Multiple choice questions - Binomial expansion for rational n and series modelling

Year: Year 13 · 10

Question 1 The expansion of $(1+x)^{-1}$ is valid for

- ◯ **A.** $|x|$
- ◯ **B.** $x > -1$
- ◯ **C.** $|x| \leq 1$
- ◯ **D.** all x

Question 2 The coefficient of x in $(1+x)^{1/2}$ is

- ◯ **A.** 1
- ◯ **B.** $\frac{1}{2}$
- ◯ **C.** $-\frac{1}{2}$
- ◯ **D.** $\frac{1}{4}$

Question 3 The coefficient of x^2 in $(1+x)^{-2}$ is

- ◯ **A.** 2
- ◯ **B.** -2
- ◯ **C.** 3
- ◯ **D.** 6

Question 4 $(1-3x)^{-1}$ is valid for

- ◯ **A.** $|x|$
- ◯ **B.** $|x|$
- ◯ **C.** x
- ◯ **D.** $|x|$

Question 5 $\sqrt{9+x} =$

- ◯ **A.** $3\left(1+\frac{x}{9}\right)^{1/2}$
- ◯ **B.** $9\left(1+\frac{x}{9}\right)^{1/2}$
- ◯ **C.** $3(1+x)^{1/2}$
- ◯ **D.** $\frac{1}{3}\left(1+\frac{x}{9}\right)^{1/2}$

Question 6 The first three terms of $(1+x)^{-1/2}$ are

- **A.** $1+\frac{x}{2}+\frac{3x^2}{8}$
- **B.** $1-\frac{x}{2}+\frac{3x^2}{8}$
- **C.** $1-\frac{x}{2}-\frac{x^2}{8}$
- **D.** $1-x+x^2$

Question 7 Which value of x can safely be used in the series of $\sqrt{1+x}$?

- **A.** 3
- **B.** -1.5
- **C.** 0.05
- **D.** 1

Question 8 The expansion of $(2+x)^{-1}$ is valid for

- **A.** $|x|$
- **B.** $|x|$
- **C.** $x>-2$
- **D.** $|x|$

Question 9 For $(1+ax)^n$ the x term is

- **A.** nax
- **B.** nx
- **C.** anx^2
- **D.** a^nx

Question 10 A series approximation for a number is best when

- **A.** x is as large as possible
- **B.** x is small and inside the validity range
- **C.** the power n is an integer
- **D.** more than ten terms are used

Answer grid - Binomial expansion for rational n and series modelling

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Question	Answer	Explanation
1	**A**	The condition is |x|<1.
2	**B**	n = 1/2.
3	**C**	n(n-1)/2 = (-2)(-3)/2 = 3.
4	**D**	|3x|<1.
5	**A**	Factor out 9, and then 9^(1/2)=3.
6	**B**	(-1/2)(-3/2)/2 = 3/8.
7	**C**	Must satisfy |x|<1.
8	**D**	(2)(1+x/2)^{-1}: |x/2|<1.
9	**A**	Substitute u=ax.
10	**B**	Convergence is fastest for small x.