Name:

Level 2 Further Maths

Expanding Brackets using Pascal's Triangle

Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

1. Use Pascal's triangle to expand $(x + y)^4$

$x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$

.....

(3)

---

2. Use Pascal's triangle to expand $(x + y)^5$

$x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$

.....

(3)

3. Use Pascal's triangle to expand $(x + 1)^3$

$x^3 + 3(x^2)(1) + 3(x)(1^2) + 1^3$

$= x^3 + 3x^2 + 3x + 1$

.....

(3)

---

4. Use Pascal's triangle to expand $(2 + y)^4$

$(2^4) + 4(2^3)(y) + 6(2^2)(y^2) + 4(2)(y^3) + y^4$

$16 + 32y + 24y^2 + 8y^3 + y^4$

.....

(4)

5. Use Pascal's triangle to expand $(1 + w)^6$

$1^6 + 6(1^5)(w) + 15(1^4)(w^2) + 20(1^3)(w^3) + 15(1^2)(w^4) + 6(1)(w^5) + w^6$

$1 + 6w + 15w^2 + 20w^3 + 15w^4 + 6w^5 + w^6$

.....

(3)

---

6. Use Pascal's triangle to expand $(3 + y)^5$

$(3)^5 + 5(3^4)(y) + 10(3^3)(y^2) + 10(3^2)(y^3) + 5(3)(y^4) + y^5$

$243 + 405y + 270y^2 + 90y^3 + 15y^4 + y^5$

.....

(4)

7. Use Pascal's triangle to expand $(x - y)^4$

$x^4 + 4(x^3)(-y) + 6(x^2)(-y)^2 + 4(x)(-y)^3 + (-y)^4$

$x^4 - 4x^3y + 6x^2y^2 - 4xy^3 + y^4$

.....

(4)

---

8. Use Pascal's triangle to expand $(x - 2)^5$

$x^5 + 5(x)^4(-2)^1 + 10(x)^3(-2)^2 + 10(x)^2(-2)^3 + 5(x)(-2)^4 + (-2)^5$

$x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$

.....

(4)

9. Use Pascal's triangle to expand $(2x + 1)^3$

$(2x)^3 + 3(2x)^2(1) + 3(2x)(1)^2 + (1)^3$

$8x^3 + 12x^2 + 6x + 1$

.....

(4)

---

10. Use Pascal's triangle to expand $(5x + 3)^4$

$(5x)^4 + 4(5x)^3(3) + 6(5x)^2(3)^2 + 4(5x)(3)^3 + (3)^4$

$= 625x^4 + 1500x^3 + 1350x^2 + 540x + 81$

.....

(4)

11. Use Pascal's triangle to expand $(3x - 2)^3$

$(3x)^3 + 3(3x)^2(-2) + 3(3x)(-2)^2 + (-2)^3$

$27x^3 - 54x^2 + 36x - 8$

.....

(4)

---

12. Use Pascal's triangle to expand $(10 - 3x)^4$

$(10)^4 + 4(10)^3(-3x) + 6(10)^2(-3x)^2 + 4(10)(-3x)^3 + (-3x)^4$

$10000 - 12000x + 5400x^2 - 1080x^3 + 81x^4$

.....

(4)

13. Use Pascal's Triangle to work out the coefficient of x^3 in the expansion of $(1 + 5x)^4$

$(1)^4 + 4(1)^3(5x) + 6(1)^2(5x)^2 + 4(1)(5x)^3 + (5x)^4$

$500x^3$

$=$

500

(3)

14. Use Pascal's Triangle to work out the coefficient of x^2 in the expansion of $(2 + 3x)^5$

$(2)^5 + 5(2)^4(3x) + 10(2)^3(3x)^2 + 10(2)^2(3x)^3 + 5(2)(3x)^4 + (3x)^5$

$32 + 240x + 720x^2 + \ldots$

$=$

720

(3)

15. Use Pascal's Triangle to work out the coefficient of x^4 in the expansion of $(2-x)^6$

$(2)^6 + 6(2)^5(-x)^1 + 15(2)^4(-x)^2 + 20(2)^3(-x)^3 + 15(2)^2(-x)^4 + \ldots$

$60x^4$

60

.....

(3)

---

16. Use Pascal's Triangle to work out the coefficient of x^2 in the expansion of $(2x-7)^5$

$(2x)^5 + 5(2x)^4(-7)^1 + 10(2x)^3(-7)^2 + 10(2x)^2(-7)^3 + \ldots$

$-13720x^2$

-13720

.....

(3)

17. The coefficient of the x^3 term in the expansion of $(x + a)^4$ is 256

Work out the value of a

$x^4 + 4(x)^3(a)^1 + \ldots$

$4ax^3$

$4a = 256$

$a = 64$

64

.....

(3)

---

18. The coefficient of the x^4 term in the expansion of $(a + 2x)^5$ is 400

Work out the value of a

$a^5 + 5(a)^4(2x) + 10(a)^3(2x)^2 + 10(a)^2(2x)^3 + 5(a)(2x)^4 + \ldots$

$80ax^4$

$80a = 400$

$a = 5$

.....

(3)

19. The coefficient of the x^2 term in the expansion of $(2x + a)^5$ is -1080

Work out the value of a

$(2x)^5 + 5(2x)^4(a) + 10(2x)^3(a)^2 + 10(2x)^2(a)^3 + \ldots$

$40a^3x^2$

$40a^3 = -1080$

$a^3 = -27$

$a = -3$

.....

(3)

---

20. The coefficient of the x^2 term in the expansion of $(x + a)^6$ is 240

Find the possible values of a

$x^6 + 6(x)^5(a) + 15(x)^4(a)^2 + 20(x)^3(a)^3 + 15(x)^2(a)^4 + \ldots$

$15a^4x^2$

$15a^4 = 240$

$a^4 = 16$

$a = \pm 2$

2 or -2

(4)

21. The coefficient of the x^3 term in the expansion of $(2x + a)^5$ is 3920

Find the possible values of a

$(2x)^5 + 5(2x)^4(a) + 10(2x)^3(a)^2 + \ldots$

$80a^2x^3 + \ldots$

$3920 = 80a^2$

$a^2 = 49$

$a = \pm 7$

$a = 7$ or $a = -7$

(4)