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Rana Abubakar Khan

If you want to learn computer programming then contact with me

truefriendlion@gmail.com

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MTH301 SOLVED MEGA MCQs FILE BY; MALIK AWAIS KHOKHAR

Question No: 1 (Marks: 1) - Please choose one

Intersection of two straight lines is -----

►Surface

►Curve

►Plane

►Point



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Question No: 2 (Marks: 1) - Please choose one

All axes are negative in ----- octant

►Second

►Fourth

►Seventh

►Eighth

Question No: 3 (Marks: 1) - Please choose one

In three dimensional space, intersection of two surfaces is a -----

►Plane

►Sphere



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►Curve

►None of these

Question No: 4 (Marks: 1) - Please choose one

$$\frac{\partial^2 f}{\partial^2 x} + \frac{\partial^2 f}{\partial^2 y} + \frac{\partial^2 f}{\partial^2 z} = 0$$

For a function $f(x, y, z)$, the equation is known as -----

►Gauss Equation

►Euler's equation

►Laplace's Equation

►Stoke's Equation

Question No: 5 (Marks: 1) - Please choose one



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Is the function $f(x, y, z)$ continuous at origin? If not, why?

$$f(x, y, z) = \frac{x^3}{y} + \sin z$$

► $f(x, y, z)$ is continuous at origin

► $f(0, 0, 0)$ is not defined

► $f(0, 0, 0)$ is defined but $\lim_{(x, y, z) \rightarrow (0, 0, 0)} f(x, y, z)$ does not exist

► $f(0, 0, 0)$ is defined and $\lim_{(x, y, z) \rightarrow (0, 0, 0)} f(x, y, z)$ exists but these two numbers are not equal.

Question No: 6 (Marks: 1) - Please choose one

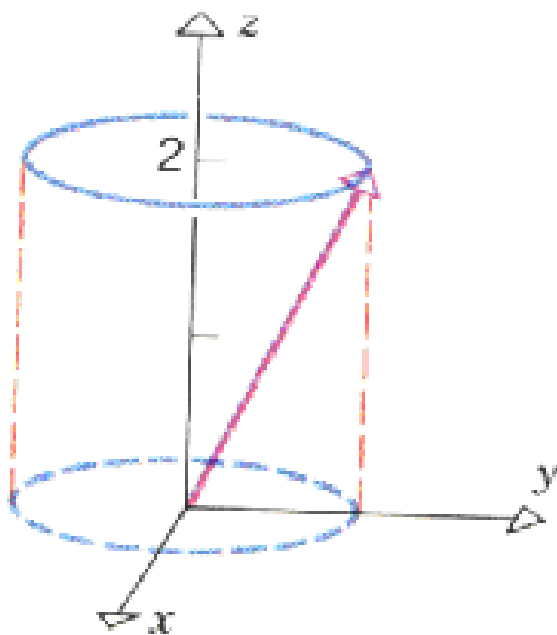
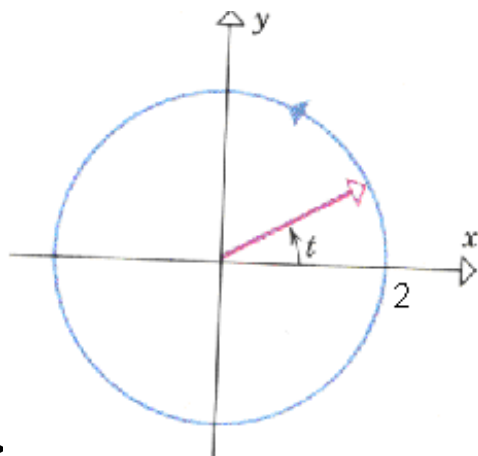
Match the following vector-valued function with its graph.

$$r(t) = \cos t \hat{i} + \sin t \hat{j} + 2\hat{k} \quad \text{and} \quad 0 \leq t \leq 2\pi$$



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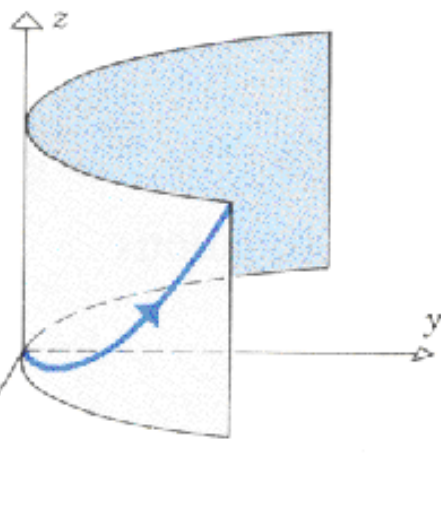
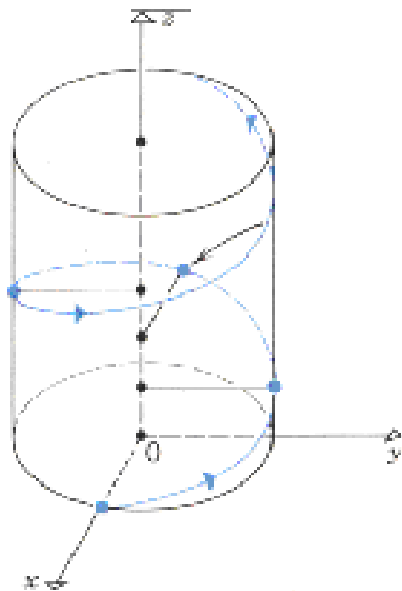
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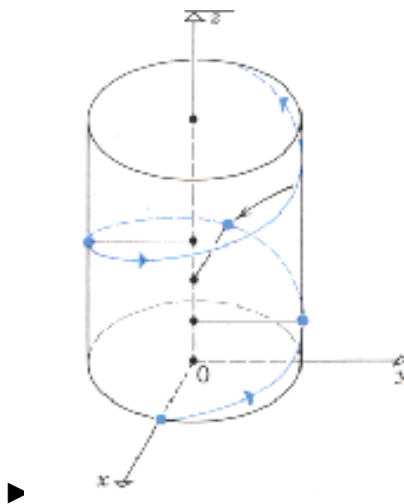
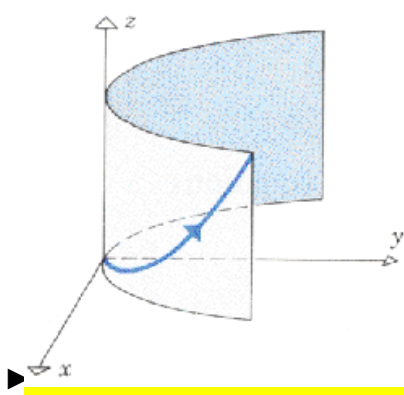
Question No: 7 (Marks: 1) - Please choose one



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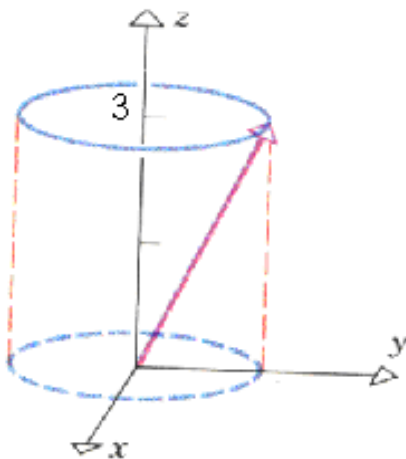
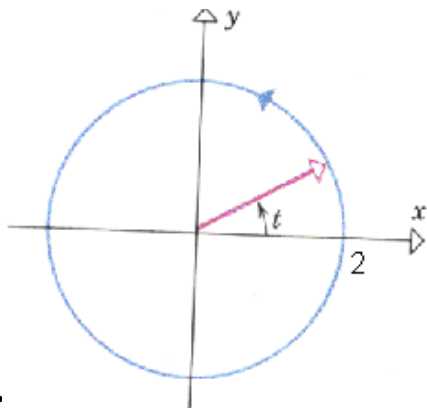
Match the following vector-valued function with its graph.

$$r(t) = \cos t \hat{i} + \sin t \hat{j} + 3\hat{k} \quad \text{and} \quad 0 \leq t \leq 2\pi$$





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Question No: 8 (Marks: 1) - Please choose one

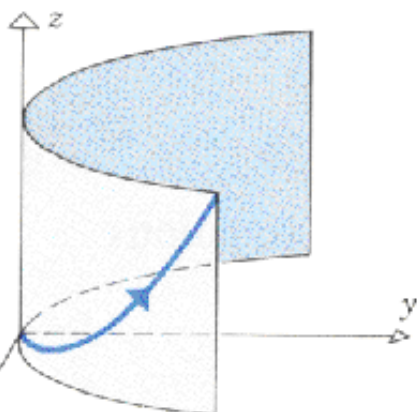
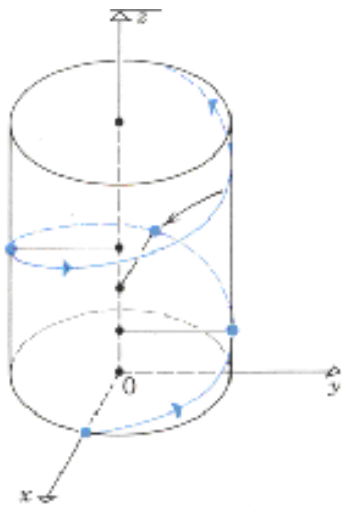
Match the vector-valued function with its graph.

$$r(t) = (a \cos t)\hat{i} + (a \sin t)\hat{j} + (ct)\hat{k} \quad \text{where } a \text{ and } c \text{ are positive constants and } 0 \leq t \leq 2\pi$$



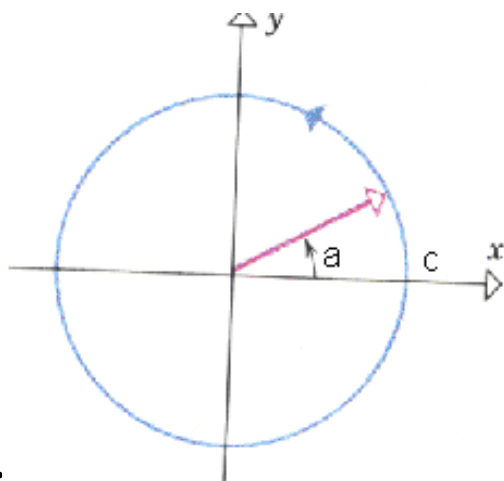
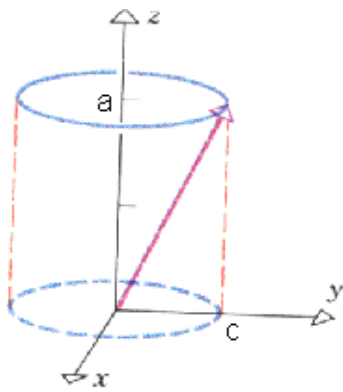
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Question No: 9 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?

$$\vec{r}(t) = \left(t^4, \sqrt{t+1}, \frac{3}{t^2} \right)$$



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$$\vec{r}'(t) = \left(4t^3, \frac{1}{\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{6}{t^3} \right)$$



$$\vec{r}'(t) = \left(4t^4, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



Question No: 10 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?

$$\vec{r}(t) = (e^{t^2}, t^2, \sec 2t)$$

$$\vec{r}'(t) = (2te^{t^2}, 2t, 2\sec 2t \tan 2t)$$





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$$\vec{r}'(t) = (te^{t^2}, 2t, \sec 2t \tan 2t)$$



$$\vec{r}'(t) = (2te^{t^2}, 2t, \tan 2t)$$



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$$\vec{r}'(t) = (t^2 e^{t^2}, 2t, \sec 2t \tan 2t)$$



Question No: 11 (Marks: 1) - Please choose one

The following differential is exact

$$dz = (x^2 + y^2) dx - 2xy dy$$

► True

► False



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Question No: 12 (Marks: 1) - Please choose one

Which one of the following is correct Wallis Sine formula when n is even and $n \geq 2$?

▶
$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \cdots \frac{5}{6} \frac{3}{4} \frac{1}{2}$$

▶
$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \cdots \frac{6}{7} \frac{4}{5} \frac{2}{3}$$

▶
$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \cdots \frac{6}{5} \frac{4}{3} \frac{2}{1}$$

▶
$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \cdots \frac{6}{5} \frac{4}{3} \frac{2}{1}$$

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Question No: 13 (Marks: 1) - Please choose one

If $a > 0$, then the equation, in polar co-ordinates, of the form $r^2 = a^2 \cos 2\theta$ represent which of the following family of curves?

► Lemniscate

► Cardioids

► Rose curves

► Spiral

Question No: 14 (Marks: 1) - Please choose one

Which of the following condition must be satisfied for a vector field $\vec{F}$ to be a conservative vector field?

► $\vec{F} = 0$



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► $\text{grad } \vec{F} = 0$

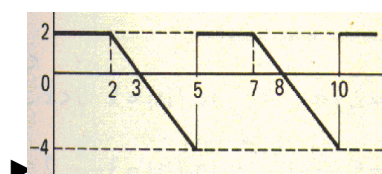
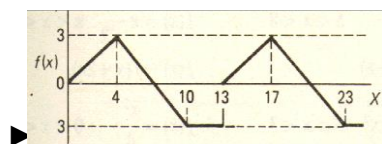
► $\text{div } \vec{F} = 0$

► $\text{curl } \vec{F} = 0$

Question No: 15 (Marks: 1) - Please choose one

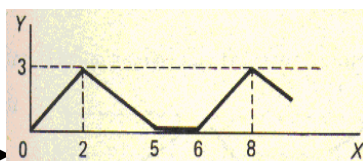
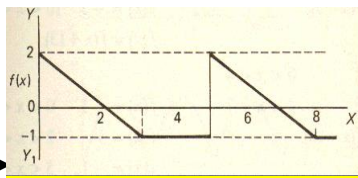
Match the following periodic function with its graph.

$$f(x) = \begin{cases} 2-x & 0 < x < 3 \\ -1 & 3 < x < 5 \end{cases}$$





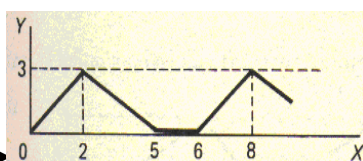
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Question No: 16 (Marks: 1) - Please choose one

Match the following periodic function with its graph.

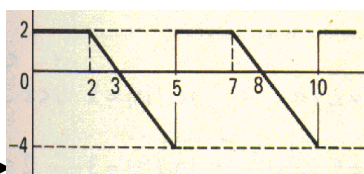
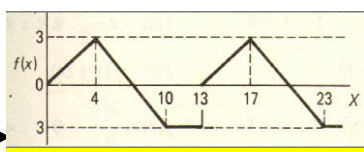
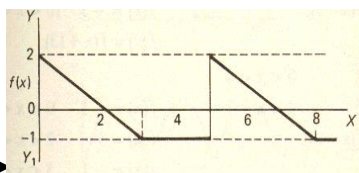
$$f(x) = \begin{cases} \frac{3}{4}x & 0 < x < 4 \\ 7 - x & 4 < x < 10 \\ -3 & 10 < x < 13 \end{cases}$$





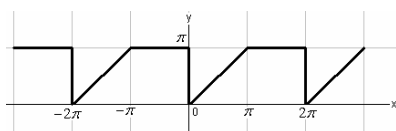
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Question No: 17 (Marks: 1) - Please choose one

What is the period of periodic function whose graph is as below?



► π

► $-\pi$



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▶ 2π

▶ -2π

Question No: 18 (Marks: 1) - Please choose one

Let L denotes the Laplace Transform.

If $L\{F(t)\} = f(s)$ where s is a constant, then which of the following equation holds?

▶ $L\{t F(t)\} = -\frac{d}{ds}\{f(s)\}$

▶ $L\{t F(t)\} = f(s+t)$

▶ $L\{t F(t)\} = f(s)$

▶ $L\{t F(t)\} = \int_s^\infty f(s) ds$



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Question No: 19 (Marks: 1) - Please choose one

The function $f(x) = x^2 \cos 2x$ is -----

►Neither even nor odd

►Odd function

►Even function

Question No: 20 (Marks: 1) - Please choose one

Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s) = \frac{3}{s-2} - \frac{2}{s}$?

► $3te^{2t} - 2$

► $3e^{2t} - 2t$



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► $3e^{2t} - 2$

► None of these.

Question No: 21 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $(f_{xx}, f_{yy} \text{ and } f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0) f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$

If $D = 0$ then -----

► f has relative maximum at (x_0, y_0)

► f has relative minimum at (x_0, y_0)

► f has saddle point at (x_0, y_0)

► No conclusion can be drawn.



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Question No: 22 (Marks: 1) - Please choose one

The path of integration of a line integral must be -----

► straight and single-valued

► continuous and single-valued

► straight and multiple-valued

► continuous and multiple-valued

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Question No: 23 (Marks: 1) - Please choose one

What is the value of $L\{e^{5t}\}$ if L denotes Laplace transform?

► $L\{e^{5t}\} = \frac{1}{s-5}$



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► $L\{e^{5t}\} = \frac{s}{s^2 + 25}$

► $L\{e^{5t}\} = \frac{5}{s^2 + 25}$

► $L\{e^{5t}\} = \frac{5!}{s^6}$

Question No: 24 (Marks: 1) - Please choose one

What is the Laplace Inverse Transform of $\frac{1}{s+1}$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = t+1$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t} + e^t$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^t$



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► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t}$

Question No: 25 (Marks: 1) - Please choose one

$$\int_C (3x + 2y) dx + (2x - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (2, 0).

►6

►-6

►0

►Do not exist

Question No: 26 (Marks: 1) - Please choose one



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$$\int_C (2x + y) dx + (x^2 - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (0, 2).

► -4

► -2

► 0

► 2

Question No: 27 (Marks: 1) - Please choose one

Curl of vector function is always a -----

► Scalar

► Vector

Question No: 28 (Marks: 1) - Please choose one



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If p is the period of a function then that function is said to be periodic if $f(x+p) = f(x)$, _____

►For all values of x in the domain of f

►For positive values of x in the domain of f

►For negative values of x in the domain of f

Question No: 29 (Marks: 1) - Please choose one

Which of the following is geometrical representation of the equation $y = x^2$, in three dimensional space?

►Parabola

►Straight line



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►Half cylinder

►Cone

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Question No: 30 (Marks: 1) - Please choose one

If $a = 1$, then the equation, in polar co-ordinates of the form $r = a \theta$ represents which of the following curve?

►cardioid

►circle

►rose curve

►Archimedean spiral

Question No: 1 (Marks: 1) - Please choose one

π is an example of -----

►Irrational numbers



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►Rational numbers

►Integers

►Natural numbers

Question No: 2 (Marks: 1) - Please choose one

Straight line is a special kind of -----

►Surface

►Curve

►Plane

►Parabola

Question No: 3 (Marks: 1) - Please choose one



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An ordered triple corresponds to ----- in three dimensional space.

►A unique point

►A point in each octant

►Three points

►Infinite number of points

Question No: 4 (Marks: 1) - Please choose one

The angles which a line makes with positive x ,y and z-axis are known as -----

►Direction cosines

►Direction ratios

►Direction angles



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Question No: 5 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = 4xy + \sin 3x^2y$$

► $f(x, y)$ is continuous at origin

► $f(0, 0)$ is not defined

► $f(0, 0)$ is defined but $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ does not exist

► $f(0, 0)$ is defined and $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ exists but these two numbers are not equal.

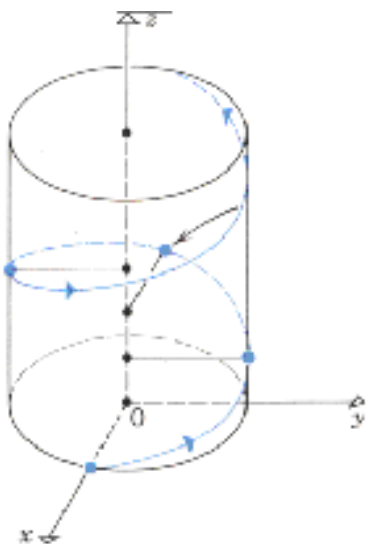
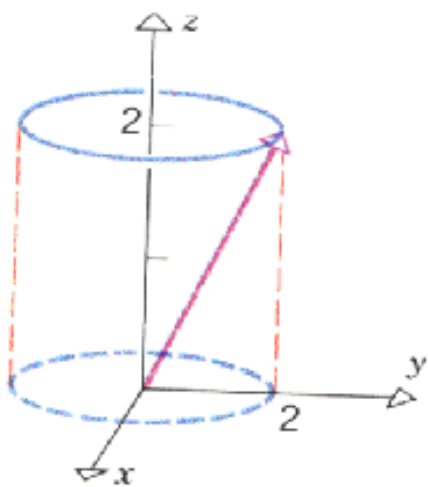
Question No: 6 (Marks: 1) - Please choose one



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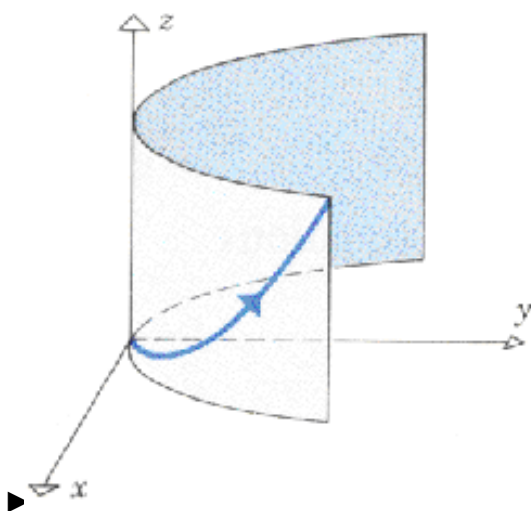
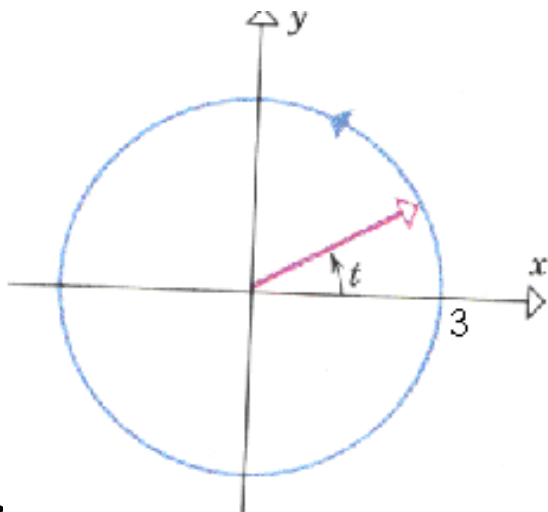
Match the following vector-valued function with its graph.

$$r(t) = 3\cos t \hat{i} + 3\sin t \hat{j} \quad \text{and} \quad 0 \leq t \leq 2\pi$$





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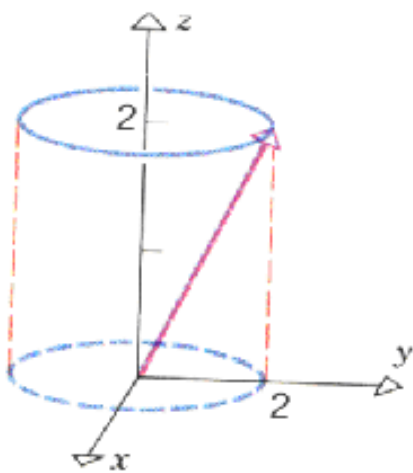
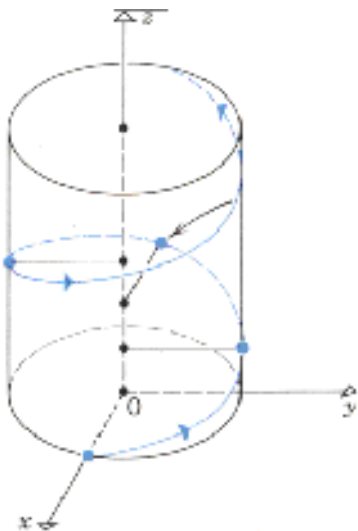
Question No: 7 (Marks: 1) - Please choose one

Match the following vector-valued function with its graph.



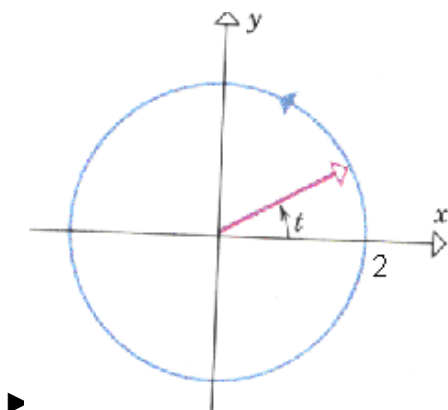
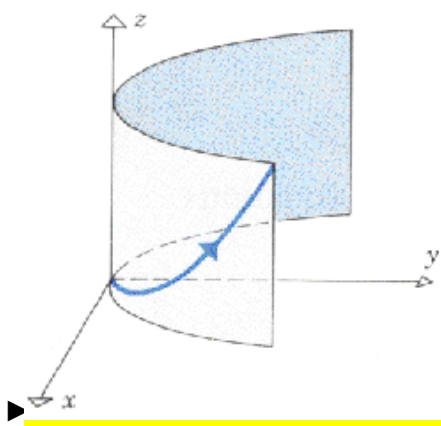
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$$r(t) = t\hat{i} + t^2\hat{j} + t^3\hat{k} \quad \text{and} \quad t \geq 0$$





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Question No: 8 (Marks: 1) - Please choose one

What are the parametric equations that correspond to the following vector equation?

$$\vec{r}(t) = \sin^2 t \hat{i} + (1 - \cos 2t) \hat{j}$$



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► $x = \sin^2 t$, $y = 1 - \cos 2t$, $z = 0$

► $y = \sin^2 t$, $x = 1 - \cos 2t$, $z = 0$

► $x = \sin^2 t$, $y = 1 - \cos 2t$, $z = 1$

► $x = \sin^2 t$, $y = \cos 2t$, $z = 1$

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Question No: 9 (Marks: 1) - Please choose one

Is the following vector-valued function $\vec{r}(t)$ continuous at $t=0$? If not, why?

$$\vec{r}(t) = (4\cos t, \sqrt{t}, 4\sin t)$$

► $\vec{r}(0)$ is not defined



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► $\vec{r}(0)$ is defined but $\lim_{t \rightarrow 0} \vec{r}(t)$ does not exist

► $\vec{r}(0)$ is defined and $\lim_{t \rightarrow 0} \vec{r}(t)$ exists but these two numbers are not equal.

► $\vec{r}(t)$ is continuous at $t = 0$

Question No: 10 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?

$$\vec{r}(t) = (\cos 5t, \tan t, 6 \sin t)$$

► $\vec{r}'(t) = \left(\frac{\sin 5t}{5}, \sec t, 6 \cos t \right)$

► $\vec{r}'(t) = \left(-\frac{\sin 5t}{5}, \sec t, 6 \cos t \right)$



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► $\vec{r}'(t) = (-5\sin 5t, \sec^2 t, 6\cos t)$

► $\vec{r}'(t) = (\sin 5t, \sec^2 t, -6\cos t)$

Question No: 11 (Marks: 1) - Please choose one

The following differential is exact

$$dz = (3x^2y + 2) dx + (x^3 + y) dy$$

► True

► False

Question No: 12 (Marks: 1) - Please choose one

The following differential is exact

$$dz = (3x^2 + 4xy) dx + (2x^2 + 2y) dy$$



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►True

►False

Question No: 13 (Marks: 1) - Please choose one

Which one of the following is correct Wallis Sine formula when n is odd and $n \geq 3$?

$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \cdots \frac{5}{6} \frac{3}{4} \frac{1}{2}$$



$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \cdots \frac{6}{5} \frac{4}{3} \frac{2}{1}$$



$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \cdots \frac{6}{7} \frac{4}{5} \frac{2}{3}$$





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$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \cdots \frac{6}{5} \frac{4}{3} \frac{2}{1}$$



Question No: 14 (Marks: 1) - Please choose one

Which of the following is correct?

$$\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3}{16}$$



$$\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3\pi}{16}$$



$$\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3}{8}$$





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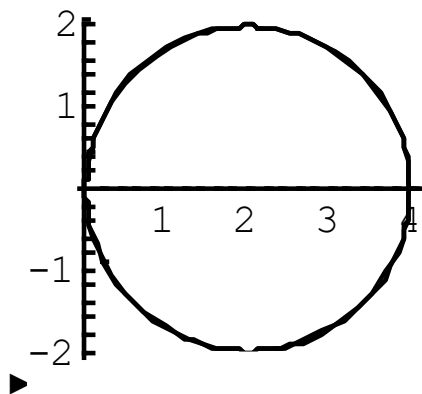
$$\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{2\pi}{3}$$



Question No: 15 (Marks: 1) - Please choose one

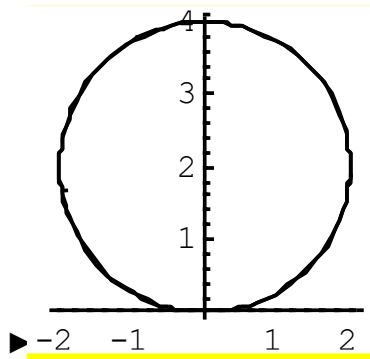
Match the following equation in polar co-ordinates with its graph.

$$r = 4 \sin \theta$$

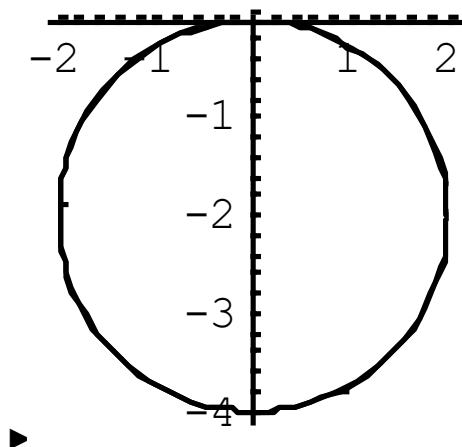
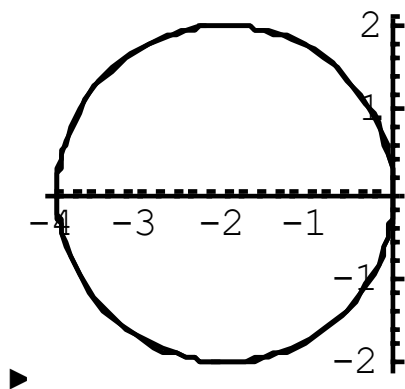




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Question No: 16 (Marks: 1) - Please choose one

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, \pi - \theta)$ then the curve is said to be symmetric about which of the following?

►Initial line

►y-axis

►Pole

Question No: 17 (Marks: 1) - Please choose one

$$f(x) = \sin \frac{x}{2}$$

What is the period of a periodic function defined by ?

$$\frac{\pi}{2}$$



$$\pi$$





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$$\frac{3\pi}{2}$$



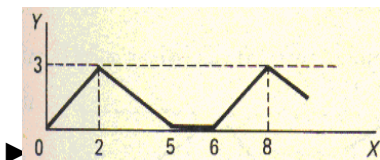
$$4\pi$$



Question No: 18 (Marks: 1) - Please choose one

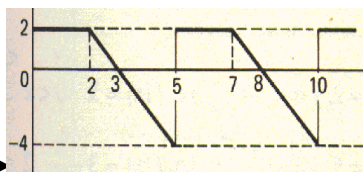
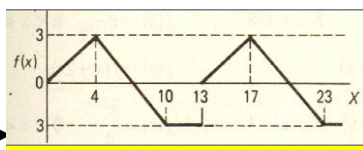
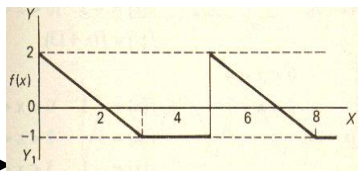
Match the following periodic function with its graph.

$$f(x) = \begin{cases} \frac{3}{4}x & 0 < x < 4 \\ 7 - x & 4 < x < 10 \\ -3 & 10 < x < 13 \end{cases}$$



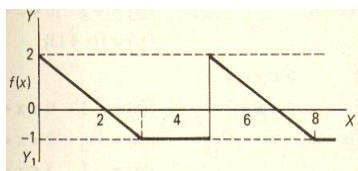


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Question No: 19 (Marks: 1) - Please choose one

What is the period of periodic function whose graph is as below?



►2

►3



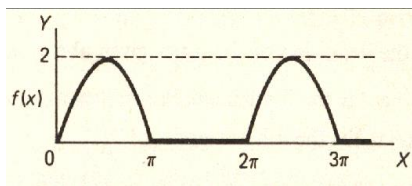
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►4

►5

Question No: 20 (Marks: 1) - Please choose one

What is the period of periodic function whose graph is as below?



►0

►2

► π

► 2π

Question No: 21 (Marks: 1) - Please choose one



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$$\left(-2, \frac{-3\pi}{2}\right)$$

Polar co-ordinates of a point are of this point?

. Which of the following is another possible polar co-ordinates representation

$$\left(2, \frac{-\pi}{4}\right)$$



$$\left(2, \frac{-\pi}{2}\right)$$



$$\left(2, \frac{-\pi}{3}\right)$$



$$\left(2, \frac{3\pi}{4}\right)$$

not sure



Question No: 22 (Marks: 1) - Please choose one

The function $f(x) = x^3 e^x$ is -----



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►Even function

►Odd function

►Neither even nor odd

Question No: 23 (Marks: 1) - Please choose one

The graph of an even function is symmetrical about -----

►x-axis

►y-axis

►origin

Question No: 24 (Marks: 1) - Please choose one

At which point the vertex of parabola, represented by the equation $y = x^2 - 4x + 3$, occurs?



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► (0, 3)

► (2, -1)

► (-2, 15)

► (1, 0)

Question No: 25 (Marks: 1) - Please choose one

The equation $y = x^2 - 4x + 2$ represents a parabola. Find a point at which the vertex of given parabola occurs?

► (2, -2)

► (-4, 34)

► (0, 0)

► (-2, 14)



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Question No: 26 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = \frac{xy}{x^2 + y^2}$$

► $f(x, y)$ is continuous at origin

► $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ does not exist

► $f(0, 0)$ is defined and $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ exists but these two numbers are not equal.

Question No: 27 (Marks: 1) - Please choose one

Sign of line integral is reversed when -----

► path of integration is divided into parts.

► path of integration is parallel to y-axis.



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► direction of path of integration is reversed.

► path of integration is parallel to x-axis.

Question No: 28 (Marks: 1) - Please choose one

What is Laplace transform of a function F(t)?

(s is a constant)

► $\int_0^s e^{-st} F(t) dt$

► $\int_0^{\infty} e^{st} F(t) dt$

► $\int_{-\infty}^{\infty} e^{-st} F(t) dt$

► $\int_0^{\infty} e^{-st} F(t) dt$



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Question No: 29 (Marks: 1) - Please choose one

What is the value of $L\{e^{5t}\}$ if L denotes laplace transform?

► $L\{e^{5t}\} = \frac{1}{s-5}$

► $L\{e^{5t}\} = \frac{s}{s^2 + 25}$

► $L\{e^{5t}\} = \frac{5}{s^2 + 25}$

► $L\{e^{5t}\} = \frac{5!}{s^6}$

Question No: 30 (Marks: 1) - Please choose one

What is the Laplace Inverse Transform of $\frac{1}{s+1}$



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► $L^{-1}\left\{\frac{1}{s+1}\right\} = t+1$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t} + e^t$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^t$

► $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t}$

Question No: 31 (Marks: 1) - Please choose one

What is Laplace Inverse Transform of $\frac{5}{s^2 + 25}$

► $L^{-1}\left\{\frac{5}{s^2 + 25}\right\} = \sin 5t$

► $L^{-1}\left\{\frac{5}{s^2 + 25}\right\} = \cos 5t$



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► $L^{-1}\left\{\frac{5}{s^2 + 25}\right\} = \sin 25t$

► $L^{-1}\left\{\frac{5}{s^2 + 25}\right\} = \cos 25t$

Question No: 32 (Marks: 1) - Please choose one

What is $L\{-6\}$ if L denotes Laplace Transform?

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► $L\{-6\} = \frac{1}{s+6}$

► $L\{-6\} = \frac{-6}{s}$

► $L\{-6\} = \frac{s}{s^2 + 36}$

► $L\{-6\} = \frac{-6}{s^2 + 36}$



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Question No: 33 (Marks: 1) - Please choose one

$$\int_C (3x + 2y) dx + (2x - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (2, 0).

▶ 6

▶ -6

▶ 0

▶ Do not exist

Question No: 34 (Marks: 1) - Please choose one

$$\int_C (2x + y) dx + (x^2 - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (0, 2).



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►-4

►-2

►0

►2

Question No: 35 (Marks: 1) - Please choose one

Plane is an example of -----

►Curve

►Surface

►Sphere

►Cone

Question No: 36 (Marks: 1) - Please choose one



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If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } -1 \leq y \leq 1\}$, then

$$\iint_R (x + 2y^2) dA =$$

$$\int_{-1}^1 \int_0^2 (x + 2y^2) dy dx$$



$$\int_0^2 \int_1^{-1} (x + 2y^2) dx dy$$



$$\int_{-1}^1 \int_0^2 (x + 2y^2) dx dy$$



$$\int_1^2 \int_{-1}^0 (x + 2y^2) dx dy$$



Question No: 37 (Marks: 1) - Please choose one



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To evaluate the line integral, the integrand is expressed in terms of x, y, z with

► $dr = dx\hat{i} + dy\hat{j}$

► $dr = dx\hat{i} + dy\hat{j} + dz\hat{k}$

► $dr = dx + dy + dz$

► $dr = dx + dy$

Question No: 38 (Marks: 1) - Please choose one

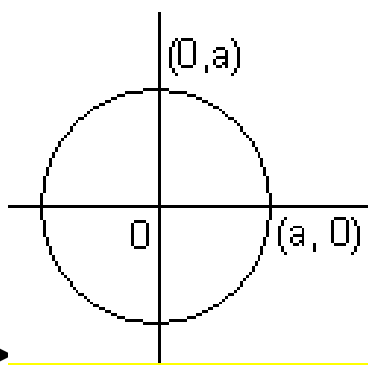
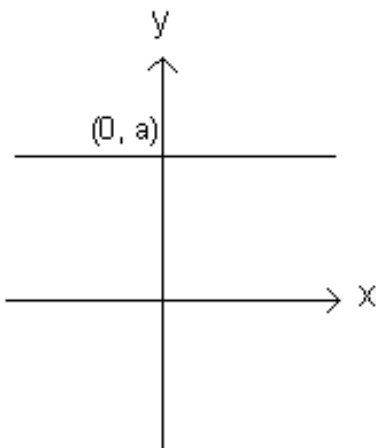
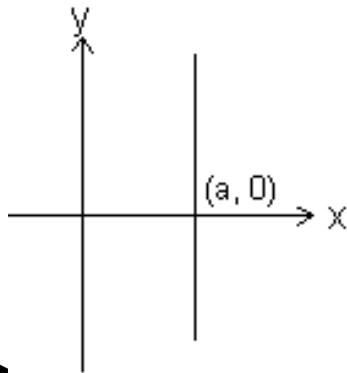
Match the following equation in polar co-ordinates with its graph.

$$r = a$$

where a is an arbitrary constant.

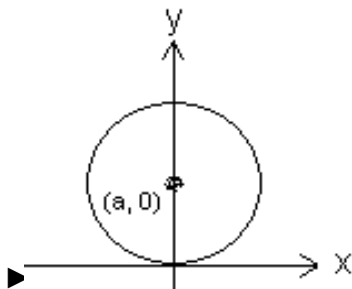


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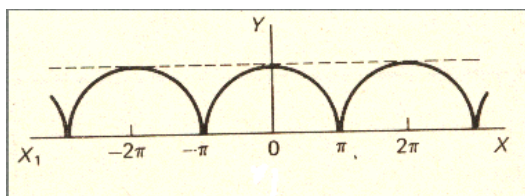


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Question No: 39 (Marks: 1) - Please choose one

Which of the following is true for a periodic function whose graph is as below?



►Even function

►Odd function

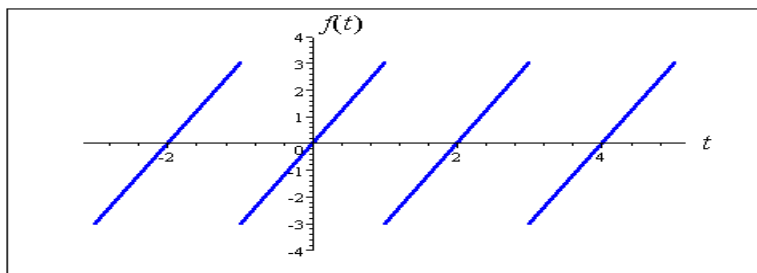
►Neither even nor odd function

Question No: 40 (Marks: 1) - Please choose one



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The graph of “saw tooth wave” given above is -----

►An odd function

►An even function

►Neither even nor odd

Question No: 2 (Marks: 1) - Please choose one



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Plane is a ----- surface.

►One-dimensional

►Two-dimensional

►Three-dimensional

►Dimensionless

Question No: 3 (Marks: 1) - Please choose one

Let $w = f(x, y, z)$ and $x = g(r, s)$, $y = h(r, s)$, $z = t(r, s)$ then by chain rule

$$\frac{\partial w}{\partial r} =$$

► $\frac{\partial w}{\partial x} \frac{\partial x}{\partial r} + \frac{\partial w}{\partial y} \frac{\partial y}{\partial r} + \frac{\partial w}{\partial z} \frac{\partial z}{\partial r}$



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$$\frac{\partial w}{\partial r} \frac{\partial x}{\partial r} + \frac{\partial w}{\partial r} \frac{\partial y}{\partial r} + \frac{\partial w}{\partial r} \frac{\partial z}{\partial r}$$



$$\frac{\partial w}{\partial x} \frac{\partial x}{\partial r} \frac{\partial x}{\partial s} + \frac{\partial w}{\partial y} \frac{\partial y}{\partial r} \frac{\partial y}{\partial s} + \frac{\partial w}{\partial z} \frac{\partial z}{\partial r} \frac{\partial z}{\partial s}$$



$$\frac{\partial w}{\partial r} \frac{\partial r}{\partial x} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial y} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial z}$$



Question No: 4 (Marks: 1) - Please choose one

What are the parametric equations that correspond to the following vector equation?

$$\vec{r}(t) = \sin^2 t \hat{i} + (1 - \cos 2t) \hat{j}$$

▶ $x = \sin^2 t$, $y = 1 - \cos 2t$, $z = 0$

▶ $y = \sin^2 t$, $x = 1 - \cos 2t$, $z = 0$

▶ $x = \sin^2 t$, $y = 1 - \cos 2t$, $z = 1$



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► $x = \sin^2 t$, $y = \cos 2t$, $z = 1$

Question No: 5 (Marks: 1) - Please choose one

What are the parametric equations that correspond to the following vector equation?

$$r(t) = (2t-1)\hat{i} - 3\sqrt{t}\hat{j} + \sin 3t\hat{k}$$

► $z = 2t - 1$, $x = -3\sqrt{t}$, $y = \sin 3t$

► $y = 2t - 1$, $x = -3\sqrt{t}$, $z = \sin 3t$

► $x = 2t - 1$, $z = -3\sqrt{t}$, $y = \sin 3t$

► $x = 2t - 1$, $y = -3\sqrt{t}$, $z = \sin 3t$

Question No: 6 (Marks: 1) - Please choose one



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What is the derivative of following vector-valued function?

$$\vec{r}(t) = (\cos 5t, \tan t, 6 \sin t)$$

$$\vec{r}'(t) = \left(\frac{\sin 5t}{5}, \sec t, 6 \cos t \right)$$



$$\vec{r}'(t) = \left(\frac{-\sin 5t}{5}, \sec t, 6 \cos t \right)$$



$$\vec{r}'(t) = (-5 \sin 5t, \sec^2 t, 6 \cos t)$$



$$\vec{r}'(t) = (\sin 5t, \sec^2 t, -6 \cos t)$$



Question No: 7 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?



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$$\vec{r}(t) = \left(t^4, \sqrt{t+1}, \frac{3}{t^2} \right)$$

$$\vec{r}'(t) = \left(4t^3, \frac{1}{\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{6}{t^3} \right)$$



$$\vec{r}'(t) = \left(4t^4, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



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$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$



Question No: 8 (Marks: 1) - Please choose one

The following differential is exact



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$$dz = (x^2y + y) dx - x dy$$

►True

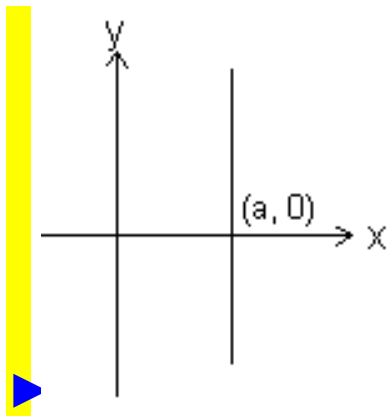
►False

Question No: 10 (Marks: 1) - Please choose one

Match the following equation in polar co-ordinates with its graph.

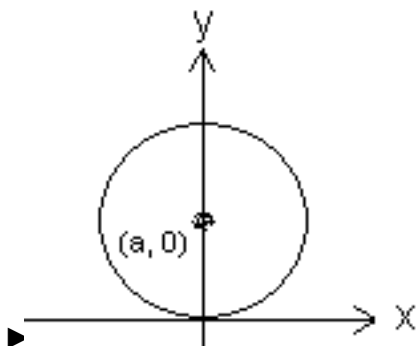
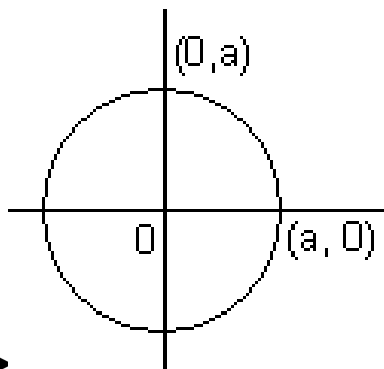
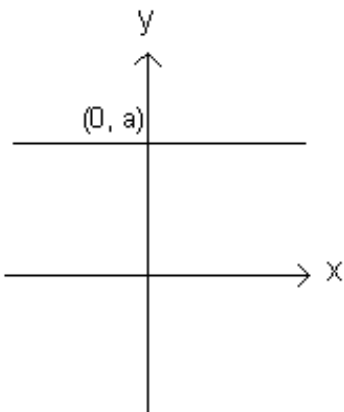
$$r \cos \theta = a$$

where a is an arbitrary constant





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Question No: 11 (Marks: 1) - Please choose one

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, \pi - \theta)$ then the curve is said to be symmetric about which of the following?

►Initial line

►y-axis

►Pole

Question No: 12 (Marks: 1) - Please choose one

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(-r, \theta)$ then the curve is said to be symmetric about which of the following?

►Initial line

►y-axis

►Pole



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Question No: 13 (Marks: 1) - Please choose one

$$f(x) = \sin \frac{x}{3}$$

What is the amplitude of a periodic function defined by ?

▶ 0 wrong

▶ 1

$$\frac{1}{3}$$



▶ Does not exist

Question No: 14 (Marks: 1) - Please choose one

What is the period of a periodic function defined by $f(x) = 4\cos 3x$?

$$\frac{\pi}{4}$$





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$\frac{\pi}{3}$



$\frac{2\pi}{3}$



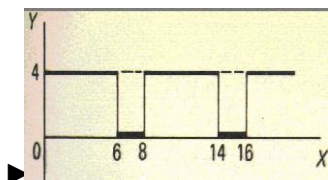
π



Question No: 15 (Marks: 1) - Please choose one

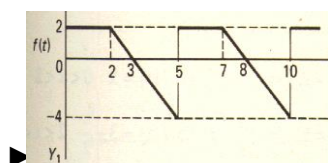
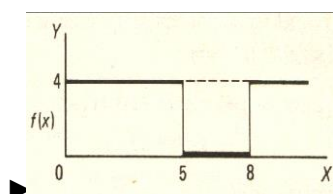
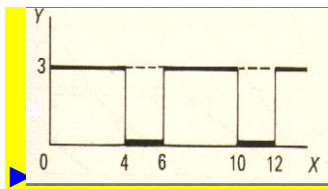
Match the following periodic function with its graph.

$$f(x) = \begin{cases} 3 & 0 < x < 4 \\ 0 & 4 < x < 6 \end{cases}$$



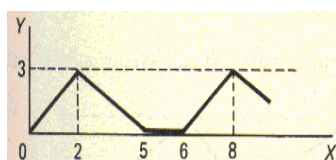


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Question No: 16 (Marks: 1) - Please choose one

What is the period of periodic function whose graph is as below?



►2



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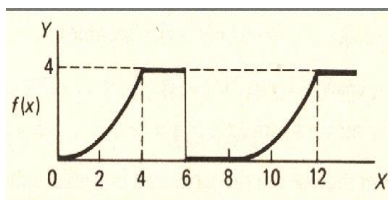
►5

►6

►8

Question No: 17 (Marks: 1) - Please choose one

What is the period of periodic function whose graph is as below?



►0

►4

►6

►8



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Question No: 18 (Marks: 1) - Please choose one

Let L denotes the Laplace Transform.

If $L\{F(t)\} = f(s)$ where s is a constant and $\lim_{t \rightarrow 0} \left(\frac{F(t)}{t} \right)$ exists then which of the following equation holds?

$$L\left(\frac{F(t)}{t}\right) = f(s+a)$$



$$L\left(\frac{F(t)}{t}\right) = f(s-a)$$



$$L\left(\frac{F(t)}{t}\right) = \int_s^{\infty} f(s) ds$$



$$L\left(\frac{F(t)}{t}\right) = -\frac{d}{ds}\{f(s)\}$$



Question No: 19 (Marks: 1) - Please choose one



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Which of the following is Laplace inverse transform of the function $f(s) = \frac{3}{s-2} - \frac{2}{s}$ defined by ?

▶ $3te^{2t} - 2$

▶ $3e^{2t} - 2t$

▶ $3e^{2t} - 2$

▶ None of these.

Question No: 20 (Marks: 1) - Please choose one

Let (x_1, y_1, z_1) and (x_2, y_2, z_2) be any two points in three dimensional space. What does the formula $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$ calculates?

▶ Distance between these two points

▶ Midpoint of the line joining these two points wrong mid point is $x_2 - x_1 / 2$ and so on



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►Ratio between these two points

Question No: 21 (Marks: 1) - Please choose one

Let the functions $P(x, y)$ and $Q(x, y)$ are finite and continuous inside and at the boundary of a closed curve C in the xy -plane. If $(P dx + Q dy)$ is an exact differential then

$$\oint_C (P dx + Q dy) =$$

►Zero

►One

►Infinite

Question No: 22 (Marks: 1) - Please choose one

What is Laplace transform of the function $F(t)$ if $F(t) = t$?



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▶ $L\{t\} = \frac{1}{s}$

▶ $L\{t\} = \frac{1}{s^2}$

▶ $L\{t\} = e^{-s}$

▶ $L\{t\} = s$

Question No: 23 (Marks: 1) - Please choose one

What is the value of $L\{e^{5t}\}$ if L denotes laplace transform?

▶ $L\{e^{5t}\} = \frac{1}{s-5}$

▶ $L\{e^{5t}\} = \frac{s}{s^2 + 25}$



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► $L\{e^{5t}\} = \frac{5}{s^2 + 25}$

► $L\{e^{5t}\} = \frac{5!}{s^6}$

Question No: 24 (Marks: 1) - Please choose one

$$\int_C (3x + 2y) dx + (2x - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (0, 2).

►1

►0

►2

►-2



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Question No: 25 (Marks: 1) - Please choose one

$$\int_C (2x + y) dx + (x^2 - y) dy$$

Evaluate the line integral

where C is the line segment from (0, 0) to (2, 0).

▶0

▶-4

▶4

▶Do not exist

Question No: 26 (Marks: 1) - Please choose one

Which of the following are direction ratios for the line joining the points (1, 3, 5) and (2, -1, 4) ?

▶3, 2 and 9

▶1, -4 and -1 not sure

▶2, -3 and 20



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► 0.5, -3 and 5/4

Question No: 27 (Marks: 1) - Please choose one

If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } 1 \leq y \leq 4\}$, then

$$\iint_R (6x^2 + 4xy^3) dA =$$

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3) dy dx$$



$$\int_0^2 \int_1^4 (6x^2 + 4xy^3) dx dy$$



$$\int_1^4 \int_0^2 (6x^2 + 4xy^3) dx dy$$





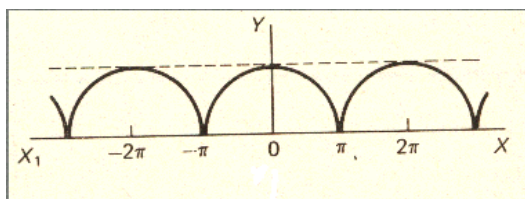
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$$\int_2^4 \int_0^1 (6x^2 + 4xy^3) dx dy$$



Question No: 28 (Marks: 1) - Please choose one

Which of the following is true for a periodic function whose graph is as below?



►Even function

►Odd function

►Neither even nor odd function