PARTICULAR TERM FROM A SINGLE BRACKET

$$T_{r+1} = {}^{n}C_{r}\, a^{n-r} b^{r}$$

TERM NO

Q Find the 5th term in expansion of $(2+3x)^8$.

$$T_{r+1} = {}^{8}C_{r}\,(2)^{8-r}(3x)^{r}$$

$r+1 = 5$

$r = 4$

$$T_5 = {}^{8}C_{4}\,(2)^{8-4}(3x)^{4}$$

$$(70)(16)(81x^4)$$

$$T_5 = 90720\,x^4$$

POWER OF x

Q: Find x^2 term in the expansion of $(3x+2)^8$

$$T_{r+1} = {}^{8}C_{r}\,(3x)^{8-r}(2)^{r}$$

$$= {}^{8}C_{r} \cdot 3^{8-r} \cdot x^{8-r} \cdot 2^{r}$$

STEP 1: EXPAND ALL POWERS AND ISOLATE X-TERMS.

STEP 2: PUT ISOLATED X-TERMS EQUAL TO REQUIRED TERM.

$$x^{8-r} = x^2$$

$$8 - r = 2$$

$r = 6$

STEP 3: FIND r and PUT ITS VALUE IN FIRST STEP.

$$T_{6+1} = {}^{8}C_{6}\,(3x)^{8-6}(2)^{6}$$

$$= (28)(9x^2)(64)$$

$$T_7 = 16128\,x^2$$

Q: Find x^2 term in expansion $\left(2x + \frac{3}{x}\right)^8$.

$$T_{r+1} = {}^{8}C_{r}\,(2x)^{8-r}\left(\frac{3}{x}\right)^{r} = {}^{8}C_{3}\,(2x)^{8-3}\left(\frac{3}{x}\right)^{3}$$

$${}^{8}C_{r} \cdot 2^{8-r} \cdot x^{8-r} \cdot \frac{3^{r}}{x^{r}}$$

$$\frac{x^{8-r}}{x^{r}} = x^{2}$$

$$x^{8-r-r} = x^{2}$$

$$8 - 2r = 2$$

$$\boxed{r = 3}$$

$$(56)(32x^{5})\left(\frac{27}{x^{3}}\right)$$

$$\boxed{48384x^{2}}$$

NEW VOCAB

1 (type) TERM INDEPENDENT OF X.

↳ Apply Formula for Particular Term.

Try to find term $\boxed{x^{0}}$

Q Find the term independent of x (x^0) in the expansion of $\left(3x - \frac{1}{x}\right)^{8}$

$$T_{r+1} = {}^{8}C_{r}(3x)^{8-r}\left(\frac{-1}{x}\right)^{r}$$

$$= {}^{8}C_{r} \cdot 3^{8-r} \cdot x^{8-r} \cdot (-1)^{r}$$

$$= {}^{8}C_{4}(3x)^{8-4}\left(\frac{-1}{x}\right)^{4}$$

$\frac{x^{8-r}}{x^r} = x^0$

$x^{8-r-r} = x^0$

$8 - 2r = 0$

$r = 4$

$(70)(81x^4)\left(\frac{+1}{x^4}\right)$

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2 (TYPE I) NO TERM IN x^2

Means Find term of x^2 and put it equal to $0x^2$ → FINAL ANS

NO TERM IN x

Means Find term of x and put it equal to $0x$ → FINAL ANS

Q i) $(2-x)^6 = 64 - 192x + 240x^2$

Final Ans = $0x^2$

ii) Given that there is no term in x^2 in expansion of $(3+kx)(2-x)^6$, Find k.

$(3+kx)(2-x)^6 \longrightarrow x^2$

$3 \times 240x^2 = 720x^2$

$+kx \times -192x = -192kx^2$

$720 - 192k = 0$

$k = 3.75$

$\therefore x^2$

TYPE 3 SUBSTITUTION.

Q (i) $(2-x)^6 = 64 - 192x + 240x^2$

(ii) Hence find coefficient of y^2 in expansion $(2-(y+y^2))^6$.

$(2-x)^6 = 64 - 192x + 240x^2$

$(2-(y+y^2))^6 = 64 - 192(y+y^2) + 240(y+y^2)^2$

$= 64 - 192y - 192y^2 + 240(y^2 + 2(y)(y^2) + (y^2)^2)$

$-192y^2 + 240(y^2)$

$\boxed{48y^2}$