

Q2

Which of the following parts of brain is concerned with regulating body posture, equilibrium and coordinated rapid muscular activity?

- (A) Diencephalon (B) Pons
- (C) Medulla (D) Cerebellum

Answer (Crossword)



Answer (Choose the correct word)

1. Cerebrospinal fluid
2. Hypothalamus
3. Cerebellum
4. Cranium
5. 12 pairs
6. Somatic Neural System and Autonomic Neural System

Answer (Scratch Your Brain)

Q.1 (C)

Q.2 (D)



The Age of Industrialization

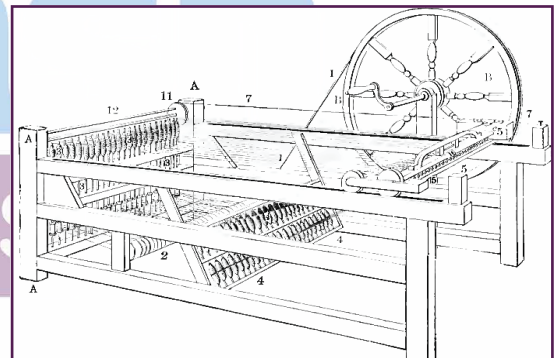
Industrialisation was the period of social and economic change that transformed human society from an agrarian society into an industrial society. It involved an extensive re-organisation of the economy for the purpose of manufacturing.

The period of Industrialisation began in the mid 18th century (i.e. 1750's) in England.

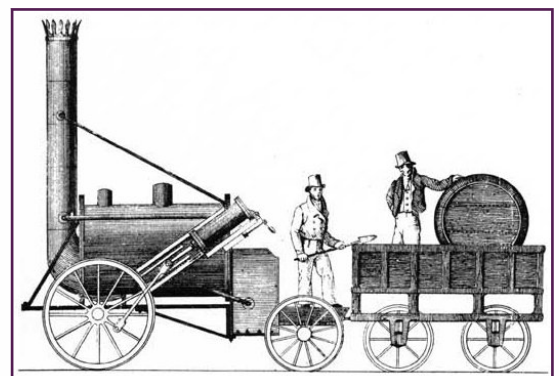
Causes of Industrial Revolution

1. Increase in the population led to the increase in the demand among the people in the market.
2. Expansion of foreign trade created an international demand for goods and services.
3. Development of effective means of transportation created efficiency in terms of the loading and unloading of the goods and services from one region to another.
4. Technological inventions like Spinning Jenny, Steam Engine helped in mass production.

These factors collectively led to the beginning of Industrial Revolution.



Spinning Jenny



Locomotive Engine, "The Rocket", 1830

Reason for the beginning of Industrial Revolution in England

England acquired colonies and established an international market through the regular supply of raw material.

It also earned a vast amount of profit through this overseas trade and the trade in slaves which made Britain a supreme and unrivalled power in the world.

Serfdom was abolished which created a large labour force. Demand of labour for industries was fulfilled from here.



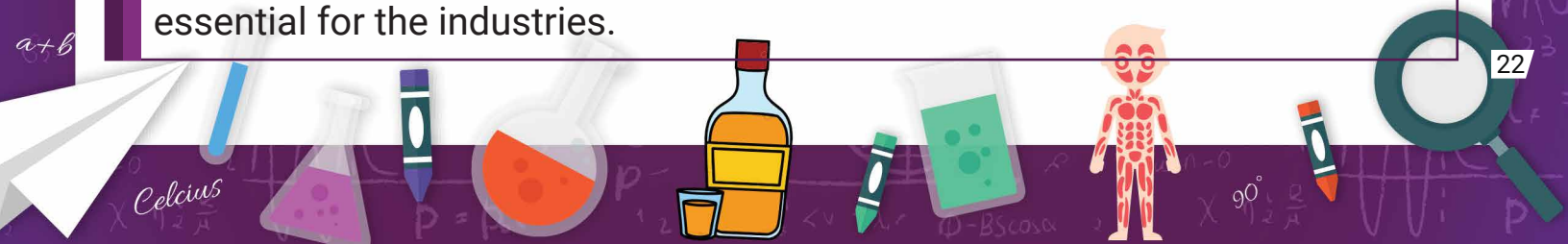
DID YOU KNOW?

Serfdom: It was a system in medieval Europe in which a tenant farmer was bound to a hereditary plot of land and the will of his landlord. Serfdom was not same as slavery.



The commercial class acquired more political power which meant no restrictions at the end of the government.

England had a lot of natural resources like coal, iron ore etc... which were essential for the industries.



England had a large shipping industry, hence no problem of transportation.

Hence, this provided all the necessary conditions for the beginning of Industrial Revolution in Britain.

Impact of the Industrial Revolution

1. Emergence of middle class
2. Emergence of many type of factories
3. Improvement in the education sector
4. Increased environmental pollution



Quiz

1. The Industrial Revolution began in which country?

- | | |
|-------------|------------|
| (A) England | (B) France |
| (C) Germany | (D) USA |

2. Who invented Spinning Jenny ?

- | | |
|----------------------|------------------|
| (A) James Hargreaves | (B) James Watt |
| (C) Newcomen | (D) Nicola Tesla |



3.

Which of the following is/are the reason/reasons behind the beginning of Industrial Revolution ?

- (A) Increase in the demand in the market
- (B) Technological innovation
- (C) Expansion of Foreign Trade
- (D) All of these

4.

The Industrial Revolution began in _____.

- (A) 1700
- (B) 1750's
- (C) 1800
- (D) 1850's

5.

Which of the following was/were the social impact of Industrial Revolution?

- (A) Creation of middle class
- (B) Rapid Urbanisation
- (C) Emergence of Nuclear Family
- (D) All of these

Answers

1. (A)

2. (A)

3. (D)

4. (B)

5. (D)



Tenses

Choose the correct form of verb.

1. He did not _____ part in the debate.
(A) took (B) taken
(C) take (D) takes

2. He _____ not taken anything till then.
(A) have (B) has
(C) had (D) did

3. Has he not _____ to school for many days?
(A) coming (B) came
(C) come (D) been coming

4. Her train _____ at 8.35 a.m. tomorrow morning.
(A) arrives (B) is arriving
(C) will arrive (D) arrive

5. The light went out while I _____.

(A) reading

(B) were reading

(C) am reading

(D) was reading

6. The father with his two sons _____ to witness the match.

(A) is going

(B) was going

(C) are going

(D) were going

7. Scoring well in Mathematics _____ in getting first division.

(A) help

(B) will be help

(C) helps

(D) helped

8. The Secretary and Treasurer _____ absent.

(A) are

(B) has

(C) is

(D) have been

9. Had the bell _____ before you reached home?

(A) ring

(B) rang

(C) rung

(D) has rung



10. One hardly _____ what to do.

(A) knew

(B) know

(C) knows

(D) known

Answers

1. (C)

2. (C)

3. (D)

4. (A)

5. (D)

6. (A)

7. (C)

8. (C)

9. (C)

10. (C)

Aakash



Alphanumeric Series

Choose the missing term out of the given options.

1

25Z, 24Y, 22W, 19T, ?

(A) 15P

(B) 16Q

(C) 16P

(D) 17Q

2

Z2J, X4L, V7N, T11P, R16R, ?

(A) T11Q

(B) P20R

(C) P22T

(D) P21M

3

0B4, 0D8, ?, 2N8, 4V4

(A) 4W6

(B) 1H6

(C) 6H1

(D) 1H5

4

1 _ m 2 n _ _ 3 o o _ _

(A) nmoon

(B) mnooo

(C) mnonn

(D) mnnoo



5

AB, BA, ABC, CBA, ?, DCBA

(A) ABCE

(B) ABCD

(C) BCDA

(D) ABDC

Answers

1. (A)

2. (C)

3. (B)

4. (D)

5. (B)

Aakash



Happy Birthday

Ronald Ross

“Science is the Differential Calculus of the mind. Art the Integral Calculus; they may be beautiful when apart, but are greatest only when combined.”



Born - 13 May 1857
Died - 16 Sep 1932

Ronald Ross was born on May 13, 1857, in Almora, India. At the age of 14, Ross won a prize in mathematics and was presented the book *Orbs of Heaven*, which sparked his interest in the field of mathematics. Ross is known for his outstanding research work on malaria-causing parasites in mosquitoes. He discovered malarial parasites in the salivary glands of mosquitoes.

Nobel Prize in Physiology or Medicine (1902), The James Tait black Memorial Prize - Biography (1923).

NSO (LEVEL-I) 2021-22 Result



Our Top International & Zonal Rankers in Class X

Intl.
Rank
1
Zonal
Rank
1



Keshav Dharni

Intl.
Rank
1
Zonal
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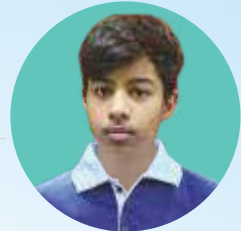
Rishi Shekher Shukla

Intl.
Rank
2
Zonal
Rank
1



Meghna Hazari

Intl.
Rank
6
Zonal
Rank
3



Daksh Goyal

Intl.
Rank
9
Zonal
Rank
1



Priyanshu Sarkar

Intl.
Rank
9
Zonal
Rank
3



Harshil Goel

Intl.
Rank
9
Zonal
Rank
3



Kanika Rattan

Intl.
Rank
9
Zonal
Rank
5



Ridhima Gupta

Intl.
Rank
9
Zonal
Rank
5



Jashan Mittal

Intl.
Rank
13
Zonal
Rank
7



Krish Raj

Intl.
Rank
14
Zonal
Rank
6



Ishan Raj Yadav

Intl.
Rank
15
Zonal
Rank
2



Raaj Asrieeth M R

Intl.
Rank
16
Zonal
Rank
5



Arjun Gupta

Intl.
Rank
16
Zonal
Rank
9



Agrim Bansal

Intl.
Rank
16
Zonal
Rank
54



Mohammed Saman

Intl.
Rank
17
Zonal
Rank
10



Jagrav Garg

1908^{*}
1741 Classroom
167 Distance & Digital

**Aakashians Outshine
in NSO (Level-I) 2021-22**

IMO (Level-I) 2021-22 Result



Our Top International & Zonal Rankers in Class X

Intl. Rank 1 Zonal Rank 1		Intl. Rank 1 Zonal Rank 1		Intl. Rank 1 Zonal Rank 1		Intl. Rank 1 Zonal Rank 1	
Intl. Rank 1 Zonal Rank 1		Intl. Rank 2 Zonal Rank 2		Intl. Rank 2 Zonal Rank 2		Intl. Rank 3 Zonal Rank 1	
Intl. Rank 4 Zonal Rank 3		Intl. Rank 5 Zonal Rank 4		Intl. Rank 8 Zonal Rank 4		Intl. Rank 8 Zonal Rank 1	
Intl. Rank 9 Zonal Rank 4		Intl. Rank 9 Zonal Rank 5		Intl. Rank 9 Zonal Rank 7		Intl. Rank 10 Zonal Rank 1	

and many more...

1723*
1485 Classroom
238 Distance & Digital

**Aakashians Outshine
in IMO (Level-I) 2021-22**

*Includes students from Classroom, Distance & Digital Courses

IOQJS 2021-22 Result

Indian Olympiad Qualifier in Junior Science



Our Top Performers from Classroom Programs



Banibrata Majee
Class-IX



Shanmathi Vasudevan
Class-X



Ketan S Hegde
Class-IX



Bidisha Majee
Class-IX



Tamayan Bera
Class-IX



Visaka muralidharan
Class-X



Aksh Gogi
Class-IX



Tanooj Kumar Kanike
Class-IX



Tejasvi Shrivastava
Class-X

and many more...

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Aakashians Outshine in IOQJS (Part-I) 2021-22

IOQM 2021-22 Result

Indian Olympiad Qualifier in Mathematics



Our Top Performers from Classroom Programs



Ananshi
Class-IX



Malavika Suja
Class-IX



Koustuv Sahoo
Class-X



Zaman Husain
Class-X



Gautham Pa
Class-X



Madhav Manu
Class-X



Bismit Sahoo
Class-X



Mohit Raj
Class-IX



Shubham Nair
Class-X



Abhisri Das
Class-X



Arnab Bhandari
Class-X

and many more...

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Aakashians eligible for IOQM (Part-B) 2021-22