Name _____

3-3 Additional Practice

Polynomial Identities

Prove the polynomial identity.

1. $x^2 - y^2 = (x - y)(x + y)$

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

$x^2 - y^2 = x^2 - y^2$

2. $(x^4 - y^4) = (x^2 + y^2)(x + y)(x - y)$

$(x^4 - y^4) = (x^2 + y^2)(x^2 - xy + xy - y^2)$

$(x^4 - y^4) = (x^2 + y^2)(x^2 - y^2)$

$(x^4 - y^4) = (x^4 + x^2y^2 - x^2y^2 - y^4)$

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

Use polynomial identities to multiply the polynomial.

3. $(3x + 9)(3x - 9)$

$9x^2 - 81$

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

$36x^4 + 84x^2y^3 + 49y^3$

5. $(8x^4 + 5y^3)^2$

$64x^8 + 80y^3 + 25y^6$

Use polynomial identities to factor the polynomial.

6. $n^6 - 25m^4$

$(n^3 - 5m^2)(n^3 + 5m^2)$

7. $16x^{12} - 64y^4$

$(4x^6 - 8y^2)(4x^6 + 8y^2)$

8. $b^2 - 36c^4$

$(b - 6c^2)(b + 6c^2)$

9. $25x^6 - 100y^4$

$(5x^3 - 10y^2)(5x^3 + 10y^2)$

10. $225x^6 - y^{10}$

$(15x^3 - y^5)(15x^3 + y^5)$

Expand the equations using Pascal's Triangle and the Binomial Theorem.

11. $(x + 0.5)^3$

$x^3 - 1.5x^2 + 0.75x - 0.125$

12. $(s + 4t)^6$

$s^6 + 24s^5t + 240s^4t^2 + 1280s^3t^3 + 3840s^2t^4 + 6144st^5 + 4096t^6$

Use Pascal's Triangle to expand the equations below.

13. $(3a - 3b)^4$

$81a^4 - 324a^3b + 486a^2b^2 - 324ab^3 + 81b^4$

14. $(3m - 2n)^5$

$243m - 810m^4 + 1080m^3n^2 - 720mn^4 + 240mn^4 - 32n^5$

15. $(a - 4)^5$

$a^5 - 20a^4 + 160a^3 - 640a^2 + 1280a - 1024$

16. A rectangular lawn has an area of $a^3 - 125$. Use the difference of cubes to find out the dimensions of the rectangle.

$(a - 5)(a^2 + 5a + 25)$