Binomial Expansion

Notes:

- Remember to use Pascal's Triangle.
- Work out the expansion for $(a+b)^n$
- $Pa^nb^0 + Pa^{n-1}b^1 + Pa^{n-2}b^2 + \cdots + Pa^1b^{n-1} + Pa^0b^n$
- P is the number from Pascal's Triangle
- Put the values of a and b in brackets to help you figure out each term
- Collect the like terms together

1 Expand $(a+b)^5$ and hence expand $\left(8+\sqrt{2}\right)^5$

2 Expand $(a+b)^7$ and hence expand $\left(1+\sqrt{3}\right)^7$

3 Expand $(a+b)^4$ and hence expand $(x+6)^4$

4 Expand $(a+b)^7$ and hence expand $\left(x+\frac{3}{4}\right)^7$

5 Expand $(a+b)^3$ and hence expand $\left(3x+\sqrt{5}\right)^3$

6 Expand $(a+b)^4$ and hence expand $\left(x+3\sqrt{5}\right)^4$

7 Find the eighth term in the expansion of $\left(3+\sqrt{5}\right)^{11}$

8 Find the twelfth term in the expansion of $\left(3x+\sqrt{3}\right)^{17}$

9 Find the sixth term in the expansion of $\left(4x^2+\frac{2}{3}\right)^{10}$

10 Find the seventh term in the expansion of $\left(2x^2+\sqrt{3}\right)^{11}$

11 Find the ninth term in the expansion of $\left(3x^2+\frac{1}{\sqrt{3}}\right)^{10}$

12 Find the eleventh term in the expansion of $\left(\frac{2}{\sqrt{5}}-3x\right)^{12}$

13 Find the fifth term in the expansion of $\left(7x-\frac{4}{1+2\sqrt{2}}\right)^7$

14 Find the fourth term in the expansion of $\left(\frac{3}{5}-\frac{\sqrt{3}}{2}\right)^{12}$

15 Find the seventh term in the expansion of $\left(\frac{5x}{2}-\frac{3}{\sqrt{7}}\right)^8$

Notes to help you with these difficult questions

With these questions, you are presented with the idea of this is one of the terms and you are trying to work out another term from that information. In effect, you have to find n and m in the expression $(mx + y)^n$.

- $mx^a y^b$: you work out ***n*** by $(mx + y)^{n=a+b}$
- You will need to write out the nth row of Pascal's Triangle. Remember the row number is the same as the second term in each row.
- Bearing in mind that ***a*** decreases with each term, you will need to match up the term of the expansion with the term in Pascal's Triangle.
- You will need to divide the term by the coefficient of the term in Pascal's Triangle that relates to ***a*** value in $mx^a y^b$.
- You work out $\sqrt[a]{m^a}$ to find the value of ***m.***
- Finally, work out the coefficient for the term that they specify in the question.

16 The simplified expansion of $(mx + b)^n$ includes the term $80x^3y^2$. Find the coefficient for the x^4y term.

17 The simplified expansion of $(mx + b)^n$ includes the term $2835x^4y^3$. Find the coefficient for the x^6y term.

18 The simplified expansion of $(mx + b)^n$ includes the term $-64x^3y$. Find the coefficient for the x^2y^2 term.

19 The simplified expansion of $(mx + b)^n$ includes the term $43750x^4y^4$. Find the coefficient for the x^6y^2 term.

20 The simplified expansion of $(mx + b)^n$ includes the term $61440x^3y^7$. Find the full expression for the $x^k y^{k-2}$ term.