10ᵗʰ Grade Assignment – Week #28

Group Assignment From *Exponential Growth*

for Tuesday
- **Problem Set #5**, problems #34-41.

for Thursday
- **Problem Set #6**, problems #30-36.

Individual Work

- Next week's assignment will include a test on the material found in a combination of both the previous *Logarithms* unit and the current *Exponential Growth* unit. The (below) Individual Work should help you to prepare for this test.
- From **Problem Set #5** (*Exponential Growth* unit), do problems #1-30
- From **Problem Set #6** (*Exponential Growth* unit), do problems #1-26
- Finish anything from the "Group Assignment" that your group doesn't complete.

— Exponential Growth —

Problem Set #5

Logs and Growth Review!

Calculate each. Use the *Power and Base Tables*, if needed. No Calculators!

1) $64^{-1/2}$

2) $64^{1/3}$

3) $64^{1/6}$

4) 64^{-2}

5) $64^{5/6}$

6) $64^{-4/3}$

7) $\left(\frac{2}{5}\right)^2$

8) $\left(\frac{3}{4}\right)^{-2}$

9) $\left(\frac{64}{343}\right)^{2/3}$

10) $\log_4 64$

11) $\log_4 2$

12) $\log_4 \left(\frac{1}{16}\right)$

13) $\log_4 (-\frac{1}{4})$

14) $\log_5 \left(\frac{1}{625}\right)$

15) $\log_{25} \left(\frac{1}{5}\right)$

16) $\log_{25} (125)$

17) $\log_8 \left(\frac{1}{16}\right)$

18) $\log_4 (\frac{1}{2})$

19) $\log_9 1$

20) $\log_7 0$

21) $\log 0.1$

22) $\log 10,000$

23) $\log_5 (125 \cdot 625)$

24) $\log_2 \left(\frac{1024}{64}\right)$

25) $\log_3 (9^7)$

26) $\log_3 (3^6)$

27) $6^{\log_6 17}$

28) Change to log form:

$$9^{-3/2} = \frac{1}{27}$$

29) Change to exponent form:

$$\log_7 \left(\frac{1}{2401}\right) = -4$$

30) Solve for X.
  a) $5^X = 125$
  b) $x^{-1/2} = \frac{1}{9}$
  c) $\log_x 625 = 4$
  d) $2^{5X+2} = \frac{1}{8}$

e) $\log_4 (2x-3) = -3$

f) $4 + 12 \log_{16}(3x+20) = 13$

g) $17 - 10 \cdot 25^{(3x-1)} = 15$

31) Expand as much as possible: $\log_4 \left(\frac{x^3}{64y}\right)$

32) First estimate the answer to one decimal place, then use your calculator to give an answer rounded to three significant figures.
  a) $\log_3 70$
  b) $\log_9 2$
  c) $4^{2.3}$

33) Calculate by using the common log table. No calculators!
  a) $\log 38,700$
  b) $\log 0.0000542$
  c) $10^{4.84}$
  d) $10^{-4.6}$
  e) $5642 \cdot 398$
  f) $\sqrt[8]{12.5}$

34) Kate has $1107.45 in an account that she started 20 years ago at 2.7% APR (compounded annually). How much money did she initially put into the account?

35) A city's population grew from 53,000 to 230,000 over a 40-year period. What was the average annual growth rate?

36) Karen's investment exactly tripled over an 18-year period. What was her average annual rate of return during this period?

37) At 3.8% APR, how long does it take an account to go
   a) from $800 to $1600 with annual compounding?
   b) from $9000 to $18,000 with annual compounding?
   c) from $800 to $1600 with quarterly compounding?
   d) from $800 to $1600 with monthly compounding?
   e) from $800 to $1600 with continuous compounding?

38) Given an initial deposit of $4200, an APR of 3.1%, and an eight-year period of time that the money is invested in the account, calculate the ending balance given…
   a) annual compounding
   b) quarterly compounding

   c) monthly compounding
   d) daily compounding
   e) continuous compounding

39) Twelve years ago, Jeff purchased a guitar on his credit card for $580, but has not made any payments on this debt. How much does he now owe if the credit card company charges 8.5% APR compounded monthly?

40) John put $3200 into a savings account at 1.8% APR compounded continuously. How long will it take for the account…
   a) to triple?
   b) to reach $5000?

41) Use a calculator to evaluate each.

a) $\dfrac{1}{0!} + \dfrac{1}{1!} + \dfrac{1}{2!} + \dfrac{1}{3!} + \dfrac{1}{4!} + \ldots$

b) $1 + \cfrac{2}{1 + \cfrac{1}{6 + \cfrac{1}{10 + \cfrac{1}{14 + \cfrac{1}{18 + \cfrac{1}{22 + \ldots}}}}}}$

Problem Set #6

Logs and Growth Review Sheet!

Calculate each. Use the *Power and Base Tables*, if needed. No Calculators!

1) 36^{-2}
2) $36^{1/2}$
3) $36^{-1/2}$
4) $25^{-3/2}$
5) $\left(\frac{3}{4}\right)^{-1}$
6) $\left(\frac{25}{36}\right)^{1/2}$
7) $\left(\frac{8}{27}\right)^{-4/3}$

8) $\log_5 (25)$
9) $\log_{25} (5)$
10) $\log_5 (-25)$
11) $\log_5 1$

12) $\log_8 512$
13) $\log_8 \left(\frac{1}{8}\right)$
14) $\log_8 2$
15) $\log_8 \left(\frac{1}{16}\right)$
16) $\log_8 16$
17) $\log 1000$
18) $\log 0.001$
19) $\log_2 (128 \cdot 32)$
20) $\log_6 \left(\frac{46656}{1296}\right)$
21) $\log_5 (625^8)$
22) $\log_{13} (13^4)$
23) $9^{\log_9 3}$
24) Change to log form:
   $5^{-3} = \frac{1}{125}$

25) Change to exponent form:
   $\log_4 32 = \frac{5}{2}$

26) Solve for X.
   a) $x^3 = 64$
   b) $7^X = \frac{1}{49}$
   c) $\log_x 4 = \frac{1}{2}$
   d) $3^{2X-6} = 81$
   e) $\log_8 (3x+5) = -\frac{2}{3}$
   f) $-4 + 5 \log_{10}(50x-500) = 11$
   g) $11 + \frac{1}{4} 2^{(\frac{1}{2}x-2)} = 13$

27) Condense. (i.e., rewrite as one logarithm):
$5\log_6 x - \log_6 y - \log_6 z$

28) First estimate the answer to one decimal place, then use your calculator to give an answer rounded to three significant figures.

a) $\log_5 800$

b) $\log_5 0.3$

c) $5^{-3.2}$

29) Calculate by using the common log table. No calculators!

a) $\log 8350$

b) $\log 0.0077$

c) $10^{6.3}$

d) $10^{-3.1}$

e) $637,100,000 \div 54,800$

f) 17.3^5

30) A town's population grew from 7,540 to 17,008. How long did this take if the average annual growth was 3.6%?

31) A bank account increases by 5.9% annually for 13 years. What is the percentage increase over the 13-year period?

32) The enrollment of a school is increasing by 9% per year. If the enrollment is currently 300 and that growth rate continues indefinitely, then what will the enrollment be…

a) after 20 years?

b) after 100 years?

33) A country's population is growing at 3% annually. How long does it take the population…

a) to double?

b) to increase by 30%?

c) to go from 26 million to 200 million?

34) If a country has a 1.2% annual growth rate, by what percentage does it grow every decade? Every century?

35) John put $3200 into a savings account at 1.8% APR compounded continuously. What is his balance after nine years?

36) Joe put $3200 into a savings account where the interest is compounded continuously. After nine years, the balance is $3900.68. What was the APR of the account?

37) Arie's birth weight was 8 lbs, 13 oz. Then, after one month, he weighed 10 lbs, 14 oz. (This is fairly typical weight gain for the first month.)

a) By what percentage did his weight increase in this first month?

Assuming that this growth rate continues, calculate his weight at…

b) Two months old.

c) Six months old.

d) One year old.

e) Two years old.

f) Four years old.

g) Six years old.

h) Eight years old.

i) Ten years old.

j) Fifteen years old.

k) Twenty years old.

l) Twenty-five years old.

Note: The weight of the earth is approximately $6.6 \cdot 10^{21}$ tons.