Question 1 330

$$\begin{aligned}\int \sqrt{5x-1}\,dx &= \frac{(5x-1)^{\frac{3}{2}}}{\frac{3}{2}} \cdot \frac{1}{5} + C \\ &= \frac{2}{15}(5x-1)^{\frac{3}{2}} + C\end{aligned}$$

Question 2 405

1. $$\begin{aligned}\int \left(1 + x^{\frac{1}{2}}\right)\,dx &= x + \frac{2x^{\frac{3}{2}}}{3} + C \\ &= x + \frac{2}{3}x\sqrt{x} + C\end{aligned}$$

2. $$\int \cos\frac{4}{9}x\,dx = \frac{9}{4}\sin\frac{4}{9}x + C$$

3. $$\begin{aligned}\int \frac{x}{1+3x^2}\,dx &= \frac{1}{6}\int \frac{6x}{1+3x^2}\,dx \\ &= \frac{1}{6}\ln(1+3x^2) + C\end{aligned}$$

4. $$\int e^{-\frac{x}{3}}\,dx = -3e^{-\frac{x}{3}} + C$$

Question 3 497

$\int_{-1}^{1} x^2 - 3x dx = \left[\frac{x^3}{3} - \frac{3x^2}{2}\right]_{-1}^{1}$
$= \left(\frac{1}{3} - \frac{3}{2}\right) - \left(-\frac{1}{3} - \frac{3}{2}\right)$
$= \frac{2}{3}$

Question 4 570

$\int (2x-5)^3 dx = \frac{(2x-5)^4}{8} + c$

Question 5 614

$\int_1^2 \frac{1}{(3x-1)^2}dx = \int_1^2 (3x-1)^{-2}dx$
$= \left[\frac{(3x-1)^{-1}}{3x(-1)}\right]_1^2$
$= \left[\frac{-1}{3x(3x-1)}\right]_1^2$
$= \frac{-1}{15} - \left(-\frac{1}{6}\right)$
$= \frac{-1}{15} + \frac{1}{6}$
$= \frac{1}{10}$

Question 6 658

$$\begin{aligned}\int (4x+6)^6 dx &= \frac{(4x+3)^7}{7\times 4} + C \\ &= \frac{(4x+3)^7}{28} + C\end{aligned}$$

Question 7 1170

What is the primitive function of $x^3 - 2x$?

1. $\frac{x^4}{4} - x^2 + C$

Question 8 1183

What is the primitive function of $2x^3$?

1. $\frac{x^4}{2} + C$

   $\frac{2x^{3+1}}{3+1}$

   $= \frac{2x^4}{4} + C$

   $= \frac{x^4}{2} + C$

Question 9 1391

$\int \frac{1}{3x^2}dx = \int \frac{1}{3}x^{-2}dx$
$= \frac{1}{-3}x^{-1} + c$
$= -\frac{1}{3x} + c$

Question 10 1395

$\int \sqrt{5x+1}dx = \int (5x+1)^{\frac{1}{2}}dx$
$= \frac{(5x+1)^{\frac{3}{2}}}{\frac{3}{2}\cdot 5} + c$
$= \frac{2(5x+1)^{\frac{3}{2}}}{15} + c$
$= \frac{2\sqrt{(5x+1)^3}}{15} + c$

Question 11 1396

$\int_0^6 (x+k)dx = 30$
$\left[\frac{x^2}{2} + kx\right]_0^6 = 30$
$\left[\frac{6^2}{2} + 6k\right] - \left[\frac{0^2}{2} + 0\right] = 30$
$18 + 6k = 30$
$6k = 30 - 18$
$6k = 12$
$k = 2$

Question 12 1397

i. $\int 5dx = 5x + c$

ii. $\int \frac{3}{(x-6)^2}dx = \int 3(x-6)^{-2}dx$
$= \frac{3(x-6)^{-1}}{1.-1} + c$
$= \frac{-3}{x-6} + c$

iii. $\int_1^4 x^2 + \sqrt{x}dx = \int_1^4 x^2 + x^{\frac{1}{2}}dx$
$= \left[\frac{x^3}{3} + \frac{2x^{\frac{3}{2}}}{3}\right]_1^4$
$= \left[\frac{(4)^3}{3} + \frac{2(4)^{\frac{3}{2}}}{3}\right] - \left[\frac{(1)^3}{3} + \frac{2(1)^{\frac{3}{2}}}{3}\right]$
$= 25\frac{2}{3}$

Question 13 1401

$\int_1^4 \frac{8}{x^2}dx = \int_1^4 8x^{-2}dx$
$= \left[\frac{8x^{-1}}{-1}\right]_1^4$
$= \left[-\frac{8}{x}\right]_1^4$ on calculator
$= -\frac{8}{4} - -\frac{8}{1}$
$= -2 + 8$
$= 6$