Precalculus. Test #2. 1.1-3.1-4.5. Name_____
Spring 2014 class time of day, section number, or instructor's name _____

Show clear supporting work on problems with several steps. Algebraic problems that display little or no supporting work will get little or no credit. You do not need to show work on calculator problems. To solve numerical problems guess-and-check is legal unless you are requested to solve them "algebraically."

1.Short answer

a) What is the maximum number of local extrema that a polynomial of degree n can have?

b) Find the equation of the line through the two points (4, 5) and (4, 10).

c) Give the slope of a line which is perpendicular to the line $y = 3(x - 4) + 7$.

d) Give the end-behavior model of $(x^2 - 4)(5 - x - 3x^2)$.

2. Solve for x: $x^{-2.3} = 0.54$

3. Solve algebraically: $x = 2 + \sqrt{2x + 11}$

Problem	points	score
1	12	
2	4	
3	8	
4	8	
5	8	
6	8	
7	4	
8	10	
9	10	
10	12	
11	10	
12	6	
total	100	

4. To show a graph on a TI calculator you must enter an equation of the form "$y = ...$". What equation should you enter if you want to graph "$x^2 + 4xy + 3y^2 + 2x = 100$"?

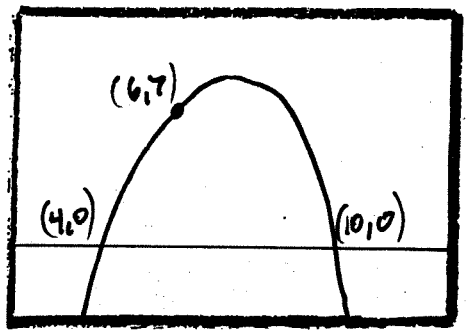
5. Solve algebraically: $(1-x)^4 x^{1/2} - 4x^{3/2}(1-x)^3 = 0$.

6. a) State the "standard form" of the equation a circle.
b) Sketch a picture to illustrate the standard form, **labeling all the points and distances** in the formula on the picture.
c) Explain, in a very few words, why the formula in (a) is correct.

7. Complete the theorem: Let n be a positive integer and $c \neq 0$. Then the equation "$x^n = c$" has exactly one real-valued solution iff ...

8. Here is the graph of a quadratic, with three points labeled (4, 0), (10, 0) and (6, 7).
Find the quadratic in factored form. Show work, and when you are done, fill in the answer here:

$P(x) =$



9. Suppose we know that $f(1.9) = 1.62$ and the graph of $y = f(x)$ is approximately a line through that point with slope -.4.

a) Find the relevant line algebraically.

b) Use your line to approximate the solution to $f(x) = 1.7$.

10. A stock went up 45% one year, up 62% the next year, and changed an unknown amount the third year. Over those three years it was up 80%.

a) What was the average annual change over those three years?

b) What was the percent change the third year?

11. In professional soccer when a game is played and one team wins the winner gets 3 points and the loser gets 0 points. If the two teams draw, each team gets 1 point. Suppose 380 games are played and the total points awarded is 1018 points. a) Set up the relevant equation and b) algebraically solve for the number of games that were drawn.

12. The difference quotient of a function f is $\frac{f(x) - f(a)}{x - a}$. Find and simplify the difference quotient when $f(x) = \frac{1}{x}$.