

Math 229 Summation Worksheet

Summation Formulas

$$\sum_{i=1}^n c = \underbrace{c + c + \cdots + c}_{n \text{ times}} = n \cdot c$$

$$\sum_{i=1}^n i = 1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$$

$$\sum_{i=1}^n i^2 = 1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{i=1}^n i^3 = 1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4}$$

Evaluate

$$(1) \sum_{i=0}^3 (5 + \sqrt{4^i})$$

$$(2) \sum_{i=1}^{100} (4 + 3i)$$

$$(3) \sum_{i=1}^{200} (i - 3)^2$$

$$(4) \sum_{i=15}^{150} (4i + 1)$$

$$(5) \sum_{i=10}^{80} (i^3 + i^2)$$

$$(6) \sum_{i=1}^{20} \sin\left(\frac{i \cdot \pi}{2}\right)$$

$$(7) \sum_{i=7}^{32} \cos(i \cdot \pi)$$

$$(8) \sum_{i=25}^{150} \left(\frac{1}{i+4} - \frac{1}{i+5}\right)$$

(9) Compute the sum of the first 120 numbers in $3 + 7 + 11 + 15 + \cdots$

$$(10) \lim_{n \rightarrow \infty} \sum_{i=1}^n (1 + i + i^2)$$

Math 229 LIMIT Problems A

Compute

(1)
$$\lim_{x \rightarrow 3} \frac{5x^2 - 8x - 13}{x^2 - 5}$$

(2)
$$\lim_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$$

(3)
$$\lim_{x \rightarrow 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$$

(4)
$$\lim_{x \rightarrow -2} \frac{\frac{1}{x} + \frac{1}{2}}{x^3 + 8}$$

(5)
$$\lim_{x \rightarrow 4} \frac{3 - \sqrt{x+5}}{x-4}$$

(6)
$$\lim_{x \rightarrow 27} \frac{x-27}{x^{1/3} - 3}$$

(7)
$$\lim_{x \rightarrow 1} \frac{x^{1/3} - 1}{x^{1/4} - 1}$$

(8)
$$\lim_{x \rightarrow 0} \frac{\sin(5x)}{3x}$$

(9)
$$\lim_{x \rightarrow 0} \frac{\cos(2x) - 1}{\cos x - 1}$$

(10)
$$\lim_{x \rightarrow 0} \frac{x^3 - 7x}{x^3}$$

(11)
$$\lim_{x \rightarrow 0} \frac{x^4 + 5x - 3}{2 - \sqrt{x^2 + 4}}$$

(12)
$$\lim_{x \rightarrow 1} \frac{x^3 - 1}{(x-1)^2}$$

Math 229 LIMIT Problems B

Compute

(1) $\lim_{x \rightarrow \infty} \frac{100}{x^2 + 5}$

(2) $\lim_{x \rightarrow -\infty} \frac{7}{x^3 - 20}$

(3) $\lim_{x \rightarrow \infty} 3x^3 - 100x^2$

(4) $\lim_{x \rightarrow -\infty} x^4 + 5x^2 + 1$

(5) $\lim_{x \rightarrow \infty} x^5 - x^2 + x - 10$

(6) $\lim_{x \rightarrow -\infty} \frac{x + 7}{3x + 5}$

(7) $\lim_{x \rightarrow \infty} \frac{7x^2 + x - 100}{2x^2 - 5x}$

(8) $\lim_{x \rightarrow \infty} \frac{x^2 - 3x + 7}{x^3 + 10x - 4}$

(9) $\lim_{x \rightarrow \infty} \sqrt{\frac{x^3 + 7x}{4x^3 + 5}}$

(10) $\lim_{x \rightarrow \infty} x - \sqrt{x^2 + 7}$

(11) $\lim_{x \rightarrow -\infty} x - \sqrt{x^2 + 7}$

(12) $\lim_{x \rightarrow \infty} \frac{x + 3}{\sqrt{9x^2 - 5x}}$