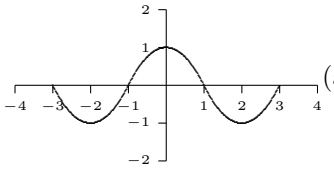
Review 1A

Math 124

1. Given $f(x) = x^2 - 3$, (a) find $f(2)$, (b) find and simplify $f(x+1)$, and (c) simplify $\dfrac{f(x+h) - f(x)}{h}$ to cancel h.

2. Given the graph of $y = f(x)$: 

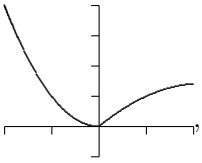
(a) What is $f(2)$? (b) What is the domain of $f(x)$. (c) Find the y-intercept.

3. Algebraically determine if $f(x) = \dfrac{x^2 + 3}{x}$ is even, odd or neither.

4. Find the average rate of change of the function $g(x) = \sqrt{x^2 + 9}$ between $x = 0$ and $x = 4$.

5. Graph the function $f(x) = \begin{cases} 1 & \text{if } x \le -1 \\ x^2 & \text{if } x > -1 \end{cases}$.

6. Starting with a basic function, show each shift and reflection used in sketching the graph of $h(x) = -\sqrt{x+1}$.

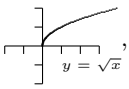
7. If $y = f(x)$ has the graph  , sketch the graphs of $y = f(-x) + 2$ and $y = f(x-1)$

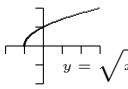
8. For the line $f(x) = 2x - 3$, determine the slope, the x-intercept, the y-intercept and the solution to $f(x) \ge 0$.

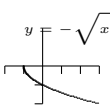
9. Write $f(x) = x^2 + 2x - 3$ in the form $f(x) = a(x-h)^2 + k$ and sketch the graph.

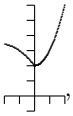
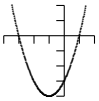
10. Does $f(x) = -x^2 + 5x + 1$ have a minimum or maximum value? Where does it occur?

11. If $f(x) = x^2 + 2$ and $g(x) = 2x + 1$, solve $f(x) = g(x)$ and $f(x) > g(x)$.

Answers to problems above: 1. (a) 1, (b) $x^2 + 2x - 2$, (c) $2x + h$ 2. (a) -1, (b) $[-3, 3]$, (c) (0,1) 3. $f(-x) = \dfrac{(-x)^2 + 3}{-x} = \dfrac{x^2 + 3}{-x} = -\dfrac{x^2 + 3}{x} = -f(x)$ so f is odd. 4. $\frac{1}{2}$ 5.  6. 

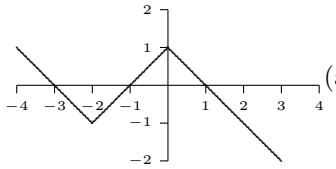
, 

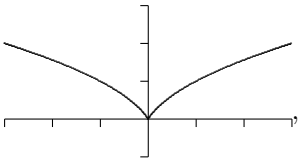
, 

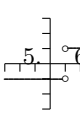
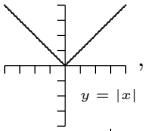
7.  , and  8. $m = 2$, $a = \frac{3}{2}$, $b = -3$, $\left[\frac{3}{2}, \infty\right)$ 9. $f(x) = (x+1)^2 - 4$,  10. maximum when $x = \frac{5}{2}$ 11. $x = 1$ and $(-\infty, 1) \cup (1, \infty)$

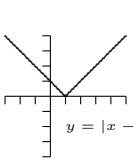
Review 1B

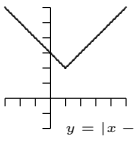
Math 124

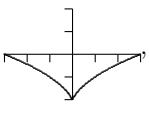
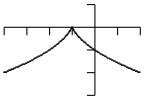
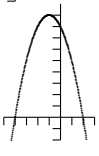
1. Given $f(x) = \sqrt{x+1}$, (a) find $f(8)$, (b) find and simplify $f(x+1)$, and (c) simplify $\dfrac{f(x+h)-f(x)}{h}$ to cancel h.
2. Given the graph of $y = f(x)$: 

(a) What is $f(-2)$? (b) Solve $f(x) \geq 0$. (c) Find the x-intercepts.
3. Algebraically determine if $f(x) = \dfrac{x+3}{x^2}$ is even, odd or neither.
4. Find the average rate of change of the function $g(x) = x^2 - 11$ between $x = -1$ and $x = 4$.
5. Graph the function $f(x) = \begin{cases} -1 & \text{if } x < 1 \\ 1 & \text{if } x > 1 \end{cases}$.
6. Starting with a basic function, show each shift and reflection used in sketching the graph of $h(x) = |x-1| + 2$.
7. If $y = f(x)$ has the graph  , sketch the graphs of $y = f(x) - 2$ and $y = -f(x+1)$
8. For the line $h(x) = -\frac{1}{2}x + 1$, determine the slope, the x-intercept, the y-intercept and the solution to $h(x) < 0$.
9. Write $f(x) = -x^2 - 2x + 8$ in the form $f(x) = a(x-h)^2 + k$ and sketch the graph.
10. Does $f(x) = x^2 + 4x + 1$ have a minimum or maximum value? What is this value?
11. Solve $x^2 - 7x \leq -12$.

Answers to problems above: 1. (a) 3, (b) $\sqrt{x+2}$, (c) $\dfrac{1}{\sqrt{x+h+1} - \sqrt{x+1}}$ 2. (a) -1, (b) $(-\infty, -3] \cup [-1, 1]$, (c) $(-3, 0)$, $(-1, 0)$, $(1, 0)$ 3. $f(-x) = \dfrac{-x+3}{(-x)^2} = \dfrac{-x+3}{x^2}$ which is not equal to $f(x)$ nor $-f(x)$, so f is neither odd nor even. 4. 3 5.  6. 





7.  and  8. $m = -\frac{1}{2}$, $a = 2$, $b = 1$, $(2, \infty)$ 9. $f(x) = -(x+1)^2 + 9$,  10. minimum is $y = -3$ 11. $[3, 4]$