Assignment for Teachers- Chapter 11(14.4.2026)

Section A

1. $\int_1^4 e^{x+1.3} dx =$

   A. $e^4 - e^1$ B. $e^{5.3} - e^1$ C. $e^{5.3} - e^{2.3}$ D. $e^4 - e^{2.3}$.

2. $\int_1^3 \sqrt{4x-3}\, dx =$

   A. $\frac{13}{3}$ B. $\frac{25}{3}$ C. $\frac{11}{3}$ D. $\frac{41}{3}$.

3. $\int_0^{2\pi} \sin\left(\frac{x}{2}\right) dx =$

   A. 5 B. 6 C. 3 D. 4.

4. The value of $\int_0^{\frac{\pi}{3}} 16 \cos^4 \theta \sin \theta \, d\theta$ is

   A. –0.1 B. 3.1 C. 0.1 D. –3.1.

5. The value of $\int_0^1 (3 \sin 2\theta - 4 \cos \theta)\, d\theta$, correct to 4 significant figures, is

   A. –0.06890 B. –1.242 C. –2.742 D. –1.569.

6. The traffic flow rate (cars per hour) across an intersection is

   $r(t) = 200 + 800t - 90t^2$, where t is in hours and t = 0 is 6 am.

   The number of cars pass through the intersection from 6 am to 10 am is

   A. 5428 B. 5824 C. 5082 D. 5280.

7. An object is moving with a velocity (ft/sec) $v = t^2 - 3t - 10$.

   The displacement travelled from t = 0 to t = 6 is

   A. 18 ft B. 72 ft C. $-$ 42 ft D. $-$ 52 ft.

8. Area of the region bounded by the curve y = cos x between x = 0 and

$x = \frac{\pi}{2}$ is

A. 1 unit^2 B. 3 unit^2 C. 5 unit^2 D. 7 unit^2

9. The area, in square units, enclosed by the curve $y = 2x + 3$, the x-axis and ordinates $x = 1$ and $x = 4$ is

A. 28 unit^2 B. 32 unit^2 C. 24 unit^2 D. 39 unit^2.

10. Volume formed by rotating $y = x, x \in [0,1]$, about x-axis is

A. $\frac{\pi}{3}$ unit^3 B. $\frac{\pi}{2}$ unit^3 C. π unit^3 D. $\frac{2\pi}{3}$ unit^3.

Section B

1. Evaluate $\int_{-\sqrt{3}}^{\sqrt{3}} \frac{6 - 2x^2}{(3 + x^2)^2}\, dx$.

Solution

Now check:

$$\frac{d}{dx}\frac{x}{3+x^2} =$$

A. $\frac{6 - 2x^2}{(3 + x^2)^2}$ B. $\frac{-6 + 2x^2}{(3 + x^2)^2}$ C. $\frac{3 - x^2}{(3 + x^2)^2}$ D. $\frac{-3 + x^2}{(3 + x^2)^2}$.

Thus $\frac{6 - 2x^2}{(3 + x^2)^2} =$

A. $2 \times \frac{d}{dx}\frac{x}{3+x^2}$ B. $(-1) \times \frac{d}{dx}\frac{x}{3+x^2}$ C. $1 \times \frac{d}{dx}\frac{x}{3+x^2}$ D. $(-2) \times \frac{d}{dx}\frac{x}{3+x^2}$.

$\int_{-\sqrt{3}}^{\sqrt{3}} \frac{6 - 2x^2}{(3 + x^2)^2}\, dx =$

A. $\frac{2\sqrt{3}}{4}$ B. $\frac{\sqrt{3}}{3}$ C. $\frac{\sqrt{3}}{4}$ D. $\frac{2\sqrt{3}}{3}$.

2. Identify the curves whose gradient function is $\frac{dy}{dx}$ = 2x and find the equation of the curve with the gradient function in a which has a y-intercept (0, 4).

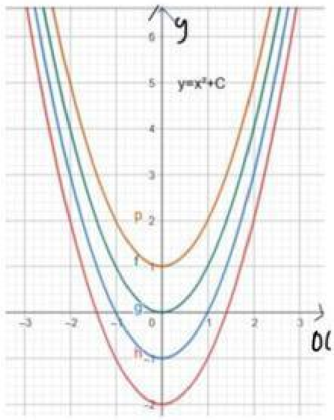
Solution

$$\frac{dy}{dx} = 2x$$

Integrating, y =

A. $2x^2$ + C B. x^2 + C C. $\frac{x^2}{2}$ + C D. $3x^2$ + C.

This represents a family of parallel curves.



The curve passes through (0, 4), C =

A. 1 B. 3 C. 2 D. 4.

Thus y =

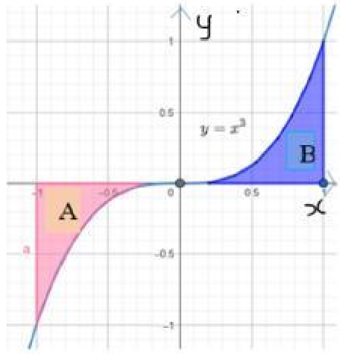
A. $x^2 + 4$ B. $2x^2 + 1$ C. $\frac{x^2}{2} + 3$ D. $3x^2 + 2$.

3. Find the area between the curve y = x^3 and the x-axis between the values x = − 1 and x = 1.

Solution

The curve intersects the x- axis at x =

A. -1 B. 1 C. 0 D.0.5.



The area of A and the area of B are

A. $\int_{-1}^{0} x^3\, dx$ and $\int_{0}^{1} x^3\, dx$

B. $\int_{-1}^{0}(-x^3)\, dx$ and $\int_{0}^{1}(-x^3)\, dx$

C. $\int_{-1}^{0} x^3\, dx$ and $\int_{0}^{1}(-x^3)\, dx$

D. $\int_{-1}^{0}(-x^3)\, dx$ and $\int_{0}^{1} x^3\, dx$.

The required area =

A. $\frac{1}{4}$ unit^2 B. $\frac{1}{2}$ unit^2 C. $\frac{1}{5}$ unit^2 D. $\frac{1}{3}$ unit^2.

Section C

1. The equation of a curve has second derivative, $\frac{d^2y}{dx^2} = -12x + 4$.

   It passes through the point (3, 34), where it has gradient -12.

   Find the equation of the curve.

   Solution

   $$\frac{d^2y}{dx^2} = -12x + 4.$$

   Integrate to get first derivative,

   $$\frac{dy}{dx} = \int(-12x + 4)dx$$

   A. $6x^2 - 4x + C_1$ B. $-6x^2 + 4x + C_1$

   C. $-6x^2 - 4x + C_1$ D. $6x^2 + 4x + C_1$.

   Use gradient condition at $x = 3$, $C_1 =$

   A. 30 B. 40 C. 50 D.60.

   Thus, we have $\frac{dy}{dx}$.

   Integrate again to get y,

   $$y =$$

   A. $2x^3 + 2x^2 + 30x + C_2$ B. $-2x^3 + 2x^2 - 30x + C_2$

   C. $-2x^3 + 2x^2 + 30x + C_2$ D. $-2x^3 - 2x^2 + 30x + C_2$.

   Use point $(3, 34)$ in y, $C_2 =$

   A. -20 B. 20 C. 23 D. -23.

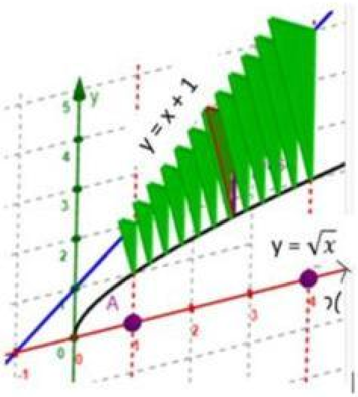
   The equation of curve, $y =$

   A. $-2x^3 + 2x^2 - 30x + 20$ B. $-2x^3 + 2x^2 + 30x + 23$

$C - 2x^3 + 2x^2 + 30x - 20$ D. $-2x^3 + 2x^2 + 30x - 23$.

2. For $1 \le x \le 4$, determine the volume of the solid where each face is a triangle with a base of (x+1) ft and a height of $\sqrt{x}$.

Solution



The area of the triangle =

A. $\frac{1}{3}(\ x^{\frac{3}{2}} +\ x^{\frac{1}{2}})$ B. $\frac{1}{2}(\ x^{\frac{3}{2}} -\ x^{\frac{1}{2}})$ C. $\frac{1}{2}(\ x^{\frac{3}{2}} +\ x^{\frac{1}{2}})$ D. $\frac{1}{3}(\ x^{\frac{3}{2}} -\ x^{\frac{1}{2}})$.

$\int_1^4 x^{\frac{3}{2}}\,dx =$

A. $\frac{-62}{5}$ B. $\frac{26}{5}$ C. $\frac{-26}{5}$ D. $\frac{62}{5}$.

$\int_1^4 x^{\frac{1}{2}}\,dx =$

A. $\frac{-14}{3}$ B. $\frac{14}{3}$ C. $\frac{-41}{3}$ D. $\frac{41}{3}$.

The volume of the solid =

A. $\frac{1}{3}\int_1^4 (x^{\frac{3}{2}} +\ x^{\frac{1}{2}})\,dx$ B. $\frac{1}{2}\int_1^4 (x^{\frac{3}{2}} +\ x^{\frac{1}{2}})\,dx$

C. $\frac{1}{2}\int_1^4 (\ x^{\frac{3}{2}} -\ x^{\frac{1}{2}})\,dx$ D. $\frac{1}{3}\int_1^4 (\ x^{\frac{3}{2}} -\ x^{\frac{1}{2}})\,dx$.

The required Volume is

A. $\frac{218}{15}$ ft^3 B. $\frac{821}{15}$ ft^3 C. $\frac{182}{15}$ ft^3 D. $\frac{128}{15}$ ft^3.

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