(17)

ii) $e^{x} e^{x^2/2} e^{x^3/3} \cdots = e^{x + x^2/2 + x^3/3 + \cdots}$ ✓

$$= e^{\sum_{k=1}^{\infty} x^k/k}$$ ✓

$$= \frac{1}{e^{-\sum x^k/k}}$$ ✓

$$\log(x) = (x-1) - \frac{(x-1)^2}{2} + \frac{(x-1)^3}{3} + \cdots$$

$$\Rightarrow \log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$$ ✓

$$\Rightarrow \log(1-x) = -x - \frac{(-x)^2}{2} + \frac{(-x)^3}{3} - \frac{(-x)^4}{4} + \cdots$$ ✓

$$= -\left(x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \cdots\right)$$ ✓

$$= -\sum_{k=1}^{\infty} \frac{x^k}{k}$$ ✓

$$\therefore \exp(\log(1-x)) = \exp\left(-\sum_{k=0}^{\infty} \frac{x^k}{k}\right)$$ ✓

$$1-x = \exp\left(-\sum_{k=0}^{\infty} \frac{x^k}{k}\right)$$ ✓

$$\frac{1}{1-x} = \frac{1}{e^{-\sum_{k=0}^{\infty} x^k/k}}$$ ✓

ie $\frac{1}{e^{-\sum_{k=1}^{\infty} x^k/k}} = \frac{1}{1-x} = 1 + x + x^2 + x^3 \cdots$ ✓

$$= \sum_{k=0}^{\infty} x^k$$ ✓

3.

$$e^{x} e^{x^2/2} e^{x^3/3} \cdots = \prod_{k=1}^{\infty} e^{x^k/k}$$

$$= \prod_{k=1}^{\infty} \left(\sum_{n=0}^{\infty} \frac{1}{n!} \left(\frac{x^k}{k}\right)^n \right)$$

Careful with writing fractions as $\binom{a}{b}$ is a mathematical symbol, but is not a/b.

Coefficient of x^{17} is sum of products