

Math Sheet

Name _____ Score _____ / 12 Teacher _____ Date _____

Factoring Polynomials: All Techniques

Factor each polynomial completely over the integers.

1. $5x^5 + 64x^4 + 313x^3 + 722x^2 + 768x + 288$

Factor completely:

2. $9x^4 + 22x^2 + 8$

Factor completely:

3. $x^3 + 125$

Factor completely:

4. $3x^2 + 15x$

Factor completely:

5. $x^3 - 1$

Factor completely:

6. $3x^6 - 27x^5 + 75x^4 - 45x^3 - 78x^2 + 72x$

Factor completely:

7. $x^3 + 3x^2 - 4x - 12$

Factor completely:

8. $x^5 - 5x^4 + 5x^3 - 3x^2 - 6x + 8$

Factor completely:

9. $x^6 + 6x^4 - x^2 - 30$

Factor completely:

10. $x^2 - 9$

Factor completely:

11. $x^4 + 9x^3 + 25x^2 + 27x + 10$

Factor completely:

12. $x^2 + 9x + 20$

Factor completely:

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Factoring Polynomials: All Techniques

Answer key

Factor each polynomial completely over the integers.

1. $5x^5 + 64x^4 + 313x^3 + 722x^2 + 768x + 288$

Answer: $(x + 2)(x + 3)(x + 3)(x + 4)(5x + 4)$

2. $9x^4 + 22x^2 + 8$

Answer: $(x^2 + 2)(9x^2 + 4)$

3. $x^3 + 125$

Answer: $(x + 5)(x^2 - 5x + 25)$

4. $3x^2 + 15x$

Answer: $3x(x + 5)$

5. $x^3 - 1$

Answer: $(x - 1)(x^2 + x + 1)$

6. $3x^6 - 27x^5 + 75x^4 - 45x^3 - 78x^2 + 72x$

Answer: $3x(x - 1)(x - 2)(x - 3)(x - 4)(x + 1)$

7. $x^3 + 3x^2 - 4x - 12$

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

8. $x^5 - 5x^4 + 5x^3 - 3x^2 - 6x + 8$

Answer: $(x - 1)(x - 4)(x + 1)(x^2 - x + 2)$

9. $x^6 + 6x^4 - x^2 - 30$

Answer: $(x^2 - 2)(x^2 + 3)(x^2 + 5)$

10. $x^2 - 9$

Answer: $(x - 3)(x + 3)$

11. $x^4 + 9x^3 + 25x^2 + 27x + 10$

Answer: $(x + 1)(x + 1)(x + 2)(x + 5)$

12. $x^2 + 9x + 20$

Answer: $(x + 4)(x + 5)$