PPP Solutions

1) $(7x-8)^4$

$= 1(7x)^4(-8)^0 + 4(7x)^3(-8)^1 + 6(7x)^2(-8)^2 + 4(7x)^1(-8)^3 + 1(7x)^0(-8)^4$

$= 2401x^4 + 4 \cdot 343x^3(-8) + 6 \cdot 49x^2 \cdot 64 + 4 \cdot 7x(-512) + 1 \cdot 1 \cdot 4096$

$= 2401x^4 - 10976x^3 + 18816x^2 - 14336x + 4096$

2) $(3x-2y)^7$

$$\binom{7}{3}(3x)^4(-2y)^3$$

$$= 35 \cdot 81x^4(-8)y^3$$

$$= -22,680x^4y^3$$

3) $a_n = -13 + (n-1)8$

$\qquad = -13 + 8n - 8$

$a_n = 8n - 21$

$a_{101} = 8 \cdot 101 - 21 = 808 - 21 = 787$

$a_n = 8n - 21$

$a_{101} = 787$

4) $a_5 = 13 \qquad a_9 = -3$

$$d = \frac{-3 - 13}{9 - 5} = -\frac{16}{4} = -4$$

$\underline{29}, \underline{25}, \underline{21}, \underline{17}, 13$

$\uparrow$

a_5

$\boxed{\begin{array}{l} d = -4 \\ a = 29 \end{array}}$

5) $a = 7$

$a_n = 7 + (42-1) \cdot 2 = 7 + 82 = 89$

$S_{42} = \dfrac{42}{2}(7 + 89) = 21 \cdot 96$

$\boxed{= 2016 \text{ seats}}$

6) $a_n = 125\left(\dfrac{1}{5}\right)^{n-1}$

$a_7 = 125\left(\dfrac{1}{5}\right)^{7-1} = 125\left(\dfrac{1}{5}\right)^6 = \dfrac{1}{125}$

7) $27 - 9 + 3 - 1 + \dfrac{1}{3} - \ldots$

$a = 27$

$r = \dfrac{-9}{27} = -\dfrac{1}{3}$

$S = \dfrac{27}{1-\left(-\frac{1}{3}\right)} = \dfrac{27}{\left(\frac{4}{3}\right)}$

$= 27 \cdot \dfrac{3}{4} = 20.25$

8) $\displaystyle\sum_{k=2}^{7}(3-4k) = (3-4\cdot2) + (3-4\cdot3) + (3-4\cdot4) + (3-4\cdot5)$

$+ (3-4\cdot6)$

$$= -5 + (-9) + (-13) + (-17) + (-21)$$
$$= -65$$

9) $\left\{ \dfrac{(-2)^n}{n^2+3} \right\}$ $\dfrac{-2}{4}$, $\dfrac{4}{7}$, $\dfrac{-8}{12}$, $\dfrac{16}{19}$, $\dfrac{-32}{28}$

$$\left\{ -\dfrac{1}{2} , \dfrac{4}{7} , -\dfrac{2}{3} , \dfrac{16}{19} , -\dfrac{8}{7} \right\}$$

10) $a_1 = -7$

$a_2 = 5 - 6(-7) = 47$

$a_3 = 5 - 6 \cdot 47 = -277$

$a_4 = 5 - 6(-277) = 1667$

$a_5 = 5 - 6 \cdot 1667 = -9997$

$$-7, 47, -277, 1667, -9997$$