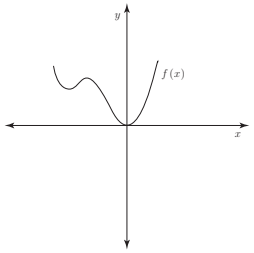
Chapter 5 Exam Name:_____

You may use a calculator to verify solutions, but not to provide them.

Show all relevant work!

1. The graph of the function $f(x)$ is shown to right.
Match each of the manipulations below with the graph best suited to it.
(There are more graphs than equations).

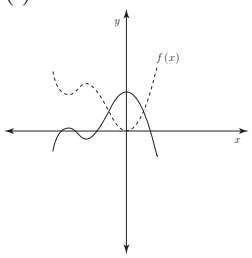


(a) $f(2-x) \longrightarrow$ _____

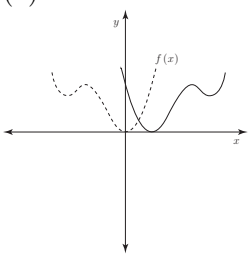
(b) $2-f(x) \longrightarrow$ _____

(c) $f^{-1}(x)-2 \longrightarrow$ _____

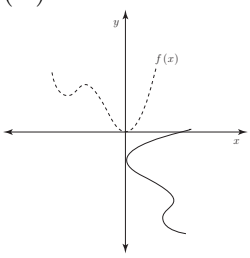
(i)



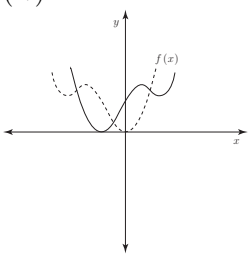
(ii)



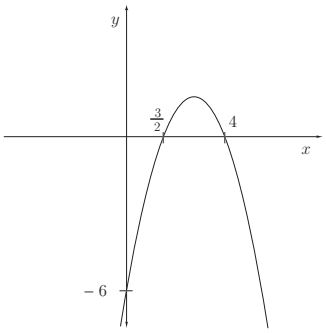
(iii)



(iv)



2. The graph of a parabola of the form $y = ax^2 + bx + c$ is shown to right.
Find the equation of this parabola using the given intercepts.



3. The present US population (in millions) is given by $P(t)$ with t in years. Match each statement (I) – (IV) with one of the formulas (a) – (h).

(I) The population 10 years before today.

(II) Today's population plus 10 million immigrants.

(III) Ten percent of the population we have today.

(IV) The population after 100,000 people have emigrated.

(a) $P(t)-10$ (b) $P(t-10)$ (c) $0.1P(t)$ (d) $P(t)+10$

(e) $P(t+10)$ (f) $P(t)/0.1$ (g) $P(t)+0.1$ (h) $P(t)-0.1$

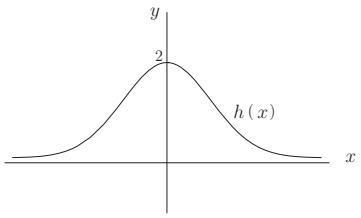
(I) $\longrightarrow$ _____ (II) $\longrightarrow$ _____ (III) $\longrightarrow$ _____ (IV) $\longrightarrow$ _____

4. If the average rate of change for $f(x)$ on the interval $[-1, 2]$ is 4, what is the average rate of change of $3f(x) + 1$ on the same interval?

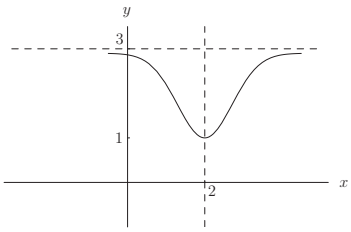
5. (a) Show that $y = 2^x$ is neither an odd function, nor an even function.

(b) Is the product of two odd functions even? If so, prove it. If not give a counter example to disprove it.

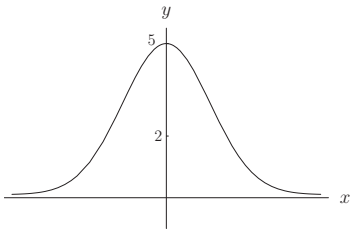
6. $h(x)$ is shown to the right. For each function below, find an equation in terms of $h(x)$.



(a)



(b)



7. Determine the minimum initial velocity needed to propel a rocket from the ground to a height of 400 feet. (Assume gravity accelerates objects at 32 feet per second per second).

8. (a) If you have a string of length 100cm, what are the dimensions of the rectangle of maximum area that you can enclose with your string?

(b) Generalize your answer to (a) for the maximum rectangular area you can enclose with a string of length x. Show how you arrive at this conclusion (prove it).