

PC-1<sup>st</sup> Semester Final Review (Extra Practice Problems)

1) Algebraically find the domain of the following functions.

a)  $h(x) = \frac{3x}{x^2 - 144}$

b)  $f(x) = \frac{4}{x^2 - 19x}$

c)  $g(x) = \sqrt{21x + 7}$

2) Find the domain of the function.

$m(x) = \log_4(x + 50)$

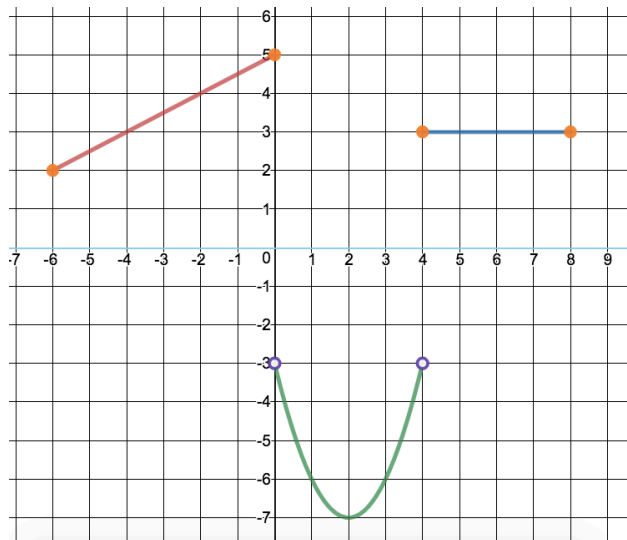
3) Find the domain of the function.

$n(x) = \log(12x - 5)$

4) Find the domain of the function.

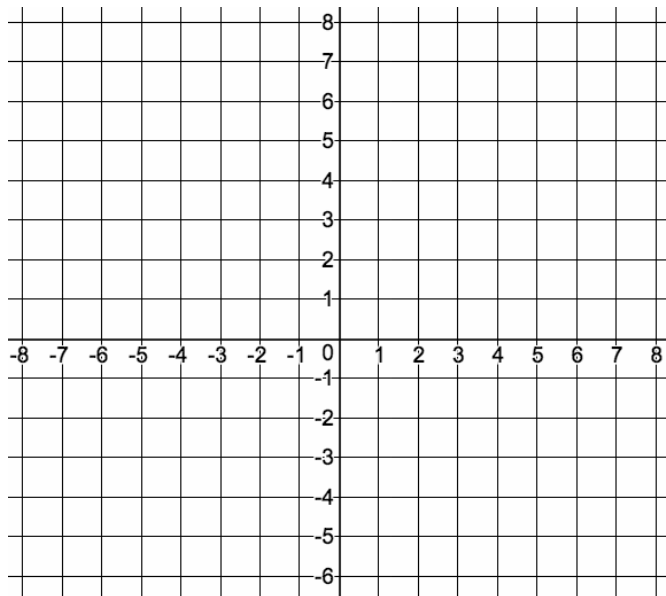
$y = 5^x$

5) Write the definition for the piecewise function.



6) For the function find the:

$$f(x) = \begin{cases} -x + 3 & \text{if } -2 \leq x < 0 \\ 4 & \text{if } x = 0 \\ (x - 2)^2 & \text{if } x > 0 \end{cases}$$

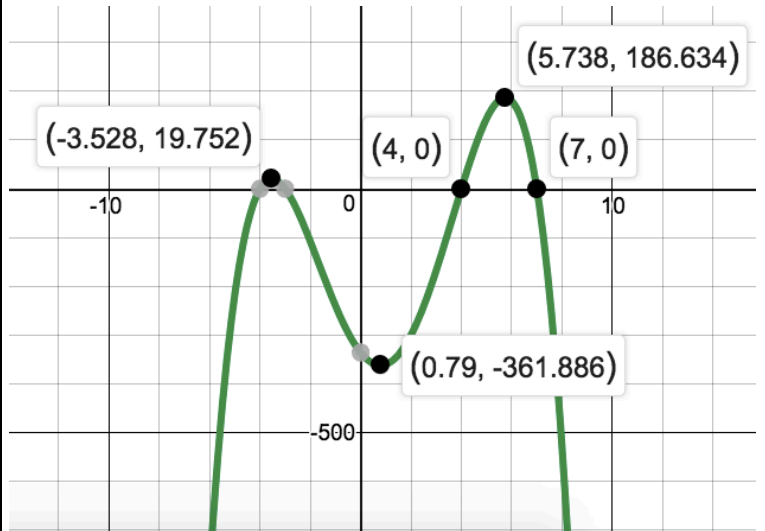


7) Fill in the table below. If a value is undefined, write "undefined".

|                   |    |    |    |    |
|-------------------|----|----|----|----|
| $x$               | -6 | -1 | 4  | 7  |
| $f(x)$            | 4  | 0  | 7  | -6 |
| $g(x)$            | -1 | 4  | -6 | 3  |
| $g(x) \cdot f(x)$ |    |    |    |    |
| $f^{-1}(x)$       |    |    |    |    |
| $g^{-1}(x)$       |    |    |    |    |

8) Use the graph to the right to answer the following:  
(ESTIMATE where needed)

- At what value(s) of  $x$ , if any does the graph of  $f$  have a local maximum?
- List the local maximum values.
- At what value(s) of  $x$ , if any does the graph of  $f$  have a local minimum?
- List the local minimum values.
- Identify intervals for which the graph is increasing/decreasing.
- Identify intervals for which the graph is concave up/down.



9) Determine if the graph is even, odd, or neither. Explain why/why not.

10) Evaluate  $f(-1)$

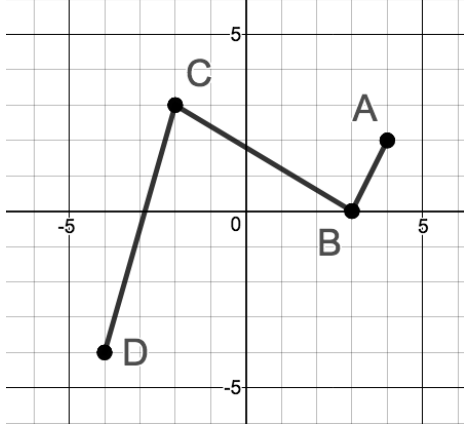
11) Solve  $f(x) = 0$

14) Point  $A(-9,25)$  is on the graph of  $y = f(x)$ . Determine the location of point  $A'$  after the transformation shown. Describe the transformation steps in detail (use words).

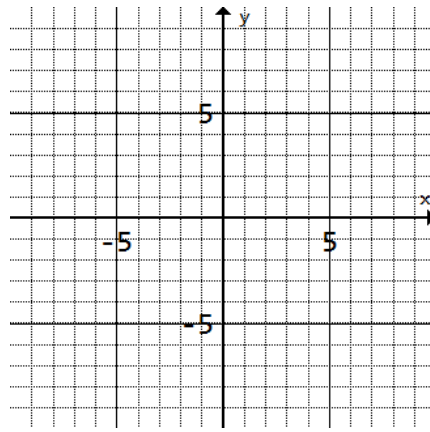
a)  $\frac{1}{5}f(-3(x-7))$

b)  $5f\left(\frac{1}{3}(x)\right) - 8$

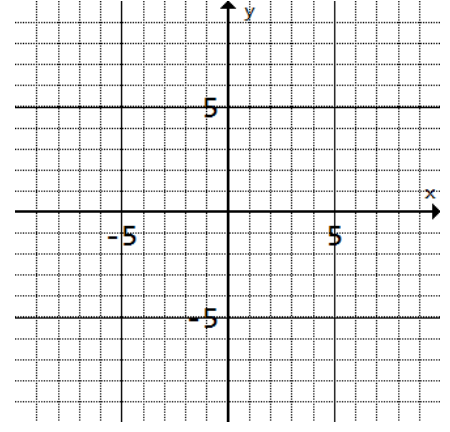
$h(x)$  is below (#4,#5: 5 pts each)



15) Graph  $h(-\frac{1}{2}(x+1))$



16) Graph  $-2h(x-4) - 2$



17) Let  $n(x) = \frac{4x-7}{8x+2}$  Algebraically determine  $n^{-1}(x)$ .

18) Consider the polynomial function  $f$  with a root of  $3i$ . Find and list all roots.

$$f(x) = x^4 + 4x^3 + 13x^2 + 36x + 36$$

19) Given a polynomial with the roots shown below, write a possible polynomial in standard form.

$$x = \{3, 5 + 2i, 5 - 2i\}$$

20) Given  $R(x) = \frac{3(x-10)(x+2)}{x^2-2x-24}$ , find the following. If none, write 'none'.

a) x-intercept(s)

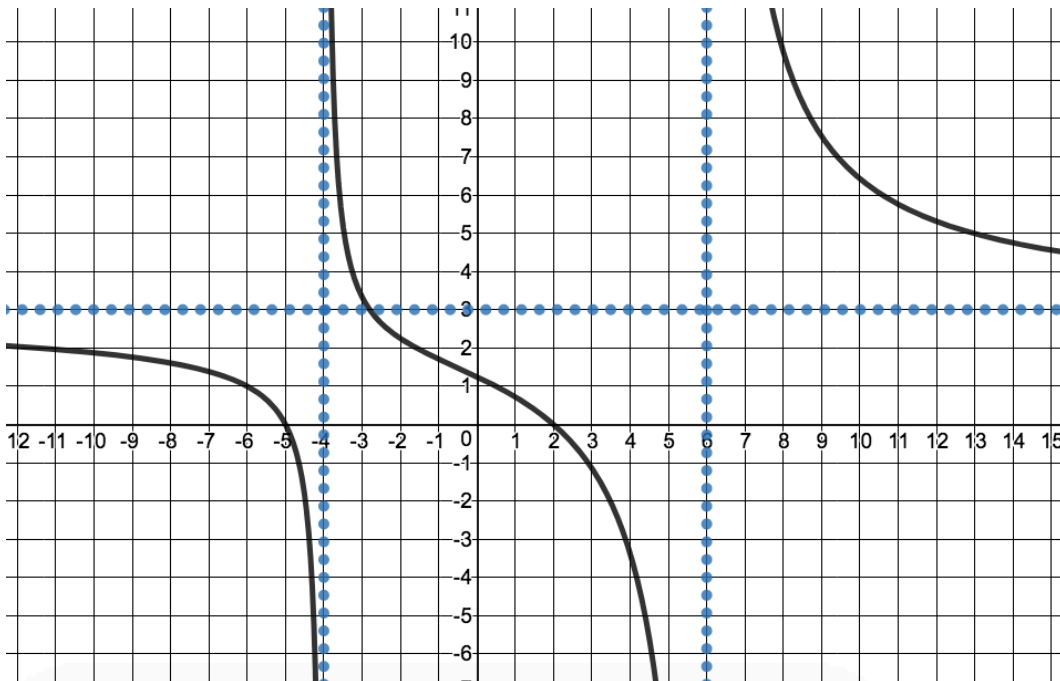
b) y-intercept(s)

c) vertical asymptote(s)

d) Horizontal asymptote

e) Oblique Asymptote

21) Write a possible equation for the graph below. (5 pts)



**22)** Solve for x.

$$5^{x+9} = 625^{4x}$$

**23)** Solve for x.

$$\log(2x) + \log(x + 1) = \log(12)$$

**24)** Solve for x.

$$\log_7(x) + \log_7(3x - 14) = 2$$

**25)** Alex deposits \$14,322 into an account with a 2.6% interest rate compounded monthly. When will he have \$22,000? Solve algebraically.

**26)** An element, Jamiesonian – 33 , has a half-life of 3220 years. If there are 555 grams of this element to start, how long until only 230 grams remain?