

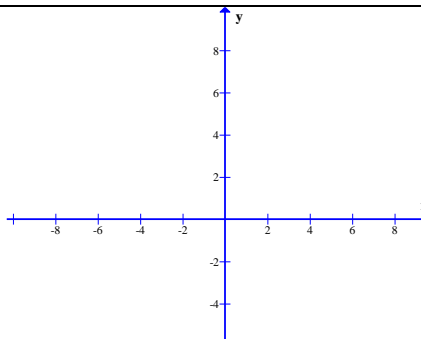
PreCalculus Honors Semester 1 Final Exam Review (No Calculator).

Directions: do not write on this test. Perform any calculations and mark your answer on lined paper.

- Find the distance between the points $(-3, 8)$ and $(1, 5)$.
- Find the inverse of $f(x) = \frac{3}{x-1}$.
- Find an equation of the line that passes through $(5, -1)$ parallel to the line $x + 2y = 1$.
- The fixed costs to produce a certain sport shoe are \$4000. If 200 pairs cost a total of \$5050, find a linear equation giving the total cost, c in terms of x , the number of shoes produced.
a. $c = 200x + 4000$ b. $c = 25.25x$ c. $c = 1050x + 4000$ d. $c = 5.25x + 4000$
- Calculate the intersections of the graphs of $y = -x + 3$ and $y = 2x^2$
- Solve the inequality algebraically: $4 < 3x - 2 < 7$
- State the domain of $f(x) = \frac{3x}{x-1}$ in **interval notation**.

8. Using **interval notation**, identify the interval over which the function is increasing, decreasing or constant. $f(x) = |x - 4|$

9. Is the function in problem 8 an even function, an odd function or neither? Explain.



- If $f(x) = x^2 - 5$ and $g(x) = \sqrt{x+6}$, find a). $(f \circ g)(x)$ b). $g^{-1}(x)$
- Find the minimum point on the graph of $f(x) = x^2 - 4x + 14$.
- Find all of the rational zeros of the function: $f(x) = 2x^3 + 14x^2 + 24x$
- Find the vertical asymptotes: $f(x) = \frac{8x^2}{x^2 + 2x - 3}$
- Divide: $(9x^3 - 6x^2 - 8x - 3) \div (3x + 2)$
- Write as the product of linear factors: $x^4 + 25x^2 + 144$.
- Find all the zeros: $f(x) = x^4 - 5x^3 + 8x^2 - 20x + 16$
- Determine the left-hand and right-hand behavior of the graph: $f(x) = -x^5 + 2x^2 - 1$.
 - Up to the left, down to the right
 - Down to the left, up to the right
 - Up to the left, up to the right
 - Down to the left, down to the right
- Solve: $2x + \ln e^{8x} = 35$
- Condense the expression to the logarithm of a single quantity: $3 \log_{10} x + 5 \log_{10} (x-7)$
- Solve: $2^{6-x} = 4^{x+2}$
- Find all real solutions: $\log_3 x + \log_3 (x^2 - 8) = \log_3 (8x)$
- Suppose that \$1200 is invested at an interest rate of 12%. How much is the investment worth after 36 months if interest is compounded (a) monthly? (b) Continuously?
- Given $\log_3 5 \approx 1.465$ and $\log_3 2 \approx 0.631$, what is the approximate value of $\log_3 20$?
- Sketch the graph of the function: $f(x) = 3^x - 3$
- Solve $\log_4 (2x+1) - \log_4 (x-2) = 1$.

For #'s 26-30 simplify.

26. i^{153}

27. $\sqrt{-6} - i\sqrt{24}$

28. $\sqrt{-2}\sqrt{-6}$

29. $(3+i) - 2(1+i)$

30. $(1+2i)^2 + (3-4i)$

31. Divide: $\frac{1-2i}{5-4i}$

32. Given: $f(x) = \frac{x^2 - x - 6}{x^2 - 4}$. Find the following features of the rational function:

A. Vertical Asymptotes (if any)

B. Horizontal Asymptotes (if any)

C. Points of Removable Discontinuity (if any)

33. Use the Leading Coefficient Test to describe the end behavior of the graph of: $y = -x^4 + 3x^3 - x$

34. Divide: $\frac{x^5 - x^2 + 5x - 7}{x^2 - 2x + 1}$

35. Find the equation of the parabola with a vertex of $(2, -1)$ that passes through the point $(-1, 3)$.