**Sketch the graph of f for the indicated value of c or a.**

1. f(x) = 2x3 + c; c = 3; c = -3 2. f(x) = ax3 + 3; a = 2; a = -1/3

  

**Graph and show that f has a zero between a and b.**

3. f(x) = x3 - 4x2 + 3x - 2; a = 3, b = 4 4. f(x) = -x4 + 3x3 - 2x + 1; a = 2, b = 3

 

**Find all values of x such that f(x) > 0 and all x such that f(x) < 0, and then sketch the graph of f.**

5. f(x) = $\frac{1}{4}x^{3}-2$ 6. f(x) = $-\frac{1}{16}x^{4}+1$ 7. f(x) = $x^{4}-4x^{2}$

  

8. f(x) = $-x^{3}+3x^{2}+10x$ 9. f(x) = $x^{3}+2x^{2}-4x-8$ 10. f(x) = $x^{4}-6x^{2}+8$

  

11. If f(x) = 3x3 - kx2 + x - 5k, find a number k such that the graph of f contains the point (-1, 4).

12. If one zero of f(x) = x3 - 2x2 -16x + 16k is 2, find two other zeros.

13. From a rectangular piece of cardboard having dimensions 20 inches x 30 inches, an open box is to be made by cutting out identical squares of area x2 from each corner and turning up the sides.

(a) Find a function for the volume V(x) of the box.

(b) Find all positive values of x such that V(x) > 0, and sketch the graph of V for x > 0.

