**Binomial Theorem**



 must be rational and not positive integer



**Questions**

Rewrite as approximations using the binomial expansion as far as the  term:

1. 
2. 
3. 
4. 

Rewrite as approximations using the binomial expansion as far as the  term:

1. 
2. 
3. 
4. 
5. 

Extra Practice

As far as the  term

1. 
2. 
3. 

As far as the  term

1. 
2. 
3. 
4. 

Application

Show that 

By substituting  into the expression above, deduce that 

Find an approximation for $\sqrt{28}$.

Why can’t this expansion be used to find an approximation for $\sqrt{35}$ ?

**Answers**

Rewrite as approximations using the binomial expansion as far as the  term:

1.  = 
2.  = 
3.  =  = 
4.  =  = 

Rewrite as approximations using the binomial expansion as far as the  term:

1.  = 
2.  = 
3.  =  = 
4.  =  = 
5.  = 

Extra practice:

1. 
2. 
3. 
4. 
5. 
6. 
7. 



Activity…



Check for…

|  |
| --- |
| $$n=-1 , x=-x$$Compare LHS vs RHS $ y=\frac{1}{\left(1-x\right)}$, $y=1+x+x^{2}+x^{3}+…$Compare Graphs (between limits)Compare the geometric series $a=1, r=x$Substitute values of x to check ($x=1, x=^{1}/\_{2}$) |
| $$n=-2, x=-x$$Compare LHS vs RHS $ y=\frac{1}{\left(1-x\right)^{2}}$, $y=1+2x+3x^{2}+4x^{3}+…$Compare Graphs (between limits)Compare the geometric series $a=1, r=?$Substitute values of x to check ($x=1, x=^{1}/\_{2}, x=0.1$) $$x=0.1⟹y=1+0.2+0.03+0.004…$$Relate to 100/81 (and consider the $10x^{9}$ term) |
| $$n=^{1}/\_{2}, x=x$$Compare LHS vs RHS $ y=\frac{1}{\sqrt{\left(1-x\right)}}$, $y=1+\frac{x}{2}-\frac{x^{2}}{8}+\frac{x^{3}}{16}+…$Compare Graphs (between limits)Compare the geometric series$a=1, r=\frac{x}{4}$Substitute values of x to checkSquare both sides |

|  |  |  |  |
| --- | --- | --- | --- |
| **Coefficient** | $$x^{n}$$ | **Term** | **Sum** |
| 1 | 1 | 1 | 1 |
| 2 | 0.1 | 0.2 | 1.2 |
| 3 | 0.01 | 0.03 | 1.23 |
| 4 | 0.001 | 0.004 | 1.234 |
| 5 | 0.0001 | 0.0005 | 1.2345 |
| 6 | 0.00001 | 0.00006 | 1.23456 |
| 7 | 0.000001 | 0.000007 | 1.234567 |
| 8 | 0.0000001 | 0.0000008 | 1.2345678 |
| 9 | 0.00000001 | 0.00000009 | 1.23456789 |
| 10 | 0.000000001 | 0.000000010 | 1.2345679 |
|  |  |  |  |
|  |  | 1.234567 910… |  |