Question Review

All

A vector coplanar with the non-collinear vectors a and b is

- a × b
- la + mb
- a . b
- None of these

EXPLANATIONS Report

57 % were correct!

It is obvious.

If a and b are two non-collinear vectors and $x\,a + y\,b = 0$

- x = 0 , but y is not necessarily zero
- y = 0 , but x is not necessarily zero
- x = 0 , y = 0
- None of these

EXPLANATIONS Report

76 % were correct!

If $a,\ b$ are two non-zero, non-collinear vectors and x, y are two scalars such that $xa + yb = 0$, then $x = 0,\ y = 0$. Because otherwise one will be a scalar multiple of the other and hence collinear which is a contradiction.

$\int x^o dx =$

- $\frac{\pi}{180}$ x+ c

- $\frac{\pi x^2}{2} + c$
- $\frac{x x^o}{2} + c$
- $\frac{(x^o)^2}{2} + c$

EXPLANATIONS Report

52 % were correct!

$$x^o = (\frac{\pi}{180})x$$

or,

$$\int (\frac{\pi}{180})x$$

=

$$(\frac{\pi}{180}) \int (x)$$

=

$$(\frac{\pi}{180})(\frac{x^2}{2}) + c$$

=

$$(\frac{x x^o}{2}) + c$$

$$\lim_{x \to \infty} \frac{\sin x}{x} =$$

- 1
- 0
- ∞
- none of these

EXPLANATIONS Report

67 % were correct!

$$\lim_{x \to \infty} \frac{\sin x}{x}$$

Let $x = \frac{1}{y}$ or, $y = \frac{1}{x}$

So that: $x \to \infty \Rightarrow y \to 0$

$$\therefore \lim_{x\to\infty}\left(\frac{\sin x}{x}\right) = \lim_{y\to 0}\left(y\cdot \sin\frac{1}{y}\right) = \lim_{y\to 0} y \times \lim_{y\to 0}\sin\frac{1}{y}$$
$$= 0 \times \ldots = 0$$

The minimum value of |x -3| + |x -2| + |x - 5| is:

- [x] 3
- [ ] 15
- [ ] 7
- [ ] 9

If y = $\frac{1}{(cosecx + cotx)}$, then $\frac{dy}{dx}$ =

- [ ] cosecx + cosecx. cotx
- [ ] -cosec^{2}x.cotx
- [ ] cosec x(cosec x+ cot x)
- [x] -cosecx (cotx + cosecx)

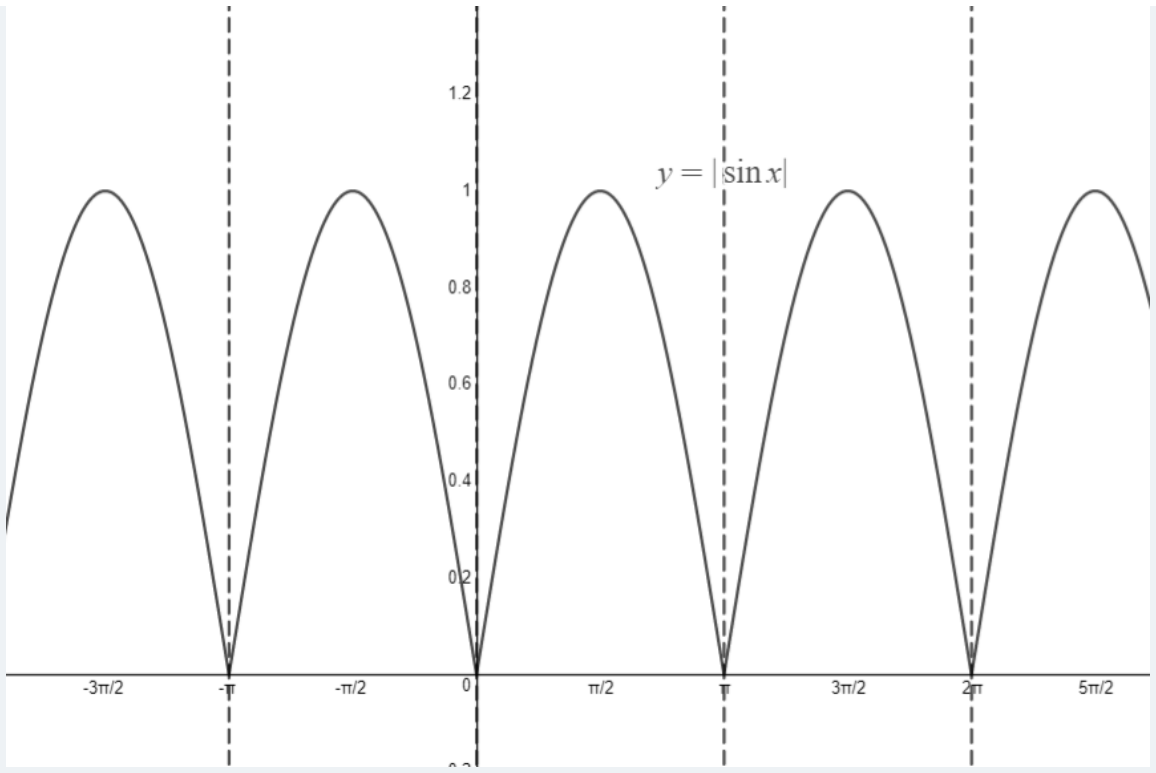
The function $y = |\sin x|$ is continuous for any *x* but it is not differentiable at a

- [ ] x = 0 only
- [ ] x = π only
- [ ] x = kπ, k ∈ Z$^+$ only
- [x] x = 0 and x = kπ(k is an integer)

EXPLANATIONS Report

54 % were correct!

It can be easily seen from the graph of $f(x) = |sinx|$ that it is every where continuous but not differentiable at integer multiples of π and at $x = 0$.



If $y = x + \frac{1}{x}$, then

- $x^2\frac{dy}{dx} + xy = 0$
- $x^2\frac{dy}{dx} + xy = 0$
- ✓ $x^2\frac{dy}{dx} - xy + 2 = 0$
- None of these

EXPLANATIONS Report

42 % were correct!

$$y = x + \frac{1}{x} \Rightarrow \frac{dy}{dx} = 1 - \frac{1}{x^2}$$

$$\text{Therefore } x^2 \cdot \frac{dy}{dx} - xy + 2 = x^2\left(1 - \frac{1}{x^2}\right)$$

$$- x\left(x + \frac{1}{x}\right) + 2 = 0$$

The bisectors of the angles between the lines xy=0 are

- x=0, y=0
- ✓ (y-x) =0, (y+x) =0
- $x^2 + y^2 = 0$, $x^2 - y^2 = 0$
- x+2y=0, x-y=0

Focus and directrix of the parabola $x^2 = -8ay$ are

- [x] (0, -2a) and y = 2a
- [ ] (0, 2a) and y = -2a
- [ ] (2a, 0) and x = -2a
- [ ] (2a, 0) and x = -2a

EXPLANATIONS Report

68 % were correct!

Given equation is $x^2 = -8ay$. Here $A = 2a$

Focus of parabola $(0, -A)$ i.e. $(0, -2a)$

Directrix $y = A$ i.e. $y = 2a$

The equation of the hyperbola whose transverse eccentricity is $\frac{\sqrt{5}}{2}$ and length of axis is 1 is

- [x] $x^2 - 4y^2 = 1$
- [ ] $4x^2 - 2y^2 = 1$
- [ ] $x^2 - y^2 = 1$
- [ ] $16x^2 - y^2 = 1$

Which of the following is the diameter of the circle $x^2 + y^2 - 4x - 2y + 7 = 0$?

- [x] x - 2y = 0
- [ ] x + 2y = 0
- [ ] 2x + y = 0
- [ ] 2x - y = 0

A body is thrown horizontally from the top of a tower of height 5 *m*. It touches the ground at a distance of 10 *m* from the foot of the tower. The initial velocity of the body is (g = 10 ms^{-2})

- 2.5 ms^{-1}
- 5 ms^{-1}
- 10 ms^{-1} ✓
- 20 ms^{-1}

EXPLANATIONS Report

68 % were correct!

$$S = u \times \sqrt{\frac{2h}{g}} \Rightarrow 10 = u\sqrt{2 \times \frac{5}{10}} \Rightarrow u = 10\text{m/s}$$

Two cars of unequal mass use similar tyres. If they are moving at same initial speed, the minimum stopping distance is

- smaller for heavier car
- smaller for lighter car
- same for both ✓
- depends on volume of car

We have three beakers *A*, *B* and *C* containing glycerine, water and kerosene respectively. They are stirred vigorously and placed on a table. The liquid which comes to rest at the earliest is

- Glycerin ✓
- Water
- Kerosene
- All of them at the same time

The length of the two rods made up of the same metal and having the same area of cross-section are 0.6 *m* and 0.8 *m* The temperature between the ends of first rod is $90^{\circ}C$ and $60^{\circ}C$ and that for the other rod is $150^{\circ}C$ and $110^{\circ}C$. For which rod the rate of conduction will be greater

- First

- ○ Second
- ◉ Same for both
- ○ None of the above

EXPLANATIONS

Report

63 % were correct!

Rate of heat conduction in first rod $R_1 = \frac{Q_1}{t} = \frac{KA(90-60)}{0.6}$

Rate of heat conduction in second rod $R_2 = \frac{Q_2}{t} = \frac{KA(150-110)}{0.8}$

$$\frac{R_1}{R_2} = \frac{\frac{KA(90-60)}{0.6}}{\frac{KA(150-110)}{0.8}} = 1$$

If work is done on a system adiabatically temperature of system

- ◉ increases
- ○ decreases
- ○ remain constant
- ○ none of above

A hot body will radiate heat most rapidly if its surface is

- ○ white and polished
- ○ white and rough
- ◉ black and polished
- ○ black and rough

Both light and sound wave

- ◉ can diffracted

- can polarized
- can travel in vacuum
- electromagnetic

The distance between two consecutive crests in a wave train produced in a string is 5 cm. If 2 complete waves pass through any point per second, the velocity of the wave is

- 10 cm/sec
- 2.5 cm/sec
- 5 cm/sec
- 15 cm/sec

EXPLANATIONS

Report

62 % were correct!

Frequency $f = 2$

Wavelength $\lambda = 5$

$v = f\lambda = 2 \times 5 = 10\,cm/sec$