

# Algebra and Limits ... Set 1

## Creative Factoring and Other Interesting Algebra

### Difference of Squares

**Example:**  $x-16=(\sqrt{x}+4)(\sqrt{x}-4)$

1.  $x-9$

2.  $x^2-5$

3.  $x^{16}-1$

4.  $(x+5)^2-25$

5.  $9y-a^4$

### Sums or Differences of Cubes "SOAP"

**Example:**  $a^3+b^3=(a+b)(a^2-ab+b^2)$

6.  $64a^3+125b^3$

**Example:**  $a^3-b^3=(a-b)(a^2+ab+b^2)$

7.  $64a^3x^3-125$

8.  $(x+1)^3+64$

9.  $8c^3-(a+b)^3$

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**Factor:**  $x^6 - y^6$ :

10. as a difference of **squares**

11. as a difference of **cubes**

**Rationalize the Numerator**

12.  $\frac{\sqrt{x+2} - \sqrt{2}}{x}$

13.  $\frac{\sqrt{x+3} + \sqrt{3}}{x}$

**Factor completely.** Use synthetic division to help find all factors.

14.  $x^3 + 6x^2 + 5x - 12$

15.  $x^3 + x^2 - 8x - 12$

16.  $x^3 + 6x^2 - 9x - 14$

**Simplify:**

17.  $\frac{2x^3 + 7x^2 + 8x + 3}{x+1}$

18.  $\frac{2x^3 + x^2 - 13x + 6}{x+3}$