

Exercises ^[A]

1. Write the expanded form of $(1 + x)^5$.
2. Write the expanded form of $(1 + 3x)^4$.
3. Write the expanded form of $(1 - 2x)^6$.
4. Write the expanded form of $(x - y)^5$.
5. Write the expanded form of $(3x + y)^4$.
6. Write the expanded form of $\left(x + \frac{1}{x}\right)^6$.
7. Write the expanded form of $(1 - \sqrt{x})^7$.
8. Write the expanded form of $(3x + 2y)^3$.
9. (a) Write the first five terms in the expansion of $(1 + x)^{12}$.
(b) Find $(1.01)^{12}$ to three decimal places.
10. (a) Write the first five terms in the expansion of $(1 - x)^{10}$.
(b) Find $(0.99)^{10}$ to four decimal places.
11. Write the first four terms in the expansion of $(x + 2y)^8$.
12. Write the first four terms in the expansion of $(x - 3y)^{15}$.
13. Write the fourth term in the expansion of $\left(\frac{1}{2} + \frac{1}{2}\right)^{10}$.
14. Write the third term in the expansion of $\left(\frac{1}{3} + \frac{2}{3}\right)^8$.
15. Write the middle term in the expansion of $\left(\frac{1}{2} + \frac{1}{2}\right)^{10}$.
16. Write the fifth term in the expansion of $\left(\frac{3}{4} + \frac{1}{4}\right)^6$.
17. If h is small, show that $\frac{(1 + h)^6 - 1}{h} \approx 6$.
18. If h is small, show that $\frac{(a + h)^n - a^n}{h} \approx na^{n-1}$.
19. By considering $(1 + 1)^n$, $n \in I_p$, show that $\sum_{r=0}^n \binom{n}{r} = 2^n$.
20. By considering $(1 + (-1))^{2n}$, $n \in I_p$, show that

$$\sum_{r=0}^n \binom{2n}{2r} = \sum_{r=1}^n \binom{2n}{2r-1}.$$

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1. $1 + 5x + 10x^2 + 10x^3 + 5x^4 + x^5$

3. $1 - 12x + 60x^2 - 160x^3 + 240x^4 - 192x^5 + 64x^6$

5. $81x^4 + 108x^3y + 54x^2y^2 + 12xy^3 + y^4$

7. $1 - 7\sqrt{x} + 21x - 35x\sqrt{x} + 35x^2 - 21x^2\sqrt{x} + 7x^3 - x^3\sqrt{x}$

9. (a) $1 + 12x + 66x^2 + 220x^3 + 495x^4 + \dots$ (b) 1.127 (approx.)

11. $x^8 + 16x^7y + 112x^6y^2 + 448x^5y^3 + \dots$ 13. $\frac{1^5}{128}$ 15. $\frac{6^3}{256}$