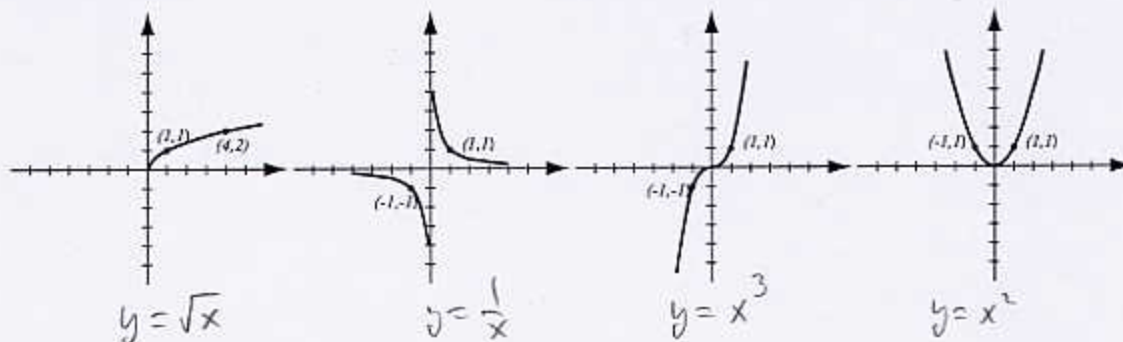


1. (4pts) The following are graphs of basic functions. Write the equation of the graph under each one.



2. (4pts) Find the domain of the function $f(x) = \sqrt{3 - 2x}$.

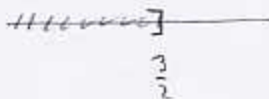
Must have

$$x \in (-\infty, \frac{3}{2}]$$

$$3 - 2x \geq 0$$

$$-2x \geq -3 \quad | \div (-2)$$

$$x \leq \frac{3}{2}$$



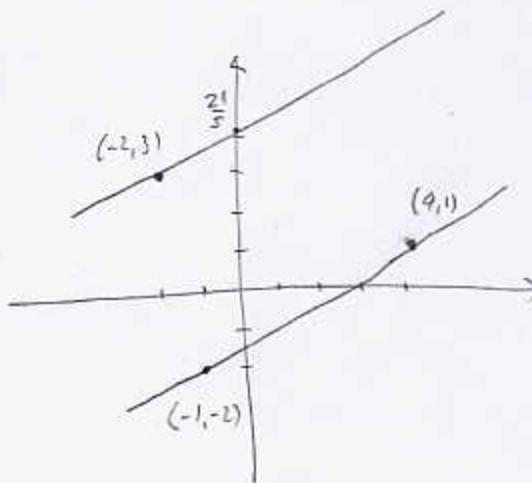
3. (5pts) Find the equation of the line that passes through $(-2, 3)$ and is parallel to the line that passes through the two points $(-1, -2)$ and $(4, 1)$. Draw both lines in the same coordinate system.

$$m = \frac{1 - (-2)}{4 - (-1)} = \frac{3}{5}$$

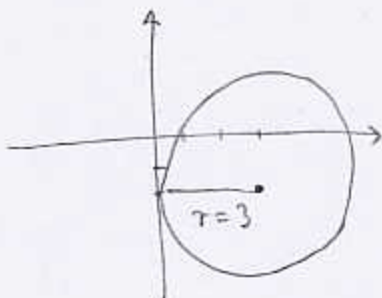
$$y - 3 = \frac{3}{5}(x - (-2))$$

$$y = \frac{3}{5}x + \frac{6}{5} + 3$$

$$y = \frac{3}{5}x + \frac{21}{5}$$



4. (5pts) Find the equation of the circle whose center is $(3, -2)$ that is tangent to the y -axis. Draw the circle.



$$(x-3)^2 + (y-(-2))^2 = 3^2$$

$$(x-3)^2 + (y+2)^2 = 9$$

5. (10pts) Use the graph of the function f at right to answer the following questions.

a) What is the domain of f ? $(-6, 4]$

b) What is the range of f ? $(-6, 4]$

c) Find $f(0)$ and $f(-3)$. $f(0) = -3$
 $f(-3) = 4$

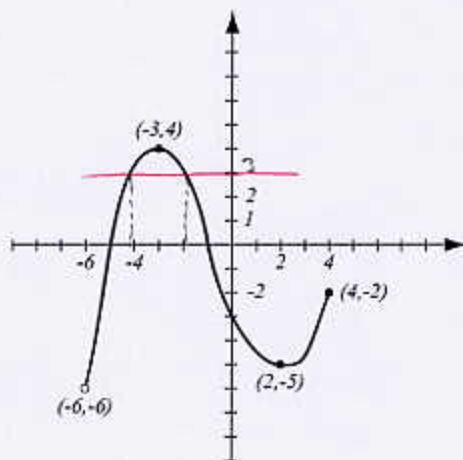
d) List the x -intercepts of the graph.
 x -int: $-5, -1$

e) Where does f have a local minimum?
What is its value? local min at $x=2$
with value -5

f) What are the solutions of the equation $f(x) = 3$? $-1.9, -4.2$

g) For which x is $f(x) > 0$?

For $x \in (-5, -1)$

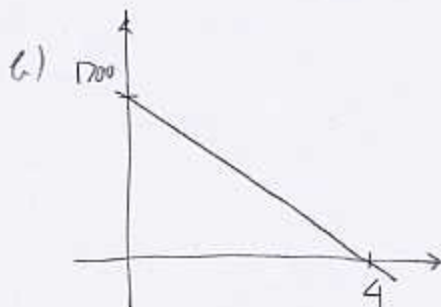


6. (5pts) The Marx brothers bought a new banana dispenser for \$1700 that they plan to depreciate over 4 years.

- Write the linear function that expresses the value of the dispenser after x years.
- Sketch the graph of the function.
- What is the value of the dispenser after 3 years?

$$a) V(x) = 1700 - 425x$$

$$c) V(3) = 1700 - 425 \cdot 3 \\ = 425$$



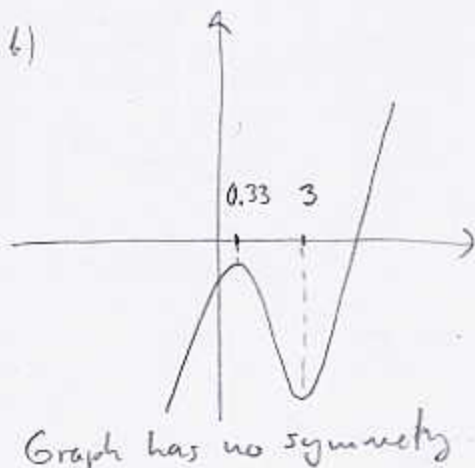
7. (7pts) The function $f(x) = x^3 - 5x^2 + 3x - 1$ is given.

- Determine algebraically whether this function is even, odd or neither.
- Sketch the graph of f on paper. Why does your picture support what you found in a)?
- List the intervals where f is increasing or decreasing. Accuracy: 2 decimal points.

$$a) f(-x) = (-x)^3 - 5(-x)^2 + 3(-x) - 1 \\ = -x^3 - 5x^2 - 3x - 1$$

neither $f(x)$ nor $-f(x)$,
so function is neither

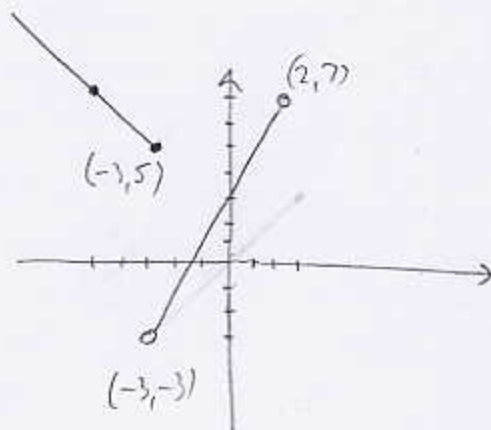
c) Increasing on $(-\infty, 0.33)$ and $(3, \infty)$
Decreasing on $(0.33, 3)$



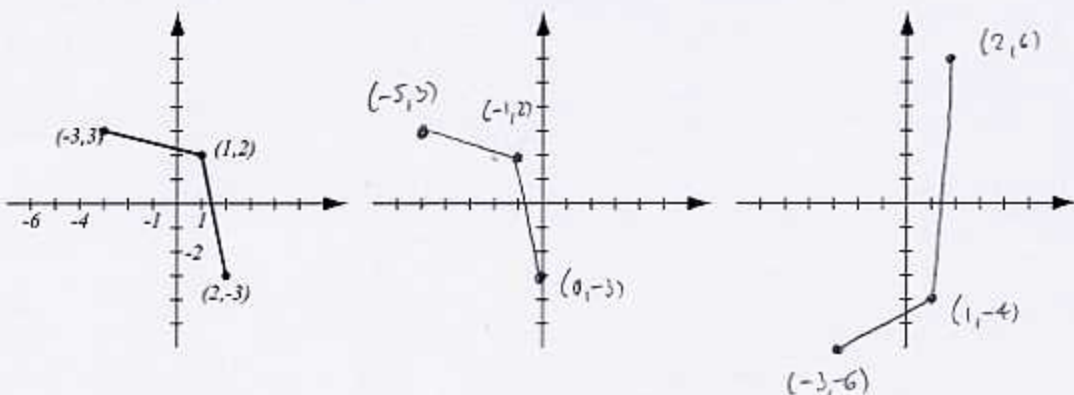
8. (5pts) Sketch the graph of the piecewise-defined function:

$$f(x) = \begin{cases} 2-x, & \text{if } x \leq -3 \\ 2x+3, & \text{if } -3 < x < 2. \end{cases}$$

x	$2-x$	x	$2x+3$
-3	5	-3	-3
-5	7	2	7



9. (5pts) The graph of the function f is given below. On separate graphs, sketch the graphs of the functions $f(x+2)$ and $-2f(x)$. Label all the relevant points.



Bonus. (5pts) The following is an equation of a circle. Bring the equation into standard form in order to find its center and radius.

$$x^2 - 8x + y^2 + 6y + 10 = 0 \quad | +4^2 + 3^2$$

$$\underbrace{x^2 - 8x + 4^2} + \underbrace{y^2 + 6y + 3^2} + 10 = 25$$

$$(x-4)^2 + (y+3)^2 = 15$$

$$(x-4)^2 + (y-(-3))^2 = 15$$

Center $(4, -3)$, radius $\sqrt{15}$