

## COLLEGE ALGEBRA QUIZ

- (1) True or False? A set which has  $n$  elements, will have  $2^n$  subsets.

**Solution: True**

- (2) How many subsets does the set  $\{A, B, C, D, E, F, G, H\}$  have?

**Solution:  $2^8$  or 256**

- (3) What is the binomial expansion of  $(w + x)^7$

**Solution: (a)**

- (a)  $w^7 + 7w^6x + 21w^5x^2 + 35w^4x^3 + 35w^3x^4 + 21w^2x^5 + 7wx^6 + x^7$   
(b)  $w^7 + 8w^6x + 28w^5x^2 + 70w^4x^3 + 56w^3x^4 + 8w^2x^5 + x^7$   
(c)  $w^7 + 6w^5x + 15w^4x^2 + 20w^3x^3 + 15w^2x^4 + 6wx^5 + x^7$   
(d)  $w^7 + 28w^6x^2 + 56w^5x^3 + 70w^4x^4 + 56w^3x^5 + 28w^2x^6 + x^7$

- (4) What is the binomial expansion of  $(y - \sqrt{3})^5$

**Solution: (a)**

- (a)  $y^5 - 5\sqrt{3}y^4 + 30y^3 - 30\sqrt{3}y^2 + 45y - 9\sqrt{3}$   
(b)  $y^5 - 5\sqrt{3}y^4 + 20y^3 - 20\sqrt{3}y^2 + 20y - 4\sqrt{3}$   
(c)  $y^5 - 6\sqrt{3}y^4 + 15y^3 - 20\sqrt{3}y^2 + 15y - 6\sqrt{3}$   
(d)  $y^5 - 5\sqrt{3}y^4 + 10y^3 - 10\sqrt{3}y^2 + 5y - \sqrt{3}$

- (5) What is the binomial expansion of  $(m^2 - 3n)^4$

**Solution: (a)**

- (a)  $m^8 - 12m^6n + 54m^4n^2 - 108m^2n^3 + 81n^4$   
(b)  $m^8 - 5m^6n + 10m^4n^2 - 10m^2n^3 + 5n^4$   
(c)  $m^8 - 15m^6n + 30m^4n^2 - 30m^2n^3 + 15n^4$   
(d)  $m^8 - 15m^6n + 90m^4n^2 - 135m^2n^3 + 81n^4$

- (6) What is the binomial expansion of  $(x + \frac{1}{x})^9$ .

**Solution: (a)**

- (a)  $x^9 + 9x^7 + 36x^5 + 84x^3 + 126x + 126x^{-1} + 84x^{-3} + 36x^{-5} + 9x^{-7} + x^{-9}$   
(b)  $x^9 + 8x^7 + 28x^5 + 56x^3 + 74x + 56x^{-1} + 28x^{-3} + 8x^{-5} + x^{-9}$   
(c)  $x^9 + 10x^7 + 45x^5 + 120x^3 + 210x + 252x^{-1} + 210x^{-3} + 120x^{-5} + 10x^{-7} + x^{-9}$   
(d) 0

- (7) What is the binomial expansion of  $(1 + 2i)^6$ , where  $i^2 = -1$ .

**Solution:  $117 + 44i$**

(8) What is the 6th term of  $(y + z)^{12}$ .

**Solution: (a)**

(a)  $792y^7z^5$

(b)  $220y^9z^3$

(c)  $396y^5z^7$

(d)  $\frac{12}{5}y^7z^5$

(9) What is the 20th term of  $(2x - y)^{25}$ .

**Solution: (a)**

(a)  $-\binom{25}{19}64x^6y^{19}$

(b)  $-\binom{25}{20}18x^6y^{20}$

(c)  $\binom{25}{21}2x^6y^{21}$

(d)  $-\binom{25}{18}64x^6y^{18}$