Lesson 17: Annually, Quarterly, or Monthly?

- Let's use different time intervals to solve problems.

17.1: Finding Equal Expressions

1. Find pairs of expressions that are equal. Be prepared to explain how you know.

$(3^5)^2$	$(3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) \cdot (3 \cdot 3)$
$3 \cdot 3 \cdot 9 \cdot 9 \cdot 9$	3^6
$(3^2)^4$	3^7
3^{10}	$3 \cdot 9 \cdot 27$

2. Write an expression that is equal to $(2^{30})^7$ using a single exponent.

3. Without evaluating the expressions, explain why 2^{15} is equal to 8^5.

17.2: How Many Times Per Year?

1. Complete the table.

If something happens...	It happens this many times a year...	It happens every _____ months...
annually		
semi-annually		
quarterly		
monthly		

2. A gym membership has an annual fee, billed monthly. How much is each bill, if the annual fee in dollars is . . .?
   a. 360

   b. 540

   c. g

3. An educational foundation gives an annual scholarship, distributed semi-annually. How much is each distribution, if the annual scholarship amount in dollars is . . .?
   a. 1,800

   b. 5,000

   c. s

4. A magazine subscription has an annual price, billed quarterly. How much is each bill, if the annual price in dollars is . . .?
   a. 48

   b. 80

   c. m

17.3: Your Problems Are Compounded

Match each item in the first column to a representation in the second column.

1. A worker sets aside \$6,000 per year for their retirement fund by saving the same amount monthly.

2. A business's revenue increases by 20% per quarter. This happens for 2 years. Initially, their quarterly profit was \$6,000.

3. $6{,}000 \cdot ((1.05)^4)^x$

4. A man borrows \$6,000 from his sister. He will reduce the amount he owes in 1 year by paying her back quarterly.

5. A business's revenue decreases by 20% semi-annually. This happens for 3 years. Initially, their quarterly revenue was \$6,000.

6. The number of subscribers to a website triples quarterly for 2 years. Initially there were 6 subscribers.

A. $6{,}000 \cdot 1.21^3$

B.

x	0	1	2	3	4	5
y	6,000	7,200	8,640	10,368	12,442	14,930

C. $6 \cdot (3^4)^2$

D.

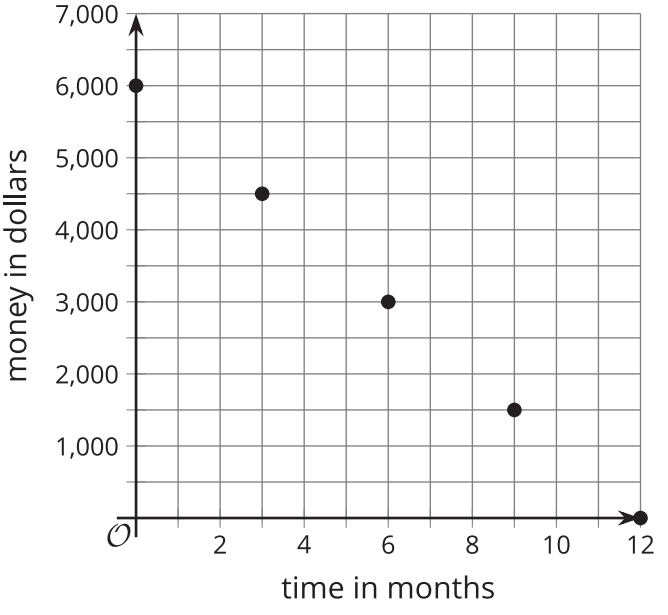
x	0	1	2	3	4	5
y	6,000	4,800	3,840	3,072	2,457.6	1,966.1

E. $6{,}000 \cdot 1.2155^x$

F. $6 \cdot 4{,}096^2$

7. $6{,}000 \cdot ((1.1)^2)^3$

G.



8. The number of likes on a post was 6, and then for the next 2 years, the number of likes doubled, monthly.

H.