

MATH 1310

Session 6

Midterm Review

Example 1: The length of a rectangle is twice its width. If the perimeter of the rectangle is 180 feet, find the dimensions of the rectangle.

Example 2: Solve the following system of equations for y :

$$4x + y = 47$$

$$6x - 2y = -10$$

Example 3: State all solutions to the equation:

$$x^2 + 40 = 0$$

Example 4: Solve the following equation:

$$x^2 + 5x - 7 = 0$$

Example 5: Solve the following by completing the square:

$$x^2 - 8x + 20 = 0$$

Example 6: Solve:

$$\frac{3}{10x} - \frac{1}{6x} = 1$$

Example 7: Simplify $\frac{3-2i}{2+i}$

Example 8: Simplify

A. $(5 - 4i)(-1 - 2i)$

B. $(2 - 3i) - (-1 + 5i)$

Example 9: Solve the following inequality and express your answer in interval notation.

$$-2 < 3 - 4x \leq 7$$

Example 10: Solve the following inequality and express your answer in interval notation.

$$|7x + 8| - 4 < -3$$

Example 11: Find the solution of the equation

$$2 + 3 | 4x - 1 | \geq 14 .$$

Example 12: Find all solutions to the equation:

$$|3 - 2x| = 6$$

Example 13: Tom has a drawer with dimes, nickels and pennies in it. He has an equal number of each kind of coin. Tom counted his money and found that he has a total of \$2.40 in the drawer. How many nickels does Tom have?

Example 14: Solve the following for x:

$$x^6 - 8x^3 - 36 = 0$$

Example 15: Solve the following for x :

$$\sqrt{x + 5} + x = 5$$

Example 17: Solve the following for x:

$$\frac{(x - 8)(x + 4)}{x - 3} \leq 0$$

18. Find the domain:

a. $f(x) = \frac{x}{7x - 14}$

b. $f(x) = \sqrt{5x - 1}$

c. $f(x) = \sqrt{5 - 4x}$

19.

a. Calculate $f(-2)$ if $f(x) = x^2 + x$

b. Calculate $f(-2)$ if $f(x) = \begin{cases} x^2 + 2x & x \leq -1 \\ x & x > -1 \end{cases}$

c. Which point below is on the graph of $f(x)$.

$$f(x) = \begin{cases} 2 & x < -1 \\ 4 & x = -1 \\ x^2 - 1 & x > -1 \end{cases}$$

$(-2, 0)$ or $(1, 0)$

20. Determine which of the following is on the graph.

a. $f(x) = -\frac{1}{2}x - 3$

$(-1, 1)$

$(0, -3)$

b. $f(x) = 2x^2 - 3x - 1$

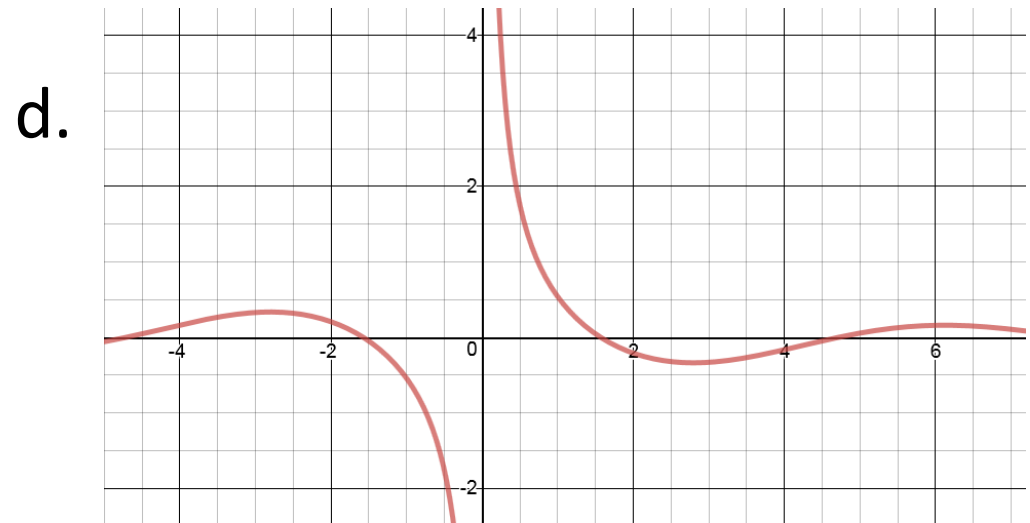
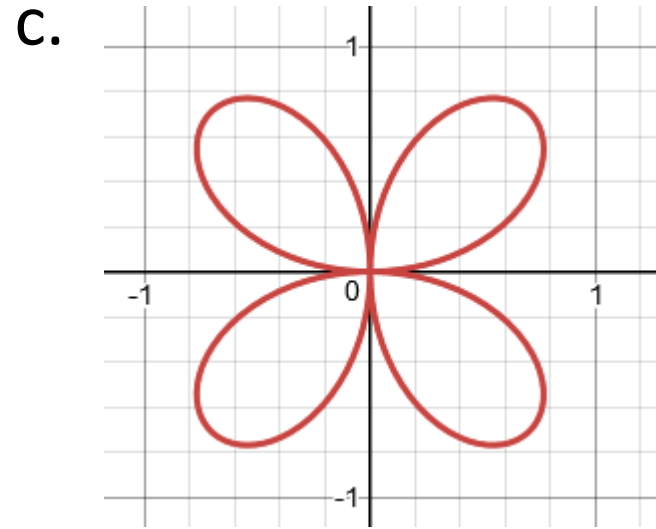
$(1, -2)$

$(-1, -1)$

21. Determine if the following is a function:

a. $x^2 + y^2 = 25$

b. $y = x^3 + 2x^2 + 5x - 1$



22.

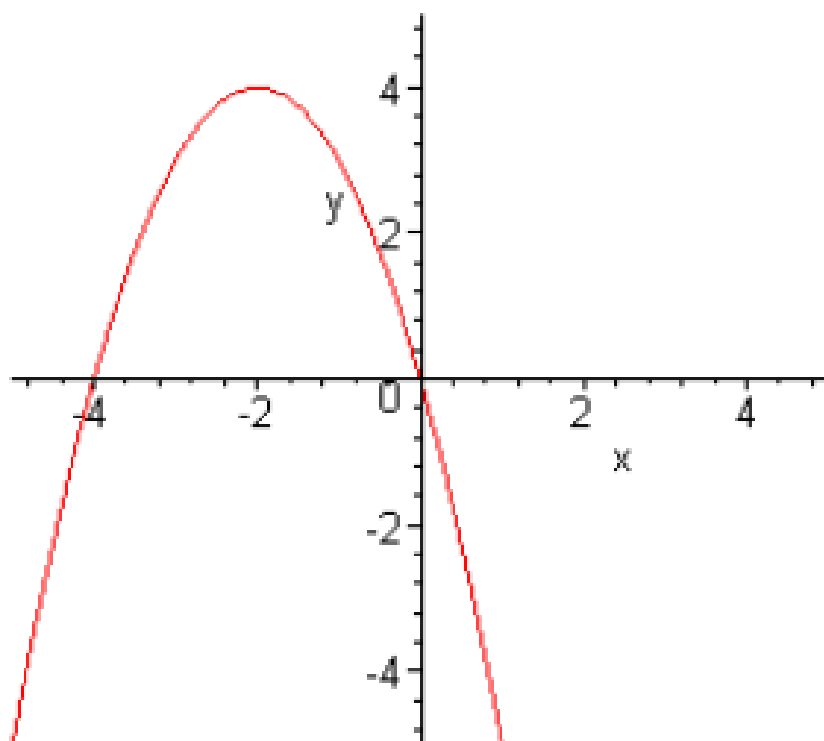
a. Sketch the graph $f(x) = -\sqrt{x-1}$

b. Sketch the graph $f(x) = -(x + 2)^2 - 1$

23.

a. What are the necessary transformations **$f(x) = (x + 3)^3 - 2$**

b. What is the function?



24.

a. Find the vertex $f(x) = 2x^2 - 4x + 21$

**b. Find the maximum or minimum value of the function
 $f(x) = x^2 - 16x + 8$**

25. Put in standard form $f(x) = -x^2 - 6x + 2$

26. If $f(x) = \sqrt{x+1}$ and $g(x) = x^2$, find $(g \circ f)(x)$ and $(f \circ g)(-1)$

27. If $f(x) = \frac{1}{2x}$ and $g(x) = x^2 - 1$, find $(f \circ g)(2)$.

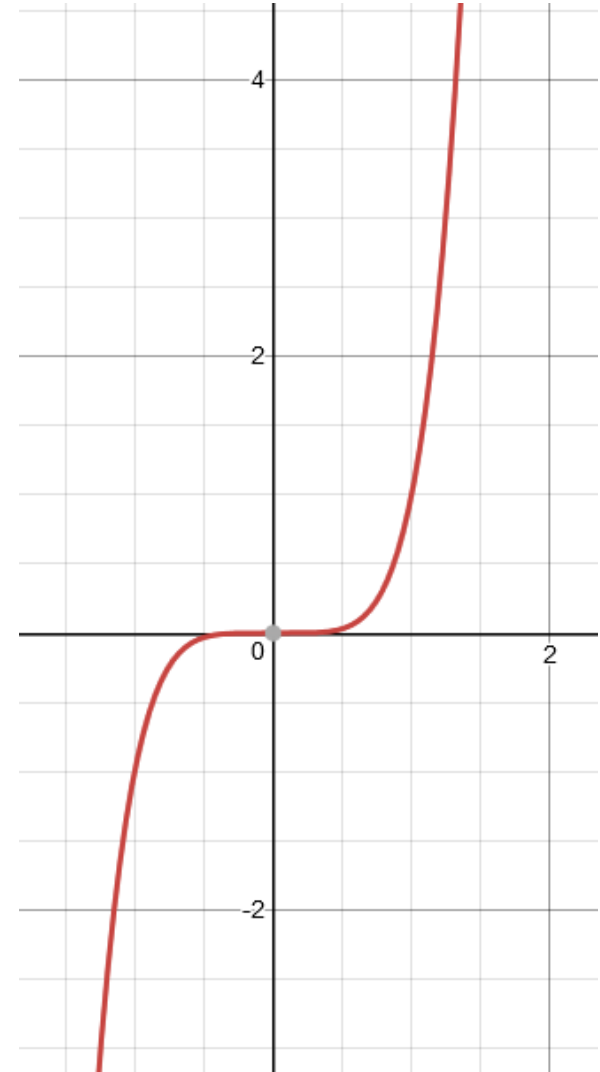
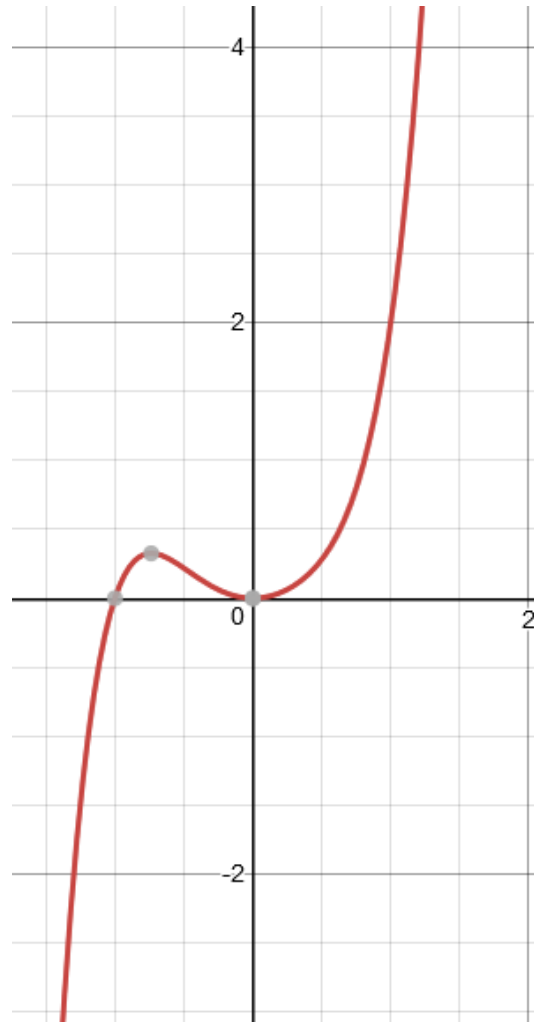
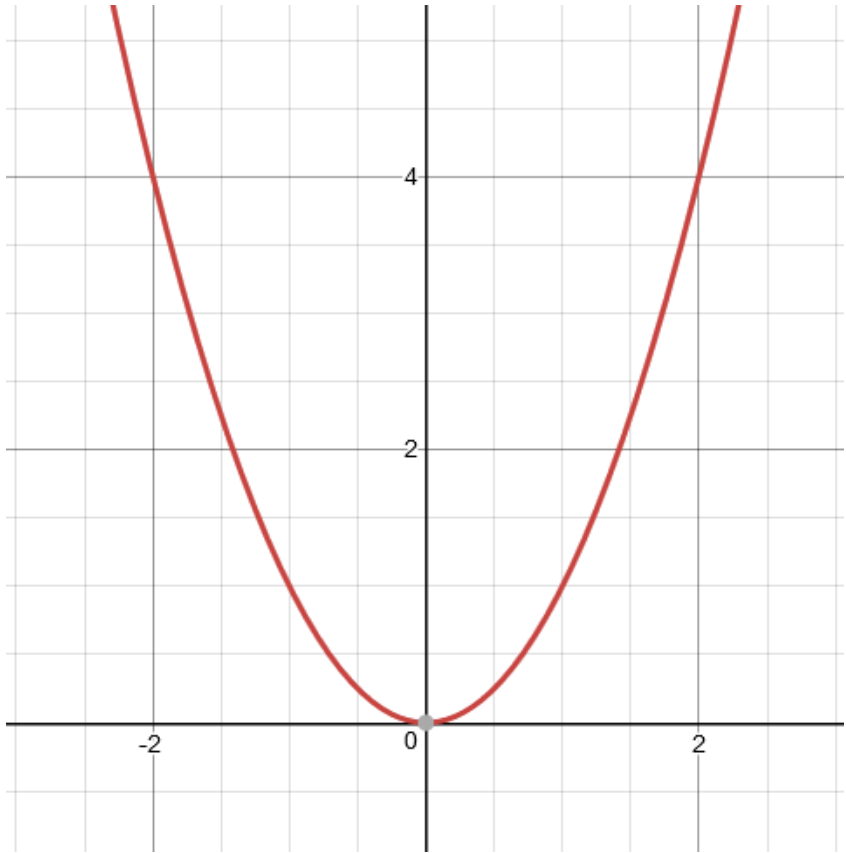
28. If $f(x) = -2x + 2$ and $g(x) = x^2 + x$, find $(f \circ g)(2)$.

29. Find the inverse:

a. $f(x) = -2x + 2$

b. $f(x) = \frac{1}{x+2}$

30. Classify the function as Even, Odd or Neither:



31. Evaluate the difference quotient for the function: $f(x) = 2x^2 + 8$

$$\frac{f(x + h) - f(x)}{h}$$

Popper 6

Questions 1 – 5, fill out answer choice B.