

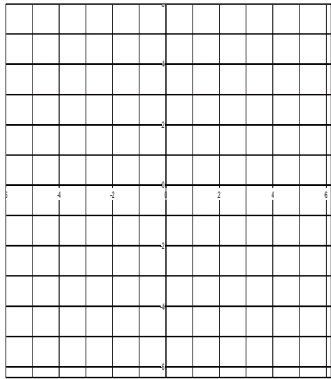
Properties of Exponential Functions

Part A – Linear Relationships

Complete a table of values, and graph each relationship below.

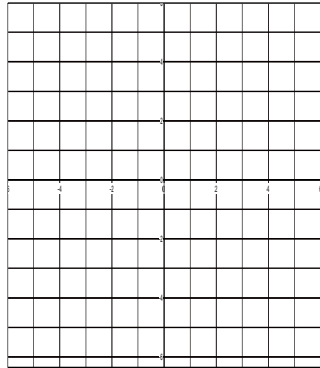
$$y = 3x - 2$$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



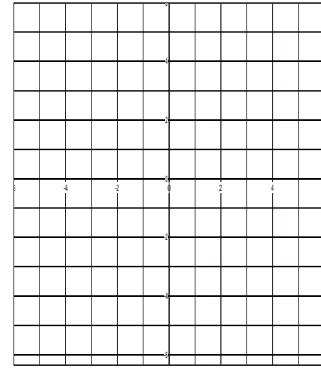
$$y = 2x$$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



$$y = -2x + 4$$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |

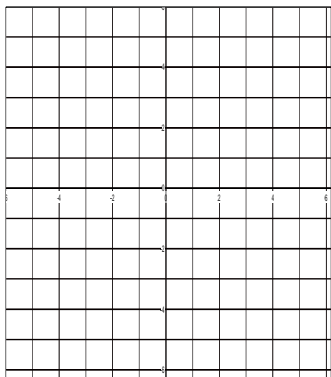


Do you notice a pattern in the table of values?

Part B – Quadratic Functions

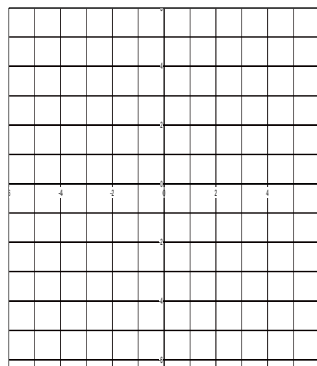
$$y = 2x^2$$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



$$y = x^2 - 2x - 3$$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |

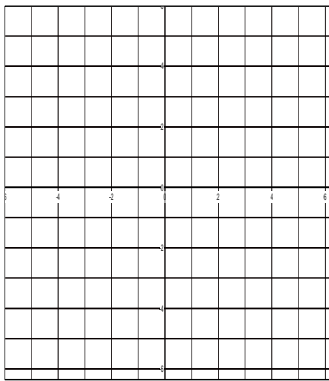


Do you notice a pattern in the table of values?

Part C – Exponential Relationships

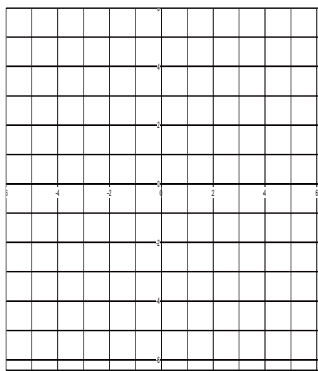
$y = 2^x$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



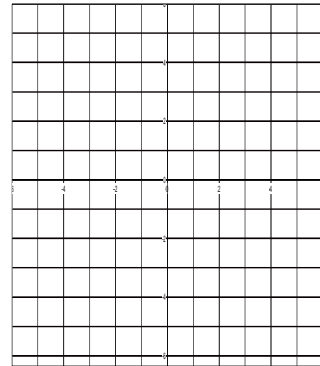
$y = 3^x$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



$y = 0.5^x$

| x | y |
|----|---|
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |



Do you notice a pattern in the table of values?

Summarize your findings below...

| Type of Relationship | What does the equation look like? | What does the graph look like? | Pattern found in the table of values. |
|----------------------|-----------------------------------|--------------------------------|---------------------------------------|
| Linear | | | |
| Quadratic | | | |
| Exponential | | | |





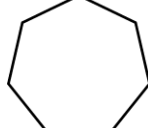

Sample Problems

1. Suppose the population of a town is shown below. Does this represent a linear, quadratic or exponential relationship?

| | | | | |
|-------------------|------|------|------|------|
| Year | 0 | 1 | 2 | 3 |
| Population | 1200 | 1320 | 1452 | 1597 |

Find the equation for the town's population.

2. A polygon is any 2-dimensional closed shape. Several polygons are drawn and the number of diagonals are found and recorded. Is this a linear, exponential or quadratic relationship?

| Number of Side in Polygon | Sketch | Number of Diagonals |
|----------------------------------|---|----------------------------|
| 3 |  | 0 |
| 4 |  | 2 |
| 5 |  | 5 |
| 6 |  | 9 |
| 7 |  | 14 |
| 8 |  | |

3. The population of a school is currently 850 students. The school grows by 25 students each year. Is the growth of the school linear, exponential or quadratic? Find an equation if possible.

Problem Set**For Questions 1 – 3**

For each question:

- Make the table of values (if not done already)
 - Determine whether the relationship is linear, exponential or quadratic.
 - If the relationship is linear or exponential, then find the equation.
1. Melissa has a job and gets a raise at the end of every year. She starts at \$35,000 per year, the next year she earns \$36,400, the year after that \$37,856 and finally the year after that she makes \$39,370.

| End of Year | Salary |
|-------------|--------|
| 0 | |
| 1 | |
| 2 | |
| 3 | |

2. Graham puts \$600 into a savings account. It is worth \$618 after 1 year, \$636 after 2 years, \$654 after 3 years and \$672 after 4 years.

| End of Year | Balance in Savings Account |
|-------------|----------------------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |

3. Joe has a new dirt bike. He accelerates the dirt bike down the road and his distance travelled is recorded over time.

| Time (seconds) | Distance Travelled (m) |
|----------------|------------------------|
| 1 | 3 |
| 2 | 12 |
| 3 | 27 |
| 4 | 48 |
| 5 | 75 |

4. Text page 323 #1 - 5, 7