

## Cubics Review

You must use a separate piece of paper, and make sure you show work for every problem. Any work/answers written ON this sheet will not be graded!!

1. Calculate each power of  $i$ .  
 $i^{38}$

2.  $i^{-11}$

Solve by factoring.

3.  $2x^2 - 9x - 18 = 0$

4. Simplify  $\sqrt{-216}$  using the imaginary number  $i$ .

Simplify the expression.

5.  $(4 + 2i) + (-2 - 3i)$

6.  $(2 + 5i) - (-4 - 6i)$

7.  $(6 - i)(5 + 3i)$

Solve the quadratic equation by completing the square.

8.  $x^2 + 14x + 42 = 0$

Use the Quadratic Formula to solve the equation.

9.  $-2x^2 - 10x - 8 = 0$

Describe the end behavior of the functions and determine the maximum number of extrema. Sketch the graph.

10.  $f(x) = x^5 - x^3 + x - 4$

11.  $h(x) = -x^8 - 3x^4 - 9$

Determine the product of the linear factors.

12.  $(2x - 1)(x + 3)(-3x)$

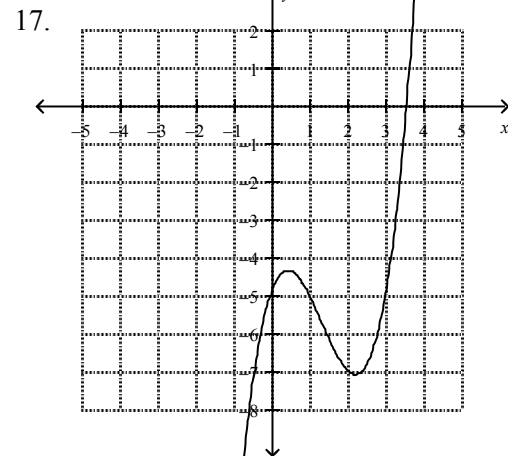
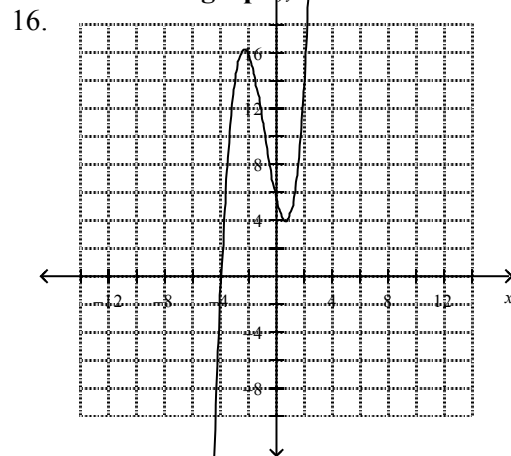
13.  $(1 - 3x)(x + 2)(x - 5)$

Determine the product of the linear and quadratic factors.

14.  $(2x^2 - 3x + 4)(x + 2)$

15.  $(-2x)(x + 4)^2$

Given the graph, determine the relative maximum/minimum.



Describe the transformations performed on  $f(x)$  that produced  $g(x)$ .

18.  $f(x) = x^4; g(x) = 3f(x - 2)$

19.  $f(x) = x^3; g(x) = -f(x + 1) - 3$

Write an equation for the given transformations.

20.  $f(x) = x^3$

Reflect over the x-axis

Vertical compression of  $\frac{1}{3}$

Translate down 3

21.  $f(x) = x^4$

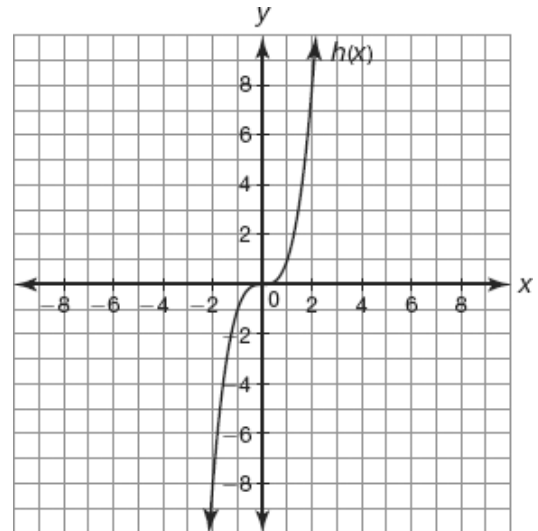
Vertical stretch of 2

Translate left 4

Translate up 1

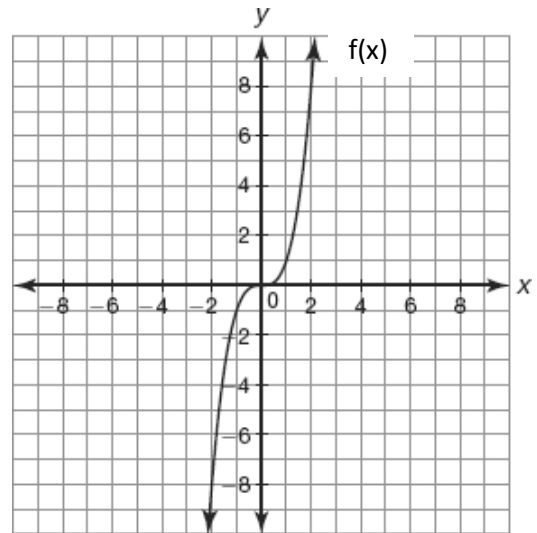
22. The graph of the basic cubic function  $h(x) = x^3$  is shown. Suppose that  $k(x) = -h(x - 2)$ . Use reference points and symmetry to complete the table of values for  $h(x)$ . Then, graph  $k(x)$  on the same coordinate plane as  $k(x)$  and label it.

Reference Points on $h(x)$	→	Corresponding Points on $k(x)$
(0, 0)	→	
(1, 1)	→	
(2, 8)	→	



23. The graph of the basic cubic function  $f(x) = x^3$  is shown. Suppose that  $g(x) = f(x - 4) + 2$ . Use reference points and symmetry to complete the table of values for  $f(x)$ . Then, graph  $g(x)$  on the same coordinate plane as  $f(x)$  and label it.

Reference Points on $f(x)$	→	Corresponding Points on $g(x)$
(0, 0)	→	
(1, 1)	→	
(2, 8)	→	



**Factor by grouping and then solve the cubic equation.**

24.  $x^3 - 5x^2 - 4x + 20 = 0$

25.  $2x^3 + x^2 + 6x + 3 = 0$

**Factor by finding a greatest common factor and then solve the cubic equation.**

26.  $x^3 + 3x^2 - 4x = 0$

27.  $2x^3 - 12x^2 + 22x = 0$

**Factor using the sum or difference of cubes formula and then solve the cubic equation.**

28.  $x^3 - 27 = 0$

29.  $8x^3 + 216 = 0$