

$$\begin{aligned} 1. \quad {}_{16}C_{12} &= \frac{16!}{12!(16-12)!} = 1820, \\ &= \binom{16}{12} \end{aligned}$$

Binomial Theorem.

$$(a+b)^n = \binom{n}{0}a^n b^0 + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \dots + \binom{n}{n}a^0 b^n$$

$$(a+b)^9 = \binom{9}{0}a^9 b^0 + \binom{9}{1}a^8 b^1 + \binom{9}{2}a^7 b^2 + \binom{9}{3}a^6 b^3 \\ + \binom{9}{4}a^5 b^4 + \binom{9}{5}a^4 b^5 + \binom{9}{6}a^3 b^6 + \binom{9}{7}a^2 b^7 \\ + \binom{9}{8}a^1 b^8 + \binom{9}{9}a^0 b^9$$

$$= a^9 + 9a^8 b + 36a^7 b^2 + 84a^6 b^3 + 126a^5 b^4 + 126a^4 b^5$$

$$+ 84a^3 b^6 + 36a^2 b^7 + 9a^1 b^8 + b^9$$

$$\begin{aligned}
 1. (y+z)^5 &= \binom{5}{0} y^5 z^0 + \binom{5}{1} y^4 z^1 + \binom{5}{2} y^3 z^2 + \binom{5}{3} y^2 z^3 \\
 &\quad + \binom{5}{4} y^1 z^4 + \binom{5}{5} y^0 z^5 \\
 &= y^5 + 5y^4z + 10y^3z^2 + 10y^2z^3 + 5yz^4 + 1z^5
 \end{aligned}$$

$${}_{16}C_{12} = \frac{16!}{12!(16-12)!} = 1820$$

$$(a+b)^2 = (a+b)(a+b) = a^2 + 2ab + b^2$$

$$(a+b)^3 = (a^2 + 2ab + b^2)(a+b)$$

$$= a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$$

								$\binom{0}{0}$
							$\binom{1}{0}$	$\binom{1}{1}$
						$\binom{2}{0}$	$\binom{2}{1}$	$\binom{2}{2}$
					$\binom{3}{0}$	$\binom{3}{1}$	$\binom{3}{2}$	$\binom{3}{3}$
				$\binom{4}{0}$	$\binom{4}{1}$	$\binom{4}{2}$	$\binom{4}{3}$	$\binom{4}{4}$
$\binom{4}{0}$	$\binom{4}{1}$	$\binom{4}{2}$	$\binom{4}{3}$	$\binom{4}{4}$				
$\binom{5}{0}$	$\binom{5}{1}$	$\binom{5}{2}$	$\binom{5}{3}$	$\binom{5}{4}$	$\binom{5}{5}$			

Binomial Theorem,

$$(a+b)^n = \binom{n}{0} a^n b^0 + \binom{n}{1} a^{n-1} b^1 + \binom{n}{2} a^{n-2} b^2 + \dots + \binom{n}{n} a^0 b^n$$

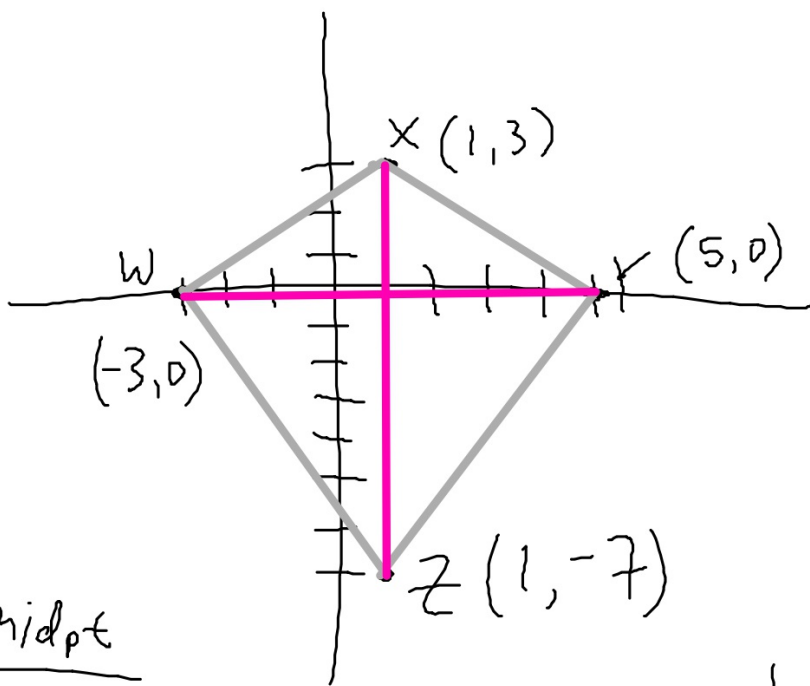
$$\begin{aligned} (a+b)^7 &= \binom{7}{0} a^7 b^0 + \binom{7}{1} a^6 b^1 + \binom{7}{2} a^5 b^2 \\ &\quad + \binom{7}{3} a^4 b^3 + \binom{7}{4} a^3 b^4 + \binom{7}{5} a^2 b^5 + \binom{7}{6} a^1 b^6 \\ &\quad + \binom{7}{7} a^0 b^7 \\ &= a^7 + 7a^6 b + 21a^5 b^2 + 35a^4 b^3 + 35a^3 b^4 \\ &\quad + 21a^2 b^5 + 7ab^6 + b^7 \end{aligned}$$

$$\begin{aligned}
 1) \quad (y+2)^5 &= \binom{5}{0} y^5 2^0 + \binom{5}{1} y^4 2^1 + \binom{5}{2} y^3 2^2 \\
 &+ \binom{5}{3} y^2 2^3 + \binom{5}{4} y^1 2^4 + \binom{5}{5} 2^5 \\
 &= y^5 + 10y^4 + 40y^3 + 80y^2 + 80y + 32
 \end{aligned}$$

9) 4th term of $(u+v)^3$

$$\binom{3}{3} u^0 v^3 = v^3$$

$$(x^4)^2 = x^8$$



Slope of WX

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{y_1 - y_2}{x_1 - x_2}$$

$$= \frac{3 - 0}{1 - -3} = \boxed{\frac{3}{4}}$$

Midpt

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Dist.

$$d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

Pyth.

$$a^2 + b^2 = c^2$$