Math 1650 Section 622

(old) Exam number 2

Show all work. How you get your answer is just as important, if not more important, than the answer itself. If you think it, write it!

6. (8 pts. each) For the polynomial function
$$f(x) = x^4 - 3x^2 + 4x - 6$$
use (synthetic or polynomial long) division to write $f(x)$ as
(a) $(x-2)g(x) + c$
(b) $(x+1)h(x) + d$

1. (12 pts.) Show that the polynomial
$$f(x) = x^5 + 3x^3 - x^2 - 4$$
has only one real root. (Hint: think positive vs. negative roots). What two consecutive integers does it lie between?

2. (12 pts.) Find all of the rational roots of the polynomial
$$f(x) = 2x^3 - 13x^2 + 3$$

3. (12 pts.) One root of the function
$$f(x) = 2x^4 - 5x^3 + 5x^2 - 2$$
is $1+i$ (you DON'T need to check this!). Find all of the other roots.

4. (6 pts. each) Find the following numbers (write them in standard form):
(a): $(1+\sqrt{2}i)(1-3i) =$
(b): $\dfrac{1+\sqrt{2}i}{1-3i} =$

5. (15 pts.) Find all of the relevant asymptotes of the function
$$f(x) = \frac{3x^2}{x+2}$$
and use this information to help draw a graph of the function.

6. (10 pts.) Use the rules of logarithms to expand the following expression as much as possible:
$$\log_4\left(\frac{(x^2+1)^{3/2}x^{32}}{(x-3)^4}\right)$$

7. (12 pts.) Solve for x:
$$\ln(x+1) - 2\ln(x) = 0$$

8. (15 pts.) How long will it take your money to triple if it is invested at 12% interest, compounded 4 times per year? (You may leave your answer in terms of logs.)