PR2 KEY homework polynomials & factoring

Wednesday, January 11, 2017
3:09 PM

Key

CAT PR2   Homework   Polynomials & Factoring   Name_____

Part 1: Operations on Polynomial Expressions

Perform each operation as indicated. Always write answers in standard form.

1. $(-6x^2 + 15) - (x^2 - 11x - 12)$

$= -6x^2 + 15 - x^2 + 11x + 12$

$= -7x^2 + 11x + 27$

Leading coefficient: -7 Degree: 2

quadratic. poly. expression

2. $(-5n^3 + 7n) - (-2n^4 - n^3 + 10) + (4n^3 + n^2 + 15)$

$= -5n^3 + 7n + 2n^4 + n^3 - 10 + 4n^3 + n^2 + 15$

$= 2n^4 + 1n^2 + 7n + 5$

Leading coefficient: 2 Degree: 4

quartic polynomial expression

3. $7n^2(4n^3 + 2n^2 - 4n - 6)$

$= 28n^5 + 14n^4 - 28n^3 - 42n^2$

4. $(5n^4 - 2)(n^2 - 6)$

$= 5n^6 - 30n^4 - 2n^2 + 12$

5. $(4n - 5y)^3$

$= (4n - 5y)(4n - 5y)(4n - 5y)$

$= (16n^2 - 40ny + 25y^2)(4n - 5y)$

	$16n^2$	$-40ny$	$25y^2$
$4n$	$64n^3$	$-160 n^2 y$	$100 ny^2$
$-5y$	$-80n^2 y$	$200ny^2$	$-125 y^3$

$= 64n^3 - 240n^2 y + 300 ny^2 - 125 y^3$

6. $12n^3(n + 6)^2 = 12n^3(n+6)(n+6)$

$= 12n^3(n^2 + 12n + 36)$

$= 12n^5 + 144n^4 + 432n^3$

7. $(2\sqrt{k} + 3\sqrt{n})(\sqrt{k} - 5\sqrt{n})$

	$\sqrt{k}$	$-5\sqrt{n}$
$2\sqrt{k}$	$2k$	$-10\sqrt{nk}$
$3\sqrt{n}$	$3\sqrt{nk}$	$-15n$

$= 2k - 7\sqrt{nk} - 15n$

Part 2: Factoring Polynomial Expressions

8. $5x^3 - 20x$

$= 5x(x^2 - 4)$

$= \boxed{5x(x+2)(x-2)}$

9. $yz^3 - 3yz^2 + 2yz$

$= yz(z^2 - 3z + 2)$

$= \boxed{yz(z-1)(z-2)}$

10. $9y^2 - 16$

$= \boxed{(3y+4)(3y-4)}$

11. $y^2 + 8y + 16$

$= (y+4)(y+4)$

or $(y+4)^2$

12. $y^2 - 11y + 30$

$= (y-6)(y-5)$

13. $10v^2 + 23v + 12$

$\begin{array}{c|c} 120 & 23 \\ \hline M & A \\ \hline 1 \cdot 120 & \\ 2 \cdot 60 & \\ 3 \cdot 40 & \\ 4 \cdot 30 & \\ 5 \cdot 24 & \\ 6 \cdot 20 & \\ 8 \cdot 15 & 8+15 \end{array}$

$= 10v + 15v + 8v + 12$
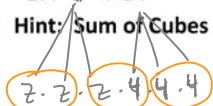
$= 5v(2v+3) + 4(2v+3)$

$= \boxed{(2v+3)(5v+4)}$

$\begin{array}{c|c} 210 & 29 \\ \hline M & A \\ \hline 1 \cdot 210 & \\ 2 \cdot 105 & \\ 3 \cdot 70 & \\ 5 \cdot 42 & \\ 6 \cdot 35 & 6+35 \end{array}$

14. $15x^2 + 29xy - 14y^2$

$= 15x^2 + 35xy - 6xy - 14y^2$

$= 5x(3x+7y) - 2y(3x+7y)$

$= \boxed{(3x+7y)(5x-2y)}$

15. $2x^3 - 3x^2 + 2x - 3$

Hint: grouping

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

$= \boxed{(2x-3)(x^2+1)}$

16. $3uw + 12uz - 2vw - 8vz$

Hint: grouping

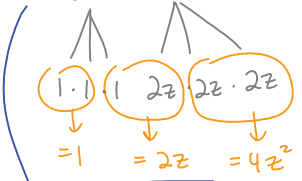$= 3u(w+4z) - 2v(w+4z)$

$= \boxed{(w+4z)(3u-2v)}$

17. $z^3 + 64$

Hint: Sum of Cubes

$z \cdot z \quad z \cdot 4 \quad 4 \cdot 4$

$= (z+4)(z^2 - 4z + 16)$

18. $1 - x^3$

Hint: Diff of Cubes

$1 \cdot 1 \quad 1 \cdot x \quad x \cdot x$

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

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

19. $2x^3 - 16x^2 + 14x$

Hint: GCF first

$\begin{array}{c|c} 7 & -8 \\ \hline M & A \\ \hline 1 \cdot 7 & \\ -1 \cdot -7 & -1 + (-7) \end{array}$

$= 2x(x^2 - 8x + 7)$

$= \boxed{2x(x-1)(x-7)}$

20. $z - 8z^4$

Hint: GCF First

$= z(1 - 8z^3)$

$1 \cdot 1 \qquad 1 \cdot 2z \qquad 2z \cdot 2z$

$= 1 \qquad = 2z \qquad = 4z^2$

$= \boxed{z(1-2z)(1+2z+4z^2)}$

21. $x^4 - 4x^3 - x^2 + 4x$

Hint: Grouping first

$= x^3(x-4) - x(x-4)$

$= (x-4)(x^3 - x)$

$= x(x^2 - 1)(x-4)$

$= \boxed{x(x+1)(x-1)(x-4)}$

2