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### 5.3 Comparing Functions

Date $\qquad$ Period $\qquad$

## Determine if the following are linear, quadratic, or exponential.

1) $\{(-2,-2),(-1,1),(0,4),(1,7),(2,10)\}$
2) 


5) $\{(-3,-17),(-2,-4),(-1,3),(2,-12)$, $(5,-81)\}$
7) A ball is thrown in the air. It then falls and returns to the ground.
9) $\{(0,-2),(2,14),(3,62),(5,4094)\}$
2) $y=-3(x-2)^{2}+7$
4)

6) Earning a $\$ 40,000$ salary with $15 \%$ commission.
8) Bacteria that split in half every 30 minutes.
10) A gumball machine that gives out 5 gumballs for every dime you put in.
11) Make a table for each function for integers $0-5$. Then find the average rate of change over the interval [ 0,4 ] for each function.
a. $f(x)=4 x+10$
b. $g(x)=4^{x}+1$
c. $h(x)=4 x^{2}+4 x$
d. Average rate of change for $f(x)$ : $\qquad$ $g(x):$ $\qquad$ $h(x)$ : $\qquad$
e. Compare the rates of change over $[0,4]$
12) Two seagulls dive into the ocean. The given functions represent the height of each seagull above the surface of the ocean as a function of the seagull's horizontal distance from a certain buoy. For each set of functions, determine which bird descends deeper into the ocean.
a. $f(x)=3(x-5)^{2}-9$
or $\quad g(x)=\{(-8,0),(-6,-12),(-4,0)\}$

or

$$
j(x)=2 x^{2}+16 x+31
$$

13) Three students are shooting wads of paper with a rubber band, aiming for a trash can in the front of the room. The height of each student's paper wad in feet is given as a function of the time in seconds. Which student's paper wad flies the highest?

Alejandro: $y=-x^{2}+2 x+7$
Melissa: $g=-(x-3)^{2}+7$
Connor: After 3 seconds his wad achieves a maximum height of 6.5 feet
14) Suppose that you have been offered a position at a prestigious company. You may choose how your salary is paid. Option 1 is described by the quadratic equation $S=2500 x^{2}+2500 x+60000$ where x is the number of years you are with the company and S is the yearly salaray in dollars. Option 2 has a starting yearly salary of $\$ 35000$, but you will get a $25 \%$ raise each year.
a. If you plan to work for this company for 5 years, which option should you choose? Why?
b. If you plan to work for this company for 30 years, which option should you choose? Why?
15) Two neighboring schools use different models for anticipated growth in enrollment. School A has 850 students and predicts an increase of 100 students per year. School B also has 850 students, but predicts an increase of $8 \%$ per year. Compare the models.

