Precalculus Unit 2 Test Review

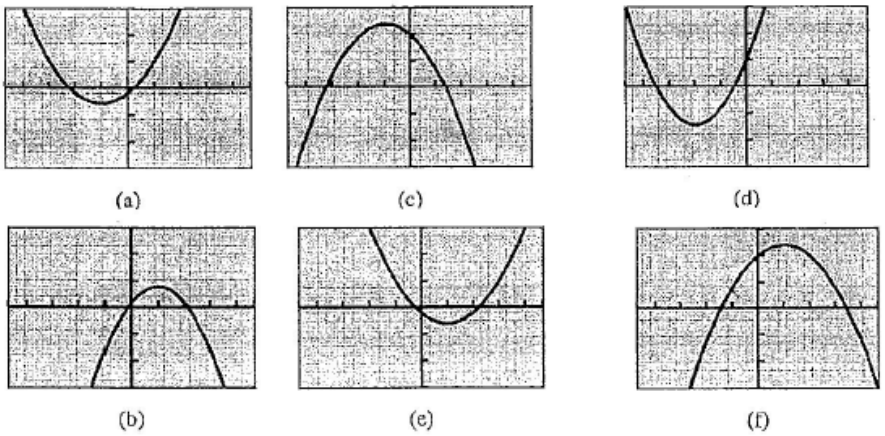
Determine which of the following equations are polynomial functions. For those that are, state the degree and leading coefficient. For those that are not, explain why not.

1. $f(x)=3x^{-4}+10$
2. $k(x)=4x-5x^2$
3. $f(x)=5x^4-\frac{1}{3}x$
4. $f(x)=1$
5. $h(x)=\sqrt[3]{64x^3+125x^9}$
6. $y(x)=\pi-ex-7x^3$

7. Write an equation for the linear function f satisfying $f(-3)=5$ and $f(6)=-2$.

Match each graph to the function:

8. $f(x)=2(x+1)^2-3$
9. $f(x)=3(x+2)^2-7$
10. $f(x)=4-3(x-1)^2$
11. $f(x)=12-2(x-1)^2$
12. $f(x)=2(x-1)^2-3$
13. $f(x)=12-2(x+1)^2$



Describe how to transform the squaring function to the given function.

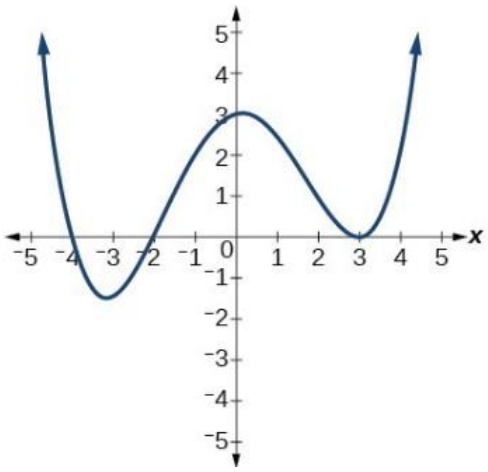
14. $g(x)=(x-5)^2-7$
15. $f(x)=-\frac{1}{2}(x+2)^2$
16. $f(x)=-5x^2+3$

Use completing the square to write each quadratic in vertex form. Identify the vertex and axis of symmetry.

17. $f(x)=x^2+16x+71$
18. $y=-x^2-9x-20$
19. $g(x)=6x^2+12x+13$

20. Write an equation for the quadratic function with vertex (-2, -5) and point (-4, -27).

21. For the given polynomial graph, find:



   a. the x-intercepts & describe the multiplicity of each
   b. a possible factorization of the equation
   c. the boundedness
   d. any local extrema values
   e. any absolute extrema values
   f. the domain and range
   g. the degree of the polynomial
   h. the end behavior (write in limit notation)

22. Find the roots of each polynomial by factoring:

   a. $f(x) = x^4 - 15x^3 + 56x^2$ b. $g(x) = 12x^3 + 2x^2 - 30x - 5$

23. Given $x = 3$ is a root of the polynomial $f(x) = x^3 - x^2 - 4x - 6$, find the other roots.

24. Find all roots of the polynomial: $f(x) = x^3 + 3x^2 - 14x - 20$

25. Sketch the polynomial: $f(x) = -(x-1)(x+4)^2(x-5)^3$

26. For each power function, sketch a graph and determine if it is even, odd, or neither:

   a. $f(x) = x^{\frac{1}{3}}$ b. $f(x) = x^{\frac{3}{8}}$ c. $f(x) = x^{\frac{3}{5}}$

27. Find $f(g(x))$ and $g(f(x))$ if $f(x) = x^2 + 2$ and $g(x) = \sqrt{x+5}$.

28. Find the domain of each composition in #27.

29. Show that $f(x) = \frac{2}{3}x + 6$ and $g(x) = \frac{3}{2}x - 9$ are inverses of one another using compositions.