

Name: _____

Date: _____

Compound Over the Long Run

GRADE 8

MATHEMATICS

F1.4

Compound growth pays interest on the interest already added, so each interval starts from a slightly larger balance. Multiplying by 1.05 four times is not the same as adding 5% four times, and the difference is the whole point.

PART A: INTERVAL BY INTERVAL

1. \$400 at 5% compound: interval 1 ends at \$_____.
2. Interval 2 ends at \$_____.
3. Interval 3 ends at \$_____.
4. For comparison, simple interest on \$400 at 5% over 3 intervals ends at \$_____.

PART B: THE GAP GROWS

5. After 3 intervals, how much more does compound growth give than simple interest on \$400 at 5%?

SHOW YOUR WORK

Answer: _____

6. A balance of \$1,000 grows at 6% compound for 5 intervals. What is the ending balance?

SHOW YOUR WORK

Answer: _____

7. The same \$1,000 at 6% simple interest for 5 intervals ends at what, and how much less is that?

SHOW YOUR WORK

Answer: _____

PART C: WHY COMPOUND WINS

8. Compound growth beats simple growth because:
- ☐ (A) each interval's interest earns interest of its own ☐ (B) the rate applied is higher
- ☐ (C) it runs for more intervals
9. \$2,000 at 10% compound for 2 intervals ends at:
- ☐ (A) \$2,420 ☐ (B) \$2,400 ☐ (C) \$2,200

PART D: WHY THE GAP WIDENS

10. Explain why the gap between simple and compound interest starts at nothing and grows. Use the \$400 at 5% figures to show it.

Compound Over the Long Run

ANSWER KEY

1. 420
2. 441
3. \$463.05
4. 460
5. \$3.05.
6. \$1,338.23.
7. \$1,300.00, which is \$38.23 less than the compound result.
8. A) each interval's interest earns interest of its own
9. A) \$2,420
10. In the first interval both pay \$20 and both reach \$420, so the gap is nothing. From the second interval on, compound charges its 5% against a larger balance, so it pulls ahead a little more each time. On \$400 at 5% the gap is \$0 after one interval, \$1.00 after two and \$3.05 after three, and it keeps widening from there.

TEACHER NOTES

Extension beyond the grade-level expectation: students compute compound balances directly rather than being given them, and Part D asks why the gap starts at zero, which is the part most explanations skip. The \$400 figures are chosen so the first three intervals stay exact to the cent.