

## Choose a Prize

You just won math bingo and you get to pick your prize now! You have two choices...PRIZE A or PRIZE B. You only have 30 seconds to pick your prize...Which one will it be??? Circle the prize you chose, then complete the questions below.

### PRIZE A:

Start with \$100 on day 1. Each day, add \$100 to your prize. Continue this pattern for 20 days.

### PRIZE B:

Start with \$0.02 on day 1. Each day, double the amount of your prize. Continue this pattern for 20 days.

1. Make a table for the first 5 days of each prize:

**Prize A**

| Day # | Winnings |
|-------|----------|
| 1     | 100      |
| 2     | 200      |
| 3     | 300      |
| 4     | 400      |
| 5     | 500      |

*Arithmetic*  
+100

**Prize B**

| Day # | Winnings |
|-------|----------|
| 1     | .02      |
| 2     | .04      |
| 3     | .08      |
| 4     | .16      |
| 5     | .32      |

*Geometric*  
.2

2. Which prize would you choose if you were only collecting for 5 days?

3. Write a recursive rule for the winnings of each prize.

Prize A

$$f(1) = 100 \quad f(n) = f(n-1) + 100$$

Prize B

$$f(1) = .02 \quad f(n) = 2f(n-1)$$

4. Which table follows a linear pattern? How can you tell?

*Prize A - It has a constant rate of change.*

$x$ : # of days  
 $y$ : \$ (winnings)  
 100, 200, 300, 400

5. Write the explicit linear equation in slope intercept form for the prize you identified in #4. Explain the meaning of the slope and the  $y$ -intercept in the context of the problem.

$y = mx + b$   
 $y = 100x + 0$   
 $y = 100x$

$y = 100 + 100(x-1)$   
 $y = 100 + 100x - 100$   
 $y = 100x$

$m = \frac{100}{1 \text{ days}}$   
 The prize money is increasing by \$100 every day.  
 on day 0 you get \$0.  
 day 0  $(0, 0)$

6. Use your linear equation to find the total value of your winnings on Day 20.

$y = 100x$   
 $y = 100(20)$   
 $y = 2000$   
 $\$2000$

7. Use your linear equation to find the total value of your winnings on Day 25.

$y = 100(25)$   
 $y = 2500$   
 $\$2500$

8. Use your recursive rules to complete the tables for the total value of your winnings on Days 6 – 20.

| Day #   | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---------|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Prize A |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| Prize B |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |

9. Write an explicit equation that you can use to find the total value of your winnings for the other prize on Day 20 without having to compute the winnings for days 6 – 19.

$y = .02(2)^{x-1}$

10. Use your new equation to find the total value of your winnings on Day 20. Does your answer match what you found in the table above?

$y = .02(2)^{20-1}$   
 $y = 10485.76$

11. Use your new equation to find the total value of your winnings on Day 25.

$(1-0.02) = (0.98) \quad 50 = (0.98)^x$

12. Under what conditions should you choose Prize A? Prize B? Explain your reasoning using the numbers you calculated above.

Prize A - It has a constant rate of change