Mathematics 300

Quiz 27 **Name:** Key

You must show your work to get full credit.

1. Find $S = \sum_{k=4}^{8} (2k-9)^2$. $S =$ _____

$S = (2(4)-9)^2 + (2(5)-9)^2 + (2(6)-9)^2 + (2(7)-9)^2 + (2(8)-9)^2$

$= (-1)^2 + (1)^2 + (3)^2 + (5)^2 + (7)^2$

$= 1 + 1 + 9 + 25 + 49$

$= 11 + 25 + 49$

$= 85$

$\begin{array}{r} 11 \\ 25 \\ 49 \\ \hline 85 \end{array}$

2. Find the sum of the geometric series

$$S = 10 + 10x^2 + 10x^4 + \cdots + 10x^{2n}$$

$S =$ $\dfrac{10 - 10x^{2n+2}}{1 - x^2}$

$S = \dfrac{\text{first} - \text{next}}{1 - \text{ratio}} = \dfrac{10 - 10x^{2(n+1)}}{1 - x^2}$

$= \dfrac{10 - 10x^{2n+2}}{1 - x^2}$

3. Factor $x^3 - 8$. $x^3 - 8 =$ $(x-2)(x^2+2x+4)$

$x^3 - 8 = x^3 - 2^3$

$= (x-2)(x^2+2x+4)$

4. Find the sum of the arithmetic series

$$S = 1 + 5 + 9 + 13 + \cdots + 29$$

$S =$ 120

$S = (\text{number terms})(\text{Average})$

To get number of terms write out sum

$S = 1 + 5 + 9 + 13 + 17 + 21 + 25 + 29$

So 8 terms

$S = 8\left(\frac{1+29}{2}\right) = 8(15) = 120$