Thomas earns $1 on the first day of a job. The second day, he is paid $2, the third day $4, the fourth day $8, and so on. Each day, his salary is twice that of the previous day. He plans to stay on the job for 21 days and wishes to know what his total earnings will be. Find an easier way to determine his total salary without adding up all twenty-one days’ earnings.

**Al’s Allowance Problem**

Graph y = 2x.

|  |  |
| --- | --- |
| x | y |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |



Graph .

|  |  |
| --- | --- |
| x | y |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Generalize:**

 **y = ax y = c ax**

 Cases: (1) a > 1 (2) 0 < a < 1

Describe in a sentence the relationship between the graph of and the graph of each of the following exponential functions. Find any x- and y-intercepts. Give a rough sketch of the graph.

  

**The number e**  ≈ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Solving exponential equations (part 1)

 Method: **If au = av, then u = v. (from the “one-to-one-ness” of y = ax)**

3x–1 = 27   

**Applications**:

 Depreciation of a car: The price, p, in dollars, of a Honda Civic DX Sedan that is x years old is modeled by the formula p(x) = 16,630(0.90)x. How much should a 3-year old car cost?

 Optics: If a single pane of glass obliterates 3% of the light passing through it, the percent p of light that passes through n successive panes is given by the formula p(n) = 100(0.97)n. What percent of light passes through 5 panes?