**Class: XII**

**Mathematics Assignment-10**

**Topic: Integration**

**Sub Topic: Anti-derivative and Integration**

**1 MARKS**

Q1. Antiderivative of cos 2x is

$(a)\frac{\sin 2x}{2}$ (b) sin(2x) (c) 2sin(2x) (d) None of these

Q2. Antiderivative of $\sqrt{x}+\frac{1}{\sqrt{x}}$ is equal to $\frac{2}{3}x^{3/2}+2x^{1/2}+c$. (True/false).

**2 MARKS**

Q3. Evaluate $\int\frac{1-sinx}{cos^2x}dx$

Q4. Evaluate $\int\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2$ dx

Q5. Evaluate $\int\frac{sec^2x}{cosec^2x}dx$

**4 MARKS**

Q6. Evaluate $\int\sqrt{x}\,(3x^2+2x+3)$ dx

Q7. Evaluate $\int\frac{2-3sinx}{cos^2x}dx$

Q8. Find the antiderivative F where F is defined by $F(x) = 4x^3-6$ , where F(0) =3.

**Answers**

1. (a) 2. True 3. tan(x) – sec(x) + c 4. $\frac{x^2}{2}+\log|x|-2x+c$ 5. tan(x) – x + c

6. $\frac{6}{7}x^{7/2}+\frac{4}{5}x^{5/2}+2x^{3/2}+c$ 7. 2tan(x)- 3sec(x) + c 8. $x^4$- 6x+3

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**Class: XII**

**Mathematics Assignment-11**

**Topic: Integration**

**Sub Topic: Integration by substitution**

Q1. $\int \tan x \, dx$ is equal to

(a) $\sec^2 x$ (b) $\log |\sec x|$ (c) $\log(\sin(x))$ (d) None of these

Q2. $\int (\sin mx) \, dx$ is equal to $(m \cos mx)$ (True/false).

**2 MARKS**

Q3. Evaluate $\int \frac{(\log x)^2}{x} dx$

Q4. Evaluate $\int \cot x \, . \log(sinx) \, dx$

Q5. Evaluate $\int \frac{\sin x}{(1+\cos x)^2} dx$

**4 MARKS**

Q6. Evaluate $\int (sin^3 x \, . cos^2 x) \, dx$

Q7. Evaluate $\int \frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}} dx$

Q8. Evaluate $\int \frac{1}{1-tan\, x} dx$

**Answers**

1) (b) 2) False 3) $\frac{1}{3}$ $(\log|x|)^3 + c$ 4) $\frac{1}{2}$ $(\log \sin x)^2 + c$ 5) $\frac{1}{1+\cos x} + c$

6) $\frac{-1}{3} cos^3 x + \frac{1}{5} cos^5 x + c$ 7) $\frac{1}{2}\log(e^{2x} + e^{-2x}) + c$ 8) $\frac{1}{2}(x - \log|\cos x - sin\, x|) + c$


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**Class: XII**

**Mathematics Assignment-12**

**Topic: Integration**

**Sub Topic: Integration**

Q1. $\int \frac{e^x(1+x)}{cos^2(x\,e^x)}$ is equal to

(a) $-\cot(xe^x) + c$ (b) $\tan(xe^x) + c$ (c) $\tan(e^x)$ + c (d) None of these

Q2. $\int (sin^3 x)dx$ is equal to $(-\cos x) + \frac{1}{3}cos^3 x + c$ (True/false).

**2 MARKS**

Q3. Evaluate $\int (cos^2 x)dx$

Q4. Evaluate $\int sin^2(2x + 5)dx$

**4 MARKS**

Q5. Evaluate $\int \frac{1-\cos x}{1+\cos x}dx$

Q6. Evaluate $\int cos^4(2x)dx$

Q7. Evaluate $\int tan^4(x)dx$

Q8. Evaluate $\int \frac{sin^2 x}{1+\cos x}dx$

**Answers**

1) (b) 2) True 3) $\frac{x}{2} + \frac{1}{4}\sin(2x) + c$ 4) $\frac{x}{2} - \frac{1}{8}\sin(4x + 10) + c$ 5) $2\tan\left(\frac{x}{2}\right) - x + c$

6) $\frac{3}{8}x + \frac{1}{64}\sin 8x + \frac{1}{8}\sin 4x + c$ 7) $\frac{1}{3}tan^3(x) - \tan(x) + x + c$ 8) $x - \sin(x)$ + c

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**Class: XII**

**Mathematics Assignment- 13**

**Topic: Integration**

**Sub Topic: Integral of some particular function**

**1 MARKS**

Q1. The value of $\int \frac{dx}{x^2-16}$ is equal to

(a) $\frac{1}{8}\log\left|\frac{x-4}{x+4}\right| + c$

(b) $c$

(c) $\frac{1}{8}\log\left|\frac{x+4}{x-4}\right| + c$

(d) None of these

**2 MARKS**

Q2. Evaluate $\int \frac{dx}{3x^2+13x-10}$

Q3. Evaluate $\int \frac{x+3}{\sqrt{5-4x+x^2}}\,dx$

**4 MARKS**

Q4. Evaluate $\int \frac{x^2}{\sqrt{x^6+a^6}}\,dx$

Q5. Evaluate $\int \frac{1}{x^2+2x+2}\,dx$

Q6. Evaluate $\int \frac{1}{\sqrt{8+3x-x^2}}\,dx$

Q7. Evaluate $\int \frac{x+2}{\sqrt{4x-x^2}}\,dx$

**Answers**

1) (a)

2) $\frac{1}{17}\log\left|\frac{3x-2}{x+5}\right| + c$

3) $-\sqrt{5-4x-x^2} + \sin^{-1}\left(\frac{x+2}{3}\right) + c$

4) $\frac{1}{3}\log\left|x^3 + \sqrt{x^6+a^6}\right| + c$

5) $\tan^{-1}(x+1) + c$

6) $\sin^{-1}\left(\frac{2x-3}{\sqrt{41}}\right) + c$

7) $-\sqrt{4x-x^2} + 4\sin^{-1}\left(\frac{x-2}{2}\right) + c$

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**Class: XII**

**Mathematics Assignment- 14**

**Topic: Integration**

**Sub Topic: Integration by partial function**

## 1 MARKS

Q1. The value of $\int \frac{x}{(x+1)(x+2)}\,dx$ is equal to

(a) $\log\frac{(x+2)^2}{|x+1|}+c$ (b) $\log\frac{(x+1)^2}{|x+2|}+c$ $(c)\ \frac{1}{8}\log\left|\frac{x+4}{x-4}\right|+c$ (d) None of these

## 4 MARKS

Q2. Evaluate $\int \frac{x^2+1}{x^2-5x+6}dx$

Q3. Evaluate $\int \frac{1-x^2}{x(1-2x)}\,dx$

Q4. Evaluate $\int \frac{dx}{x(x^n+1)}$

Q5. Evaluate $\int \frac{(\cos x)\,dx}{(1-\sin x)(2-\sin x)}$

Q6. Evaluate $\int \frac{dx}{e^x-1}$

Q7. Evaluate $\int \frac{2x\,dx}{(x^2+1)(x^2+3)}$

Q8. Evaluate $\int \frac{dx}{x(x^4-1)}$

## Answers

1) (a) 2) $x-5\log|x-2|+10\log|x-3|+c$ 3) $\frac{x}{2}+\log|x|-\frac{3}{4}\log|1-2x|+c$

4) $\frac{1}{n}\log\left|\frac{x^n}{x^n+1}\right|+c$ 5) $\log\left|\frac{2-\sin x}{1-\sin x}\right|+c$ 6) $\frac{1}{4}\log\left|\frac{x^4-1}{x^4}\right|+c$ 7) $\frac{1}{2}\log\left|\frac{x^2+1}{x^2+3}\right|+c$

8) $\frac{1}{4}\log\left|\frac{x-1}{x+1}\right|-\frac{1}{2}\tan^{-1}x+c$

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**Class: XII**

**Mathematics Assignment- 15**

**Topic: Integration**

**Sub Topic: Integration by parts**

**1 MARKS**

Q1. The value of $\int x \sin x \, dx$ is equal to

(a) $-x\cos x + \sin x + c$

(b) $x\sin x + \cos x + c$

(c) $x\sin x + 2x\cos x + c$

(d) None of these

**2 MARKS**

Q2. Evaluate $\int x e^x \, dx$

**4 MARKS**

Q3. Evaluate $\int \frac{e^x \tan^{-1}(x+1)}{1+x^2} dx$

Q4. Evaluate $\int x \sin^{-1} x \, dx$

Q5. Evaluate $\int \tan^{-1} x \, dx$

Q6. Evaluate $\int \frac{x \cos^{-1} x}{\sqrt{1-x^2}} dx$

Q7. Evaluate $\int \sin^{-1}\left(\frac{2x}{1+x^2}\right) dx$

Q8. Evaluate $\int \frac{xe^x}{(1+x)^2} dx$

**Answers**

1) (a) 2) $x e^x - e^x + c$ 3) $e^x \tan^{-1} x + c$ 4) $\frac{1}{4}(2x^2 - 1)\sin^{-1} x + \frac{x\sqrt{1-x^2}}{4} + c$

5) $x \tan^{-1} x - \frac{1}{2}\log(1+x^2) + c$ 6) $-[\sqrt{1-x^2}\cos^{-1} x + x] + c$ 7) $2x \tan^{-1} x - \log(1+x^2) + c$

8) $\frac{e^x}{1+x} + c$

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**Class: XII**

**Mathematics Assignment- 16**

**Topic: Integration**

**Sub Topic: Identity based Integration**

**4 MARKS**

Q1. Evaluate $\int\sqrt{4-x^2}dx$

Q2. Evaluate $\int\sqrt{x^2+4x+6}\,dx$

Q3. Evaluate $\int\sqrt{1-4x-x^2}\,dx$

Q4. Evaluate $\int\sqrt{x^2-8x+7}\,dx$

Q5. Evaluate $\int\sqrt{1+x^2}\,dx$

Q6. Evaluate $\int\sqrt{x^2+3x}\,dx$

Q7. Evaluate $\int\sqrt{1+3x-x^2}\,dx$

**Answers**

1) $\frac{x}{2}\sqrt{4-x^2}+2\sin^{-1}x+c$

2) $\frac{x+2}{2}\sqrt{x^2+4x+6}+\log|x+2+\sqrt{x^2+4x+6}|+c$

3) $\frac{x+2}{2}\sqrt{1-4x-x^2}+\frac{5}{2}\sin^{-1}\left(\frac{x+2}{\sqrt{5}}\right)+c$

4) $\frac{x-4}{2}\sqrt{x^2-8x+7}-\frac{9}{2}\log|x-4+\sqrt{x^2-8x+7}|+c$

5) $\frac{1}{2}x\sqrt{1+x^2}+\frac{1}{2}\log|x+\sqrt{x^2+1}|+c$

6) $\frac{2x+3}{4}\sqrt{x^2+3x}-\frac{9}{8}\log|x+\frac{3}{2}+\sqrt{x^2+3x}|+c$

7) $\frac{2x-3}{4}\sqrt{1-x^2+3x}+\frac{13}{8}\sin^{-1}\left(\frac{2x-3}{\sqrt{13}}\right)+c$


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**Class: XII**

**Mathematics Assignment 17**

**Topic: Integration**

**Sub Topic: Integration as limit of sums**

**4 MARKS**

Q1. Evaluate $\int_1^2 x\,dx$ as limit of sums.

Q2. Evaluate $\int_2^3 x^2\,dx$ as limit of sums.

Q3. Evaluate $\int_{-1}^1 e^x\,dx$ as limit of sums.

Q4. Evaluate $\int_a^b x\,dx$ as limit of sums.

Q5. Evaluate $\int_0^5 (x+1)\,dx$ as limit of sums.

Q6. Evaluate $\int_0^2 e^x\,dx$ as limit of sums.

Q7. Evaluate $\int_0^2 (x+1)\,dx$ as limit of sums.

**Answers**

1) $\frac{3}{2}$ 2) $\frac{19}{3}$ 3) e - $\frac{1}{e}$ 4) $\frac{1}{2}(b^2 - a^2)$ 5) $\frac{35}{2}$ 6) $e^2 - 1$ 7) $\frac{14}{3}$

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**Class: XII**

**Mathematics Assignment- 18**

**Topic: Integration**

**Sub Topic: Definite Integral**

**1 MARKS**

Q1. If $\int f(x)dx = \emptyset(x)$ then $\int_a^b f(x)dx$ is equal to

(e) $\emptyset(a)$ - $\emptyset(b)$
(f) 0
(g) $\emptyset(b)$ - $\emptyset(a)$
(h) None of these

Q2. $\int_2^3 \left(\frac{1}{x}\right) dx$ is equal to _____.

Q3. $\int_0^{\pi/4} (\sin(2x)dx$ is equal to ½ . (True/False).

**2 MARKS**

Q4. Evaluate $\int_0^1 xe^{x^2} dx$

Q5. Evaluate $\int_1^2 \frac{x}{(x+1)(x+2)} dx$

Q6. Evaluate $\int_0^1 \frac{dx}{1+x^2}$

**4 MARKS**

Q7. Evaluate $\int_0^{\pi/4} (sin^3(2t).\cos(2t))dt$

Q8. Evaluate $\int_0^{\pi} (sin^2(x/2)) - (cos^2(x/2))dx$

Q9. Evaluate $\int_0^{\pi/2} (cos^2(x))dx$

**Answers**

| | | | | |
|---|---|---|---|---|
| 1. (c) | 2. log(3/2) | 3. True | 4. $\frac{e-1}{2}$ | 5. log(32/27) |
| 6. $\pi/4$ | 7. 1/8 | 8. 0 | 9. $\pi/4$ | |


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**Class: XII**

**Mathematics Assignment- 19**

**Topic: Integration**

**Sub Topic: Definite Integral ( $\int_a^b f(x)dx$ by substitution)**

**1 MARKS**

Q1. If $f(x) = \int_0^x tsin(t)dt$ then f '(x) is equal to

(a) cos(x) + x sin(x) (b) x sin(x) (c) x cos(x) (d) sin(x) + xcos(x)

Q2. $\int_{-1}^{1}(5x^4\sqrt{x^5+1})dx$ is equal to $\frac{4\sqrt{2}}{3}$ . (True/False).

**2 MARKS**

Q3. Evaluate $\int_0^1 \frac{\tan^{-1}x}{1+x^2}dx$

Q4. Evaluate $\int_0^1 \frac{x}{1+x^2}dx$

**4 MARKS**

Q5. Evaluate $\int_0^1 \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ dx

Q6. Evaluate $\int_0^{\pi/2} \frac{\sin(x)}{1+cos^2(x)}$ dx

Q7. Evaluate $\int_{-1}^{1} \frac{dx}{x^2+2x+5}$ dx

**Answers**

1. (b) 2. True 3. $\frac{\pi^2}{32}$ 4. $\frac{\log(2)}{2}$ 5. $(\pi/2) - \log(2)$ 6. $\pi/4$ 7. $\pi/8$

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**Class: XII**

**Mathematics Assignment- 20**

**Topic: Integration**

**Sub Topic: Properties based question**

**1 MARKS**

Q1. If 'f' is an even function then $\int_{-a}^{a} f(x)\,dx$ is equal to

(a) 2 $\int_{0}^{a} f(x)\,dx$ (b) 0 (c) 2 (d) None of these

Q2. Fill in the blank

$\int_{a}^{b} f(x)\,dx = \int_{a}^{c} f(x)\,dx$ + .....

Q3. $\int_{0}^{2a} f(x)\,dx = \int_{0}^{a} f(x)\,dx + \int_{0}^{a} f(2a-x)\,dx$ is True/false.

**2 MARKS**

Q4. Evaluate $\int_{-\pi/2}^{\pi/2} sin^7x\,dx$

Q5. Evaluate $\int_{0}^{\pi/2} \frac{sinx-cosx}{1+sinx.cosx}\,dx$

Q6. Evaluate $\int_{-1}^{1} (x^{17}cos^4x)\,dx$

Q7. Evaluate $\int_{0}^{\pi/2} \frac{cos^5x}{cos^5x+sin^5x}\,dx$

Q8. Evaluate $\int_{0}^{\pi/2} \frac{\sqrt{sinx}}{\sqrt{sinx}+\sqrt{cosx}}\,dx$

**Answers**

1) (a) 2) $\int_{c}^{b} f(x)\,dx$ 3) True 4) 0 5) 0 6) 0 (odd function) 7) $\frac{\pi}{4}$ 8) $\frac{\pi}{4}$

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**Class: XII**

**Mathematics Assignment- 21**

**Topic: Integration**

**Sub Topic: Definite Integral**

**1 MARKS**

Q1. Choose the correct answer $\int_2^3 x^2\,dx$ is equal to

(a) $\frac{19}{3}$ (b) $\frac{9}{2}$ (c) $\frac{4}{3}$ (d) None of these

Q2. $\int_a^b f(x)\,dx = \int_0^a f(a-x)\,dx$ is True/false.

Q3. Fill in the blank

If 'f ' is an odd function then $\int_{-a}^a f(x)\,dx =$ ... ... ... ... ...

**2 MARKS**

Q4. Evaluate $\int_{-1}^1 sin^4x\,.cos^4x\,dx$

Q5. Evaluate $\int_0^1 \frac{x}{x^2+1}dx$

**4 MARKS**

Q6. Evaluate $\int_0^{\pi/2}(cos2x\,)dx$

Q7. Evaluate $\int_2^3 x\,dx$ as limit of sums

Q8. Evaluate $\int_0^{\pi/2} \frac{sin^4x}{cos^4x+sin^4x}dx$

**Answers**

1) (a) 2) True 3) 0 4) 0 (odd function) 5) $\frac{1}{2}log2$ 6) 0 7) $\frac{5}{2}$ 8) $\frac{\pi}{4}$

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**Class: XII**

**Mathematics Assignment 22**

**Topic: Definite Integrals**

**Sub Topic: Application of Integrals**

**4 MARKS**

Q1. Using integration, find the area of the region bounded by the line x - y + 2 = 0,

the curve $x = \sqrt{y}\ and\ y - axis$.

Q2. Using integration, find the area of the region in the first quadrant enclosed by the X-axis, the line y = x and the circle $x^2 + y^2 = 18$.

Q3. Find the area of the region $\{(x, y): (x^2 + y^2) \leq 1 \leq x + y\}$.

Q4. Find the area of circle $4x^2 + 4y^2 = 9$ which is interior to the parabola $x^2 = 4y$.

Q5. Using integration, find the area of the region bounded by the triangle whose vertices are (1, 3), (2, 5) and (3, 4).

Q6. Find the area of the region enclosed by the parabola $y^2 = x$ and the line x + y = 2.

Q7. Using method of integration, find the area of region bounded by lines 3x - 2y + 1 = 0, 2x + 3y - 21 = 0, and x - 5y + 9 = 0.

**ANSWERS**

1. $\frac{10}{3}$ sq.units 2. $\frac{3\pi}{2}$ sq.units 3. $(\frac{\pi}{4} - \frac{1}{2})$ sq.units

4. $\left(\frac{\sqrt{2}}{6} + \frac{9}{4} \sin^{-1}\left(\frac{2\sqrt{2}}{3}\right)\right)$ sq.units 5. $\frac{3}{2}$ sq.units 6. $\frac{9}{2}$ sq.units 7. $\frac{13}{2}$ sq.units

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