### 3.4 Average Rate of Change

Name: $\qquad$ Hour: $\qquad$

First estimate the average rate of change for each of the following graphs over the given interval and then find it exactly.


Estimate:

Exac† Answer:


Estimate:

Exact Answer:


Estimate:

Exac† Answer:
6. $[0,1]$


Estimate:

Exact Answer:

Suppose 25 flour beetles are left undisturbed in a warehouse bin. The beetle population doubles in size every week. The equation $P(x)=25 \bullet 2^{x}$ can be used to determine the number of beetles after $\mathbf{x}$ weeks. Complete the table.
7. Calculate the average growth rate between weeks 1 and 3 .
8. Calculate the average growth rate for the first five weeks $[0,5]$.
9. Which average growth rate is higher? Why do you think it is higher?

| Week | Population |
| :---: | :---: |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

Find the rate of change for the given functions and intervals
10. $f(x)=x^{2}+4 \quad[1,5]$
11. $f(x)=-x^{2}+4 \quad[1,5]$
12. $f(x)=\frac{1}{2} x^{2} \quad[-2,6]$
13. $f(x)=3 x-3[-3,3]$
14. $f(x)=4 x \quad[-2,6]$
15. $f(x)=x^{2}+9 \quad[0,3]$
16. Sketch the graph of a function that has a negative average rate of change from $[0,3]$


