College Algebra
Workshop 5 - Part 1

Unit 5 (Part 1) Polynomial Functions

For each polynomial functions in problems 1 and 2, answer the following questions about the graph of the function by inspecting the function symbol rule only. *Do not graph the function.* (i) What is the degree? (ii) What is the leading coefficient? (iii) What is the maximum possible number of x-intercepts? (iv) What is the y-intercept? (v) What is the maximum possible number of turning points?

1. $f(x) = 4x^5 - 2x^3 + x + 1$

2. $h(t) = (6t^2 + 7)^2$

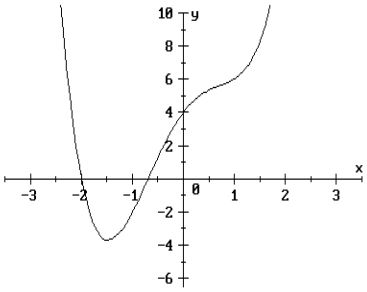
In problems 3 and 4, state the maximum number of solutions each equation may have.

3. $z(2z^2 + 3z) = 5(z^2 - 1)$

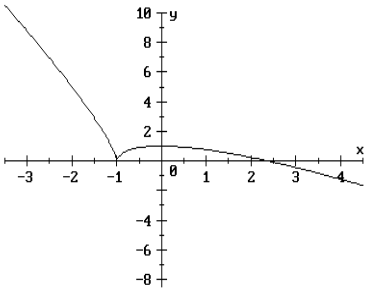
4. $a^2(a + 1) = 2(a + 1)$

5. Which of the following graphs *could be* the graph of a polynomial function of degree 4? Circle your answer.

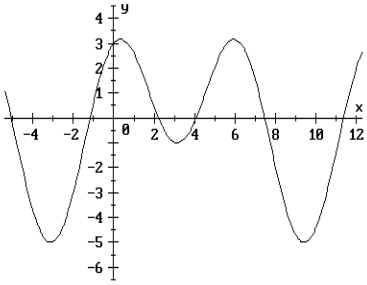
a.



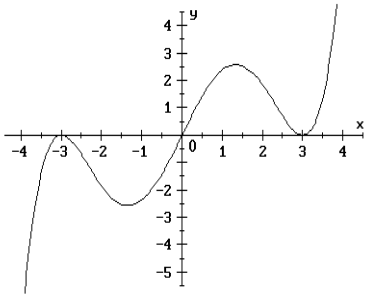
b.



c.



d.



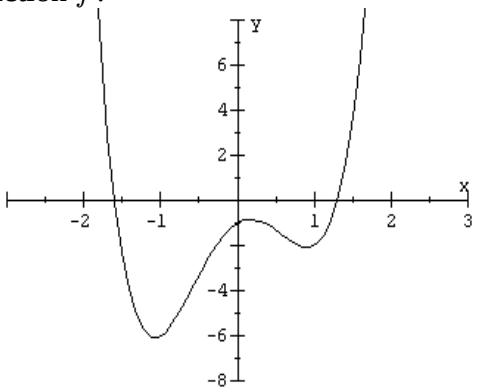
6. Consider the graph of the polynomial function **5(d)** shown above:

a. How many x-intercepts does f have?

b. How many turning points does f have? What are the coordinates of the turning points?

c. What is the smallest degree that this polynomial *could* have?

7. Shown here is a graph of the polynomial function $f(x) = 3x^4 - 6x^2 + 2x - 1$. Note this graph only shows two x-intercepts. How can you be certain that these are the only two x-intercepts of the function f?



Graph of $f(x) = 3x^4 - 6x^2 + 2x - 1$

8. Let $f(x) = x^3 - 3x^2 + 5$.

a. Sketch a good graph of the function f.

b. Use the graph of f from part a to find each of the following.

i. Root inputs of f.

ii. Set of upper inputs of f.

iii. Set of lower inputs of f.

iv. Exact number of turning points of f and the coordinates of the turning points.

c. *Use your results from part b* to solve each of the following.

i. $x^3 - 3x^2 + 5 = 0$ **ii.** $x^3 - 3x^2 > -5$

iii. $x^3 - 3x^2 + 10 \geq 5$ **iv.** $x^3 + 5 < 3x^2$

v. $x^3 - 3x^2 + 5 \leq 0$