

Calculus C Review Answers

(Mathematika Worksheet)

$$\textcircled{1} \frac{1}{3} x^2 \sin 3x + \frac{2}{9} x \cos 3x - \frac{2}{27} \sin 3x + C$$

$$\textcircled{2} \frac{1}{2} \arcsin x - \frac{1}{2} x \sqrt{1-x^2} + C$$

$$\textcircled{3} \frac{1}{2} t - \frac{1}{4} \sin 2t + C$$

$$\textcircled{4} \ln|x+2| - \ln|x+3| + C$$

$$\textcircled{5} \ln \frac{9}{8}$$

$$\textcircled{6} \ln \frac{3}{2}$$

$\textcircled{7}$ p-series, converges

$\textcircled{8}$ Geometric, Diverges $\textcircled{9}$ Ratio Test, Converges

$\textcircled{10}$ Converges absolutely, Limit Comparison of $\sum |a_n|$ to $\sum \frac{1}{n^3}$ p-series

$\textcircled{11}$ Integral Test, Converges

$$\textcircled{12} -4 \leq x < 0$$

↑ Note equality

$$\textcircled{13} \sum_{n=0}^{\infty} \frac{(-1)^n}{4^{n+1}} x^{2n} \text{ for } -2 < x < 2 \quad \text{First 3 Terms: } \frac{1}{4} - \frac{1}{16} x^2 + \frac{1}{64} x^4 + \dots$$

$$\textcircled{14} T_2(x) = \frac{f(0)}{0!} x^0 + \frac{f'(0)}{1!} x^1 + \frac{f''(0)}{2!} x^2 = \frac{1}{4} + 0 - \frac{1/8}{2} x^2 = \frac{1}{4} - \frac{1}{16} x^2$$

↑ matches

$$\textcircled{15} y(3) \approx 4$$

$$\textcircled{16} y(x) = 2x - 2 + 2e^{-x}, \quad y(3) = 4 + \frac{2}{e^3} \approx 4.09957$$

$$\textcircled{17} y = -x + 2$$

$$\textcircled{18} A = 2 \left(\frac{1}{2} \int_0^{\pi/2} (\cos 4\theta)^2 d\theta \right) = \frac{\pi}{16}$$