Which Account Wins?

Simple interest adds; compound interest multiplies. Build a table for both accounts, find the first row where the compound account is ahead, and answer with the time.

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Eventually exceeds	Passes and stays ahead.	An exponential growth eventually exceeds any line.
Intersection	Where two graphs cross: the accounts have the same balance there.	Read it from the graph or find it in a table (Unit 6, Lesson 1).
Constant difference	The same dollars added each step: linear, like simple interest.	Subtract one balance from the next.
Constant ratio	The same factor multiplied each step: exponential, like compound interest.	Divide one balance by the one before.
Compare in the same form	Put both accounts into a table, a graph, or equations before deciding.	A sentence, a formula, and a table can all describe the same kind of account.

Part A Kevin and Joseph

Each invests $100. Kevin earns $5 every month. Joseph earns 3% every month.

1. Write an equation for each. Which is linear and which is exponential?

MONTH	0	12	24	32	33	36	48
Kevin	$100.00						
Joseph	$100.00						
ahead	tie						

2. About when does Joseph take the lead? Does Kevin ever catch up again?

Part B Two banks

$10,000 in each. City Bank: 3% simple interest. National Bank: 2.6% compounded monthly.

1. Write City Bank's balance after y years. How many dollars does it add each year?

2. For National Bank, what is the rate per period, and how many periods are in 10 years?

YEAR	0	5	10	15	20
City Bank	$10,000.00				
National Bank	$10,000.00	$11,386.68			$16,810.82
ahead	tie				

3. Which bank would you choose for 8 years? For 25 years? Why?

Part C Linear or exponential?

STORY	LINEAR OR EXPONENTIAL	CLUE
$25 into a jar every month		
4% a year, compounded annually		
A loan with 6% simple interest		
A card balance growing 1.5% a month		

Part D In your own words

1. Why does the account that multiplies always pass the one that adds?

Part E Exit ticket

1. Who is ahead after 24 months, Kevin or Joseph? After 48?

2. City Bank leads at year 10 and National Bank at year 15. What should a saver conclude?

Answer key

Part A. 1. K = 100 + 5m (linear); J = $100(1.03)^m$ (exponential). Kevin: $160.00, $220.00, $260.00, $265.00, $280.00, $340.00. Joseph: $142.58, $203.28, $257.51, $265.23, $289.83, $413.23. Ahead: Kevin, Kevin, Kevin, Joseph, Joseph, Joseph. 2. About month 33. No.

Part B. 1. 10,000 + 300y; $300 a year. 2. 0.026 over 12 (about 0.0021667); 120 periods. City Bank: $11,500.00, $13,000.00, $14,500.00, $16,000.00. National Bank: $12,965.65 (year 10), $14,763.58 (year 15). Ahead: City, City, National, National. 3. City Bank for 8 years; National Bank for 25: it leads from year 11 on.

Part C. Linear (same dollars). Exponential (percent). Linear (simple interest adds). Exponential (percent).

Part D. The adding account's step is fixed; the multiplying account's step keeps growing.

Part E. 1. Kevin ($220.00 to $203.28); Joseph ($413.23 to $340.00). 2. The better account depends on how long the money stays; longer favors compound interest.