# Homework 7-2

1) $P=1$, $A=2$ $\Big\}$ doubling the principal  $r = 7\% = 0.07$

continuous compounding  $A = Pe^{rt}$

$$\underbrace{2}_{y1} = \underbrace{1\,e^{0.07t}}_{y2}$$

use calculator
MENU 5 (GRAPH)
find intersect
(shift F5, then F5)

$X = 9.9$
or about 10 years

2) $f(x) = 2^{x+3} + 4$. shift ~~3up and 4 right~~

this is wrong. shift is 3 units to the left
(x+3 is in the exponent, thus change sign)
and 4 units up (positive "outside" number)

3) half life = 64.128

$$A = \underset{\substack{\uparrow \\ 12}}{P}\left(\tfrac{1}{2}\right)^{\frac{t}{64.128}}$$

← when time = 64.128, then $\frac{64.128}{64.128} = 1$
and $\left(\frac{1}{2}\right)^1 = \frac{1}{2}$, which means
at that time half of the
amount of the substance has
decayed.

$t = 72$?
$A = ?$

$$A = 12\left(\frac{1}{2}\right)^{\frac{72}{64.128}}$$

$= 5.5$

After 72 hours 5.5 mg of
isotope Hg-197 has
remained.

4) $A = P\left(\frac{1}{2}\right)^{\frac{t}{64.9}}$ $t \leftarrow 100$, $P \leftarrow 8$

$A = 8\left(\frac{1}{2}\right)^{\frac{100}{64.9}} = \boxed{2.75}$

2.75mg of isotope Sr-85 has remained after 100 days.

5) $A = Pe^{rt}$ continuous compounding formula

$P = 2000$ $r = 5.5\% = 0.055$

a) $A = ?$ when $t = 10$

$A = 2000 \cdot e^{0.055 \cdot 10} = 2000\,e^{0.55} = 3466.51$

I will have \$3466.51 in the account after 10 years.

b) $A = 5000$, $t = ?$ $A = Pe^{rt}$

$\frac{5\cancel{000}}{2\cancel{000}} = \frac{\cancel{2000}\,e^{0.055t}}{\cancel{2000}}$

$\ln\frac{5}{2} = \cancel{\ln e}^{0.055t}$

$\frac{\ln\frac{5}{2}}{0.055} = \frac{\cancel{0.055}\,t}{\cancel{0.055}}$

$t = 16.66$ It would take about 16.66 years (16 years 8 months) to reach \$5000

# HOMEWORK 7-3

1) $9^2 = 81$

$\log_9 81 = 2$

2) $\frac{1}{64} = \left(\frac{1}{4}\right)^3$

$\log_{\frac{1}{4}} \frac{1}{64} = 3$

3) $8^3 = 512$

$\log_8 512 = 3$

4) $\left(\frac{1}{3}\right)^{-2} = 9$

$\log_{\frac{1}{3}} 9 = -2$

5) $2^9 = 512$

$\log_2 512 = 9$

6) $4^5 = 1024$

$\log_4 1024 = 5$

7) $5^4 = 625$

$\log_5 625 = 4$

8) $10^{23} = 0.001$

this is incorrect!

please write $-3$ instead of 23

$10^{-3} = 0.001$

$\log 0.001 = -3$ (if base is 10 we do not write it)

Evaluate each log:

9) $\log_2 128 = 7$

because $2^7 = 128$

10) $\log_4 32 = 2.5$

$4^x = 32$

$(2^2)^x = 2^5$

$2x = 5$

$x = 5/2$ or $2.5$

11) $\log_9 27 = 1.5$

$9^x = 27$

$(3^2)^x = 3^3$

$2x = 3$

$x = 3/2$ or $1.5$

12) $\log_2 -32 = DNE$ (does not exist)

because 2 to any power is always positive

13) $\log_{\frac{1}{3}} \frac{1}{9} = 2$

because $\left(\frac{1}{3}\right)^2 = \frac{1}{9}$

14) $\text{Log}\, 100{,}000 = 5$

because $10^5 = 100{,}000$

15) $\log_7 7^6 = 6$

16) $\text{Log}_3 \frac{1}{81} = -4$

because $3^{-4} = \frac{1}{81}$

17) $y = \log_3 x - 2$

is $\log_3 x$ translated 2 units down

18) $\log_8 (x-8)$

is $\log_8 x$ translated 8 units to the right ("inside number" changes sign)

19) $y = \log_6 (x+1) - 5$

is $\log_6 x$ translated 1 unit left and 5 units down

20) $y = \log_2 (x-4) + 1$

is $\log_2 x$ translated 4 units right, and 1 unit up.

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write in exponential form

equals

21) $\log_4 256 = 4$

to the power

$4^4 = 256$

22) $\log_7 1 = 0$

$7^0 = 1$

23) $\log_2 32 = 5$

$2^5 = 32$

24) $\log 10 = 1$

$10^1 = 10$

25) $\log_5 5 = 1$

$5^1 = 5$

26) $\log_8 \frac{1}{64} = -2$

$8^{-2} = \frac{1}{64}$

27) $\log_2 \underset{\substack{\uparrow \\ 32}}{N} = t$ $\qquad \log_2 32 = t$

$t = 5$ because $2^5 = 32$