MES44QC-LESSON 13 Mr. Pineda

Aim: How do we solve problems involving compound interest?

Do Now:

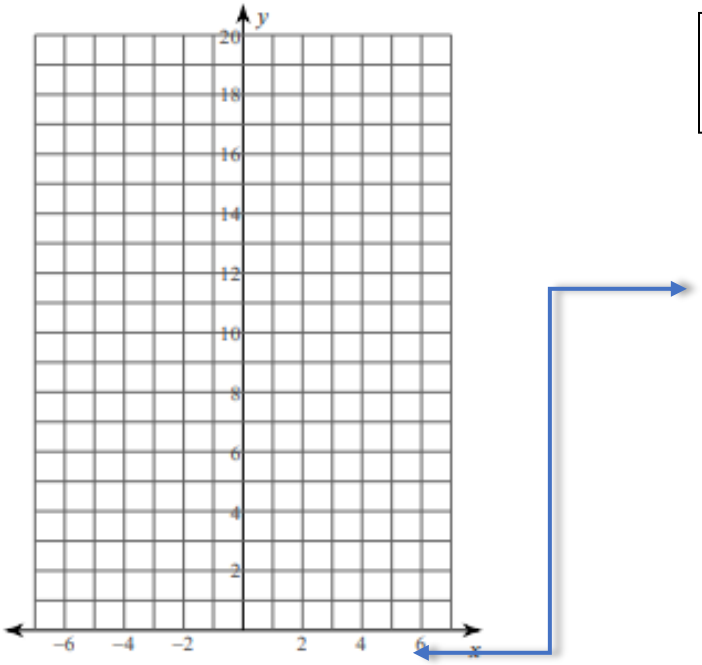
Simplify:

1. $3 \cdot 4^3$
2. $4x^3 \cdot 2x^3$
3. $x^5 \cdot x^3$
4. $2x^3 \cdot 2x^2$

(note: Use additional material for Lesson 13 to help you answer with questions from 1-4)

Sketch the graph of each function.

5) $f(x) = 4 \cdot 2^x$

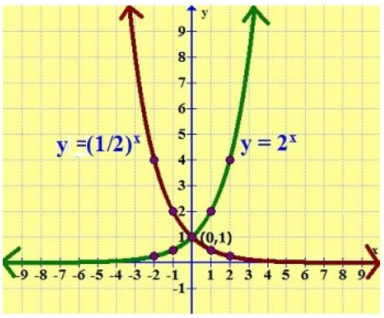


Use the table below to help you with the Graph. The x values were taken from the domain

x	$4 \cdot 2^x$	y	(x,y)
-5			
-4			
-3			
-2			
-1			
0			
1			
2			

I- Exponential Functions

1) Examples



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2) Applications for Exponential Functions
   a) Compound Interest
   b) To show Growth
   c) To show Decay

II- Compound Interest

1) If you walk into a bank and open a savings account, you will earn interest on the money you deposit in the bank. If the interest is calculated once a year then the interest is called "simple interest". If the interest is calculated more than once per year, then it is called "compound interest".
2) The Formula

COMPOUND INTEREST:

$$A = P\left(1 + \frac{r}{100}\right)^{n}$$

where :

A = *total amount after n years*
P = *principal or original value*
r = *rate of interest per annum*
n = *number of years the money is invested*

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Where,

P = principal amount (generated by ***Compound Hustle***)
r = annual nominal interest rate (as a decimal)
n = number of times the interest is compounded per year
t = number of years

3) Example:

Use simple interest to find the ending balance.

1) \$34,100 at 4% for 3 years

2) \$210 at 8% for 7 years

3) 18,000 at 9% compounded annually for 6 years

4) Regents Problem

A student invests \$500 for 3 years in a savings account that earns 4% interest per year. No further deposits or withdrawals are made during this time. Which statement does *not* yield the correct balance in the account at the end of 3 years?

(1) $500(1.04)^3$
(2) $500(1 - .04)^3$
(3) $500(1 + .04)(1 + .04)(1 + .04)$
(4) $500 + 500(.04) + 520(.04) + 540.8(.04)$

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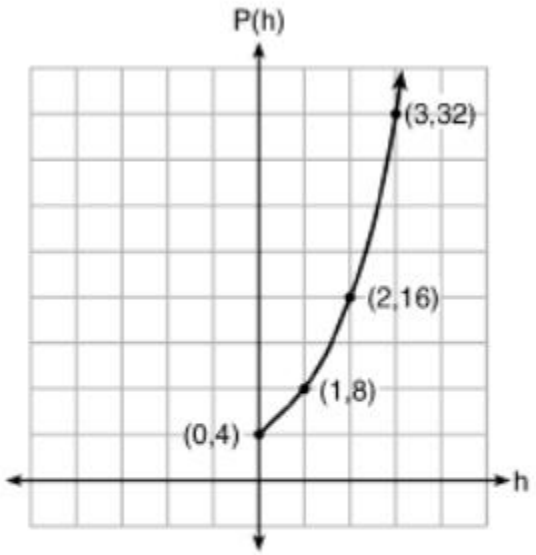
5) Regents Problem

Anne invested \$1000 in an account with a 1.3% annual interest rate. She made no deposits or withdrawals on the account for 2 years. If interest was compounded annually, which equation represents the balance in the account after the 2 years?

(1) $A = 1000(1 - 0.013)^2$
(2) $A = 1000(1 + 0.013)^2$
(3) $A = 1000(1 - 1.3)^2$
(4) $A = 1000(1 + 1.3)^2$

6) Regents Problem

Vinny collects population data, $P(h)$, about a specific strain of bacteria over time in hours, h, as shown in the graph below.



Which equation represents the graph of $P(h)$?

(1) $P(h) = 4(2)^h$
(2) $P(h) = \frac{46}{5}h + \frac{6}{5}$
(3) $P(h) = 3h^2 + 0.2h + 4.2$
(4) $P(h) = \frac{2}{3}h^3 - h^2 + 3h + 4$

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Homework # 13

Use simple interest to find the ending balance.

1) \$34,100 at 4% for 3 years

2) \$210 at 8% for 7 years

3) \$4,000 at 3% for 4 years

4) \$20,600 at 8% for 2 years

5) \$14,000 at 6% for 9 years

6) \$2,300 at 7% for 9 years

7) \$43,800 at 4.8% for 2 years

8) \$35,800 at 8.2% for 3 years

9) \$7,400 at 10.5% for $\frac{1}{4}$ years

10) \$1,900 at 5.9% for $2\frac{3}{4}$ years

11) \$7,300 at 7% compounded semiannually for 3 years

12) \$1,030 at 4% compounded semiannually for 2 years

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Answers to Homework # 13

Please select the best choice number for each question. There are more answers than questions. Answers may be repeated.

1) 24027.84

2) 8973.56

3) 4228.46

4) 38357.86

5) 2224.42

6) 4502.04

7) 359.90

8) 1114.91

9) 23652.71

10) 48105.72

11) 45348.70

12) 7594.25