

$$\begin{aligned}
 1) \quad (3x - 5)^4 &= (3x + (-5))^4 \\
 &= 1(3x)^4(-5)^0 + 4(3x)^3(-5)^1 + 6(3x)^2(-5)^2 + 4(3x)^1(-5)^3 + 1(3x)^0(-5)^4 \\
 &= 1 \cdot 81x^4 \cdot 1 + 4 \cdot 27x^3(-5) + 6 \cdot 9x^2 \cdot 25 + 4 \cdot 3x(-125) + 1 \cdot 1 \cdot 625 \\
 &= 81x^4 - 540x^3 + 1350x^2 - 1500x + 625
 \end{aligned}$$

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

$$\begin{aligned}
 2) \quad (4x + y)^{10} &= \binom{10}{6} (4x)^4 y^6 \\
 &= 210 \cdot 256x^4 y^6 = 53,760x^4 y^6
 \end{aligned}$$

7th term
1 less

10 - 6
↓
4 6

$10C_6 = 10$ MATH PRB nCr 6 enter

PPP (#2) 4th term of $(3x - 2y)^7$

$$\begin{aligned}
 3) \quad a_n &= a + (n-1)d \\
 &\quad \uparrow \qquad \qquad \uparrow \\
 &\quad 7 \qquad \qquad -2 \\
 a_n &= 7 + (n-1)(-2) \\
 a_n &= 7 - 2n + 2 \\
 a_n &= 9 - 2n
 \end{aligned}$$

$$\begin{aligned}
 a_7 &= 9 - 2 \cdot 7 \\
 &= 9 - 14 \\
 a_7 &= -5
 \end{aligned}$$

PPP #3

$a = -13$ and $d = 8$ find a_n and a_{101}

$$4) a_6 = 6$$

$$a_{11} = 26$$

$$d = \frac{26-6}{11-6} = \frac{20}{5} = 4$$

$$a_n = a + (n-1)d$$

$$6 = a + (6-1)d$$

$$6 = a + 5 \cdot 4$$

$$6 - 20 = a$$

$$a = -14$$

$$d = 4$$

$$-14, -10, -6, -2, 2, 6$$

PPP #4

$a_5 = 13$ and $a_9 = -3$

Find a and d

$$5) S_n = \frac{n}{2}(a + a_n) = \frac{19}{2}(11 + 29)$$

$$a = 11$$

$$n = 19$$

$$a_n = 29$$

$$= \frac{19}{2} \cdot 40$$

$$= 380 \text{ seats}$$

PPP #5

A stadium has 7 seats in row 1 of a section. Each row above has 2 extra seats. If that section has 42 rows, how many seats are in it?

$$6) a_n = a \cdot r^{n-1}$$

$$a_n = 128 \cdot \left(\frac{1}{2}\right)^{n-1} \quad \leftarrow$$

$$a_9 = 128 \left(\frac{1}{2}\right)^{9-1} = 128 \left(\frac{1}{2}\right)^8 = \frac{1}{2} \quad \leftarrow$$

PPP: (7) $a = 125$ and $r = \frac{1}{5}$

find a_n and a_7

$$7) \sum_{k=1}^{\infty} 128 \left(\frac{1}{2}\right)^{k-1} \quad S = \frac{a}{1-r} = \frac{128}{1-\frac{1}{2}}$$

$$a = 128 \left(\frac{1}{2}\right)^{1-1}$$

$$= 128 \left(\frac{1}{2}\right)^0 = 128$$

$$r = \frac{1}{2}$$

128, 64, 32, 16, ...

$$= \frac{128}{\left(\frac{1}{2}\right)}$$

$$= 256$$

PPP (7) Find the sum

$$27 - 9 + 3 - 1 + \frac{1}{3} - \dots$$

$$8) \sum_{k=0}^4 (k^2 - 4) = (0^2 - 4) + (1^2 - 4) + (2^2 - 4) + (3^2 - 4) + (4^2 - 4)$$

$$= -4 + (-3) + 0 + 5 + 12$$

$$= 10$$

PPP #8

$$\sum_{k=2}^7 (3 - 4k)$$

9)

$$\left\{ \frac{(-1)^n}{(n+1)(n+2)} \right\}$$

$$\frac{(-1)^1}{2 \cdot 3}, \frac{(-1)^2}{3 \cdot 4}, \frac{(-1)^3}{4 \cdot 5}, \frac{(-1)^4}{5 \cdot 6}, \frac{(-1)^5}{6 \cdot 7}$$

$$-\frac{1}{6}, \frac{1}{12}, -\frac{1}{20}, \frac{1}{30}, -\frac{1}{42}$$

PPP #9 First five terms

$$\left\{ \frac{(-2)^n}{n^2 + 3} \right\}$$

10) $a_1 = -2$

$$a_n = n + 3a_{n-1}$$

$$a_2 = 2 + 3a_1 = 2 + 3(-2) = -4$$

$$a_3 = 3 + 3a_2 = 3 + 3(-4) = -9$$

$$a_4 = 4 + 3a_3 = 4 + 3(-9) = -23$$

$$a_5 = 5 + 3a_4 = 5 + 3(-23) = -64$$

$$\{-2, -4, -9, -23, -64\}$$

PPP (#10)

$$a_1 = -7$$

$$a_n = 5 - 6a_{n-1}$$