Honors Pre-Calculus Homework Packet: UNIT 1 Functions and Graphs

1.2

Find the Domain of the function.

1. $h(x) = \frac{5}{x-3}$ 2. $f(x) = \frac{3x-1}{(x+3)(x-1)}$ 3. $g(x) = \frac{\sqrt{x^2-4}}{x-3}$
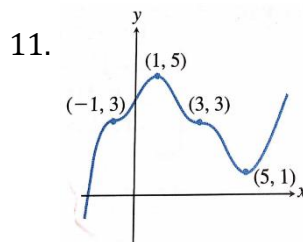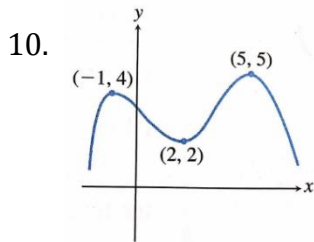
Find the Range of the function.

4. $f(x) = \frac{3+x^2}{4-x^2}$ 5. $g(x) = \frac{x^2-4}{2x+5}$ 6. $g(x) = \frac{7}{5x^2+1}$
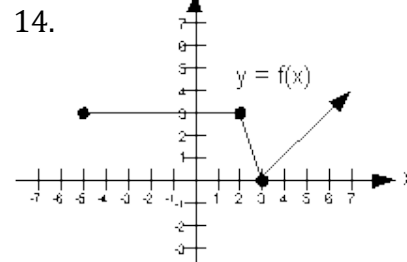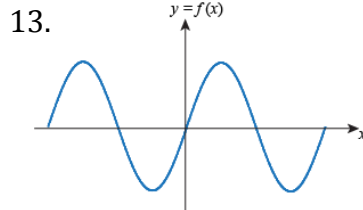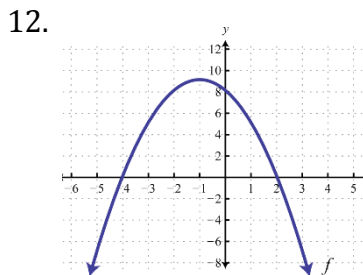
Determine the type of discontinuity that each function has.

7. $f(x) = \frac{4}{x}$ 8. $f(x) = \frac{x^2-9}{x+3}$ 9. $f(x) = \begin{cases} -x + 2, & x < 0 \\ 2x + 1, & x \geq 0 \end{cases}$

State whether each labeled point identifies as a local/absolute minimum, local/absolute maximum, or neither. Then state where the function is increasing and decreasing.

10.

11.

Determine if the function is bounded above, below, both above and below, or not bounded

12.

13.

14.

Find all asymptotes of the function (both vertical and horizontal)

15. $a(x) = \frac{5x+2}{x+4}$ 16. $t(x) = \frac{x^3+2}{2x^2-1}$ 17. $w(x) = \frac{4}{x^2+1}$

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1.4 (Composition)

Find the composition $f(g(x))$ and $g(f(x))$

1. $f(x) = 3x + 2$ $g(x) = x - 1$ 2. $f(x) = \frac{1}{x-1}$ $g(x) = \sqrt{x}$

Find the composition $f(g(3))$ and $g(f(-2))$

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

Go backwards! Find $f(x)$ and $g(x)$ if $h(x) = f(g(x))$

5. $h(x) = (x^3 + 1)^2$ 6. $h(x) = \frac{5}{2x^2+4}$

1.4 (Inverses)

Find the inverse of each function

1. $y = 2x + 5$ 2. $y = \frac{x+4}{x-7}$ 3. $y = \sqrt{x+2}$ 4. $y = x^3 + 5$ 5. $y = \sqrt[3]{x-8}$

Prove that $f(x)$ and $g(x)$ are inverses.

6. $f(x) = 3x - 2$ $g(x) = \frac{x+2}{3}$ 7. $f(x) = \frac{x+3}{x-2}$ $g(x) = \frac{2x+3}{x-1}$

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1.5

Describe how each function has been transformed from $y = x^2$

1. $y = x^2 - 3$ 2. $y = -(x - 32)^2 + 44$

Describe how each function has been transformed from $y = \sqrt{x}$

3. $y = 5\sqrt{x} - 12$ 4. $y = -\sqrt{4x - 2} + 3$

Describe how each function has been transformed from $f(x)$ to $f'(x)$

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

6. $f(x) = |2x| - 3 \rightarrow f'(x) = 4|-x| + 1$

Find the equation of the function after it has been reflected over the x axis and y axis

7. $f(x) = x^3 - 5x^2 - 3x + 2$ 8. $h(x) = \frac{-5x^2 + 4x - 2}{-4x + 1}$

Graph the following functions with their transformations.

9. $k(x) = -\frac{1}{x+1} + 5$ 10. $p(x) = \log(-x + 4)$