The half-life of a certain medicine is 40 minutes. If a patient is given a 200mg dose at 9:00 am how many mg of the medicine is still in their system at 3:00pm?

$200(.5)^9 = \boxed{.39 \text{ mg}}$

6hrs x 60
= 360 min
÷40
9

The number of cells of a certain virus doubles every 45 minutes. If there are 120 cells at 11:30 pm how many cells will there be at 5:00 am the next day?

$y = 120(2)^{330/45}$
$= \boxed{19,352 \text{ cells}}$

5.5 hrs x 60
= 330 min
÷45
$7.\overline{333}$

don't use a rounded value for x. Use the fraction 330/45 instead.

You can now finish Hwk #24

Sec 8-1

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Problems 9, 20-23, 35-38, 45-48

The value of an investment is increasing 8% each year.
If the investment's value today is $125,000 find the number of years, to the nearest hundredth, it will take to reach $1,000,000.

$125,000(1.08)^x = 1,000,000$

graphing both sides separately and finding the x-coordinate of the point of intersection leads to x = 27.02 yrs

Find the value of x in each equation:
Round to the nearest hundredth when needed.

1. $\frac{12x}{12} = \frac{600}{12}$ $x = 50$

2. $\sqrt[3]{64} = \sqrt[3]{x^3}$ $x = 4$

3. $10^5 = x$ $x = 100{,}000$

4. $10^x = 200$ X approx $\underline{2}$ to $\underline{3}$

Every math operation has it's inverse.

Inverse operations "undo" each other.

We solve equations by using inverses to get the variable by itself.

| Given Operation | Inverse Operation |
|---|---|
| Addition | Subtraction |
| Division | Multiplication |
| Squaring | Square Root |
| Cube Root | Cubing |

Find the equation of the inverse for this function:

$$y = \sqrt{\frac{4x^3 - 7}{8}} + 1$$

switch x and y then solve for y.

$$\cancel{X} = \sqrt{\frac{4\cancel{x}y^3 - 7}{8}} + 1$$

$$f^{-1} = \sqrt[3]{\frac{8(x-1)^2 + 7}{4}}$$

Find the equation of the inverse.

$$y = 10^x$$

To solve for x in an exponential equation: $y = 10^x$
we use the inverse operation called:

Logarithm

The abbreviation for Logarithm is: Log

Sec 8-3: Logarithms
(the inverse of exponential functions)

Exponential Function

$$y = b^x$$

The base of the Exponential Function

The exponent

Logarithmic Function

$$\log_b y = x$$

The base of the Logarithmic Function

<u>Exponential Function</u>:

$$y = b^x$$

<u>Logarithmic Function</u>:

"Log, base b, of y equals x"

$$\log_b y = x$$

The base is the base

The exponent is the answer

Another way to remember Logarithmic Form:

| Exponential Form: | becomes | Lograrithmic Form: |
| --- | --- | --- |
| $x = y^z$ | | $z = \mathrm{Log}_y x$ |

| Exponential Equation | Logarithmic Equation |
| --- | --- |
| Range: $y>0$ | $\log_b y = x$ |
| Domain: Any real number | Range: Any real number |
| $y = b^x$ | Domain: $x > 0$ |
| $b>0,\ b\neq 1$ | b: $b>0,\ b\neq 1$ |