

MA 115-02
§1.1-4.1

Test #1

score

Name: _____

29 June 2000

1. Find an equation of the line containing the points $(1, 2)$ and $(-4, 8)$. What is the y -intercept for this line? *(8 points)*

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2. Are the data in the set $\{(4, 10), (1, 6), (8, 1), (5, 3)\}$ lineally correlated (strongly, weakly, positively, negatively)? Explain. In any event, find the equation of the regression line for the data. *(8 points)*

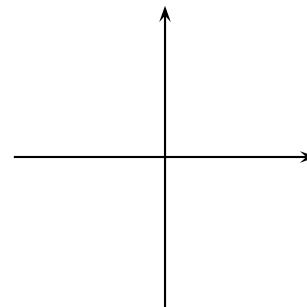
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3. Find the local extrema (maxes and mins) for the function $f(x) = x^4 - 23x^3 + 100x^2 - 400x + 625$. Report your answers correct to one decimal point. *(8 points)*

4. Determine the points of intersection of the graphs of the equations $y = 3^x$ and $y = x^4$. Give your answers correct to one decimal place. (8 points)

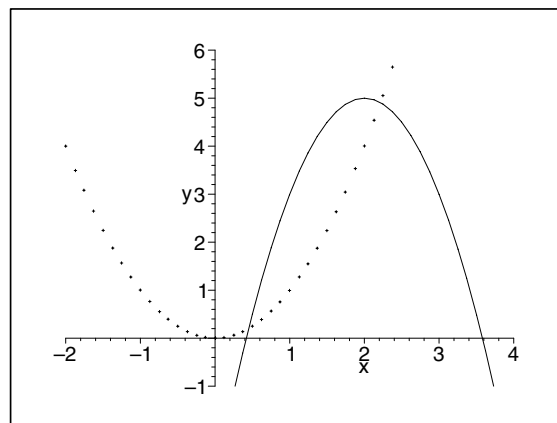
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5. Solve the inequality $|2 - 5x| < 3$ algebraically (show your work). (8 points)

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6. Let $f(x) = 2x^2 + x - 3$ and $g(x) = \sqrt{2x + 1}$. Compute a simplified formula for $f \circ g(x)$ and for $g \circ f(x)$. (8 points)

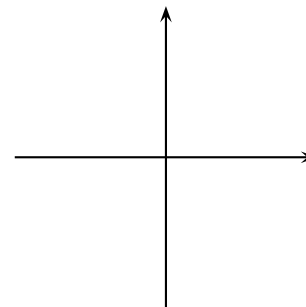
7. Sketch the graph of the relation given by the parametric equations $x(t) = t^2 - 1$ and $y(t) = t^3 - t$ in the xy -plane. Is this relation a function y of x ? (8 points)



8. To the dotted graph to the right shows a graph of the function $f(x) = x^2$ and the solid curve another quadratic polynomial. Estimate the equation of the solid curve by expressing it as a magnification and translation of the dotted curve. (7 points)



9. Let $f(x) = x^2 - 2x$. This function is not one-to-one, but its domain can be restricted to an interval of the form $x > a$ for some a so that the resulting function is one-to-one. Find a suitable value for a and a formula for the inverse function of the restricted f and sketch the graphs of the function and its inverse together on the axes. (5 points)



10. Let $f(x) = x^5 + x^2 + 1$. What does Descartes's Rule of Signs allow you to conclude about the number of positive and negative real roots? Use the Rational Root Theorem to determine if $f(x)$ has any rational zeros. Approximate the real roots to one decimal place. (8 points)

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11. Express $f(x) = x^4 + x^3 - x - 1$ as a product of irreducible linear and quadratic factors and find its exact roots (both real and complex). (7 points)

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12. Find a polynomial of least degree having real coefficients that has 1 as a double root and $1 + i$ also as a root. (6 points)

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13. Suppose we start with 500 bacteria and that their number doubles every 5 hours. Write a formula for the number of bacteria present after t hours and estimate the number present after 3 days. (8 points)