Multiply

1. $(5x^4)(-4x^{11})$

$-20x^{15}$

2. $(4a^3b^6c)^2$

$16a^6b^{12}c^2$

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

$4y^6(-14y^4x^8)$

$-56y^{10}x^8$

4. $3x(4x - 12y^3)$

$12x^2 - 36xy^3$

5. $(x - 2)^2$

$x^2 - 4x + 4$

6. $(x - 4)(x + 8)$

$x^2 + 8x - 4x - 32$

$x^2 + 4x - 32$

7. $(2a + 4b)(2a - 4b)$

$4a^2 - 16b^2$

8. $(3x + 12)(3x + 12)$

$9x^2 + 36x + 36x + 144$

$9x^2 + 72x + 144$

9. $(x - 2)(x^2 + 2x + 4)$

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

$x^3 - 8$

10. $(x + 4)(x^2 - 4x + 16)$

$x^3 - 4x^2 + 16x + 4x^2 - 16x + 64$

$x^3 + 64$

11. $(11 + 4x)(x^2 + 2x + 3)$

$11x^2 + 22x + 33 + 4x^3 + 8x^2 + 12x$

$4x^3 + 19x^2 + 34x + 33$

12. $(b + 5)^2$

$b^2 + 10b + 25$

Completely factor the following polynomials using integers

13. $9x^2 - 4$

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

14. $8x^3 - 64$

$(2x - 4)(4x^2 + 8x + 16)$

15. $2x^3 + 4x^2 + 10x^2 + 20$

$2x^2(x + 2) + 10(x + 2)$

$(2x^2 + 10)(x + 2)$

16. $18x^3 + 30x^2 + 3x + 5$

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

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

17. $4x^2 - 16x + 12$

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

$4(x - 3)(x - 1)$

18. $2x^2 - 16x + 32$

$2(x^2 - 8x + 16)$

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

19. $1 - 64x^3$

$(1 - 4x)(1 + 4x + 16x^2)$

20. $6x^2y^3 + 18x^3y$

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

21. $20a^6b^{11} - 30ab^8$

$10ab^8(2a^5b^3 - 3)$

22. $x^2 + 11x + 30$

$(x + 5)(x + 6)$

23. $6x^2 - 13x + 7$

$(6x - 7)(x - 1)$

24. $3y^2 - 30y + 75$

$3(y^2 - 10y + 25)$

$3(y - 5)(y - 5)$

25. $33 - 14x + x^2$

$x^2 - 14x + 33$

$(x - 3)(x - 11)$

26. $16x - 20 + 4x^2$

$4x^2 + 16x - 20$

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

$4(x + 5)(x - 1)$

27. $16x^6 - 8y^4$ $16x^6 - 49y^4$

$(4x^3)^2 - (7y^2)^2$

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

28. $7x^3 - 21x$

$7x(x^2 - 3)$

29. $x^4 + 12x^3 + 4x^2 + 48x$

$x^3(x + 12) + 4x(x + 12)$

$(x^3 + 4x)(x + 12)$

30. $10x^3 - 20x^2 - 2x + 4$

$10x^2(x - 2) - 2(x - 2)$

$(10x^2 - 2)(x - 2)$

31. $48 + 64x - 12x^2$

$-12x^2 + 64x + 48$

$-4(3x^2 - 16x - 12)$

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