

Mr. Ward Answer Key

Pg 418

10. $(x+z)^3$

$$(x+z)(x+z)(x+z)$$

$$x^2 + 2x + 2x + 4(x+z)$$

$$x^2 + 4x + 4(x+z)$$

$$x^3 + 2x^2 + 4x^2 + 8x + 4x + 8$$

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

11. $(x+y)^4$

$$(x+y)(x+y)(x+y)(x+y)$$

$$(x^2 + 2xy + y^2)(x^2 + 2xy + y^2)$$

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

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

12. $(x+1)^4$

$$(x+1)(x+1)(x+1)(x+1)$$

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

	x^2	$2x$	1
x^2	x^4	$2x^3$	x^2
$2x$	$2x^3$	$4x^2$	$2x$
1	x^2	$2x$	1

$$= x^4 + 4x^3 + 6x^2 + 4x + 1$$

13. $(x-3y)^3$

$$(x-3y)(x-3y)(x-3y)$$

$$x^2 - 3xy - 3xy + 9y^2(x-3y)$$

$$x^2 - 6xy + 9y^2(x-3y)$$

$$x^3 - 3x^2y - 6x^2y + 18xy^2 + 9xy^2 - 27y^3$$

$$= x^3 - 9x^2y + 27xy^2 - 27y^3$$

14. $(x-2)^4$

$$1 \quad 4 \quad 6 \quad 4 \quad 1$$

$$1x^4 \quad 4x^3 \quad 6x^2 \quad 4x \quad 1$$

$$1x^4(-2)^0 + 4x^3(-2)^1 + 6x^2(-2)^2 + 4x(-2)^3 + 1(-2)^4$$

$$x^4 - 8x^3 + 24x^2 - 32x + 16$$

15. $(2x+y)^4$

$$1 \quad 4 \quad 6 \quad 4 \quad 1$$

$$1(2x)^4 \quad 4(2x)^3 \quad 6(2x)^2 \quad 4(2x)^1 \quad 1(2x)^0$$

$$16x^4(y)^0 \quad 32x^3(y)^1 \quad 24x^2(y)^2 + 8x(y)^3 + (y)^4$$

$$= 16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4$$

16. $(x+2y)^3$

$$1 \quad 3 \quad 3 \quad 1$$

$$1x^3 \quad 3x^2 \quad 3x \quad 1$$

$$1x^3(2y)^0 + 3x^2(2y)^1 + 3x(2y)^2 + 1(2y)^3$$

$$= x^3 + 6x^2y + 12xy^2 + 8y^3$$

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Binomial Expansion

17. $(2x - y)^5$

$$1 \quad 5 \quad 10 \quad 10 \quad 5 \quad 1$$

$$1(2x)^5 \quad 5(2x)^4(-y)^1 \quad 10(2x)^3(-y)^2 \quad 10(2x)^2(-y)^3 \quad 5(2x)^1(-y)^4 \quad 1(-y)^5$$

$$32x^5(-y)^0 + 80x^4(-y)^1 + 80x^3(-y)^2 + 40x^2(-y)^3 + 10x(-y)^4 + (-y)^5$$

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

27. $(2x - 2)^3$

$$(2x - 2)(2x - 2)(2x - 2)$$

$$4x^2 - 8x + 4(2x - 2)$$

$$8x^3 - 8x^2 - 16x^2 + 16x + 8x - 8$$

$$= 8x^3 - 24x^2 + 24x - 8$$

28. $(x + \frac{1}{3})^4$

$$1x^4 \quad 4x^3 \quad 6x^2 \quad 4x \quad 1$$

$$x^4(\frac{1}{3})^0 + 4x^3(\frac{1}{3})^1 + 6x^2(\frac{1}{3})^2 + 4x(\frac{1}{3})^3 + (\frac{1}{3})^4$$

$$= x^4 + \frac{4}{3}x^3 + \frac{2}{3}x^2 + \frac{4}{27}x + \frac{1}{81}$$

29. $(x - y)^4$

$$(x - y)(x - y)(x - y)(x - y)$$

$$(x^2 - 2xy + y^2)(x^2 - 2xy + y^2)$$

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

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

30. $(4 + y)^3$

$$1(4)^3 \quad 3(4)^2 \quad 3(4)^1 \quad 1(4)^0$$

$$64(y)^0 + 48(y)^1 + 12(y)^2 + (y)^3$$

$$= 64 + 48y + 12y^2 + y^3$$