A-Level Starter Activity

Jahwa Maths

Topic: Factorial Notation

Chapter Reference: Pure 1, Chapter 8

5 minutes

1. Given that $\binom{50}{13} = \frac{50!}{13!\,a!}$, write down the value of a **(2)**

2. Given that $\binom{35}{p} = \frac{35!}{p!\,18!}$, write down the value of p. **(2)**

3. Given that $\binom{45}{17} = \frac{45!}{17!\,a!}$, write down the value of a. **(2)**

Solutions

1.

$\binom{50}{13} = \frac{50!}{13!\,37!}$	**M1**
a = 37	**M1**

2.

$\binom{35}{17} = \frac{35!}{17!\,18!}$	**M1**
p = 17	**M1**

3.

$\binom{45}{17} = \frac{45!}{17!\,28!}$	**M1**
a = 28	**M1**

Jonna Maths

A-Level Starter Activity

Jahwa Maths

Topic: Binomial Expansion

Chapter Reference: Pure 1, Chapter 8

5 minutes

1a. Find the first 4 terms of the expansion of $(1 + \frac{x}{2})^{10}$ in ascending powers of x, giving each term in its simplest form. **(2)**

b. Use your expansion to estimate the value of $(1.005)^{10}$, giving your answer to 5 decimal places. **(3)**

Solutions

1.

$(1+\frac{1}{2})^{10} = 1 + \binom{10}{1}\left(\frac{1}{2}x\right) + \binom{10}{2}\left(\frac{1}{2}x\right)^2 + \binom{10}{3}\left(\frac{1}{2}x\right)^3$	**M1**
$= 1 + 5x + \frac{45}{4}x^2 + 15x^3$	**M1**

2.

$(1.005)^{10} = (1 + \frac{1}{2} \times 0.01)^{10}$	**M1**
$= 1 + 5(0.01) + \frac{45}{4}(0.01)^2 + 15(0.01)^3$ $= 1 + 0.05 + 0.001125 + 0.000015$	**M1**
$= 1.05114$	**M1**

Jonna Maths

A-Level Starter Activity

Jotnwa Maths

Topic: Binomial Expansion

Chapter Reference: Pure 1, Chapter 8

5 minutes

1a. Write down the first three terms, in ascending powers of x, of the binomial expansion of $(1 + px)^{12}$, where p is a non zero constant. **(2)**

Given that, in the expansion $(1 + px)^{12}$, the coefficient of x is $(-q)$ and the coefficient of x^2 is $11q$.

b. Find the value of p and the value of q. **(3)**

Solutions

1a.

$1 + 12px + \frac{12\times11}{2}(px)^2$	**M1 M1**

1b.

$12p(x) = -q(x)$ $66p^2(x^2) = 11q(x^2)$	**M1**
$66p^2 = -132p$ $p = -2$	**M1**
$q = 24$	**M1**

Jonna Maths

A-Level Starter Activity

Jahwa Maths

Topic: Binomial Expansion

Chapter Reference: Pure 1, Chapter 8

5 minutes

1a. Find the first 4 terms, in ascending powers of x, of the binomial expansion of $(1 + ax)^{10}$, where a is a non-zero constant. Give each term in its simplest form. **(4)**

Give that, in this expansion, the coefficient of x^3 is double the coefficient of x^2.

b. Find the value of a. **(2)**

Solutions

1.

$(1 + ax)^{10} = 1 + 10ax + \frac{10\times9}{2}(ax)^2 + \frac{10\times9\times8}{6}(ax)^3$	**M1 M1**
$= 1 + 10ax + 45(ax)^2 + 120(ax)^3$	**M1 M1**

2.

$120a^3 = 2 \times 45a^2$	**M1**
$a = \frac{3}{4}$	**M1**

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