Warmup 10-28-13

(a) Find the solution of the equation $x^2 - 5x - 24 = 0$.

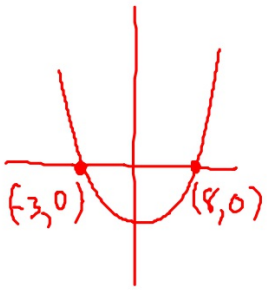
$a \quad b \quad c$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$(x+3)(x-8)$

$x+3=0 \quad x-8=0$

$x=-3 \quad x=8$



(b) The equation $ax^2 - 9x - 30 = 0$ has solution $x = 5$ and $x = -2$. Find the value of a.

1. 30
2. 15
3. 10
5. 6

$ax^2 - 9x - 30 = 0$

$(x^2 - 3x - 10) = 0$

$(x+2)(x-5) = 0$

$x = -2 \quad x = 5$

$(x-5)(x+2)$

$(x-5)(x+2)$

$3(x^2 - 3x - 10) = 0$

Number Systems Review

Consider the numbers $\sqrt{3}$, 6, $2\frac{1}{2}$, π, -5, and the sets $\mathbb{N}$, $\mathbb{Z}$, and $\mathbb{Q}$. Complete the following table by placing a tick in the appropriate box if the number is an element of the set.

	$\sqrt{3}$	6	$2\frac{1}{2} = \frac{5}{2}$	π	-5
$\mathbb{N}$	✗	✓	✗	✗	✗
$\mathbb{Z}$	✗	✓	✗	✗	✓
$\mathbb{Q}$	✗	✓	✓	✗	✓
$\mathbb{R}$	✓	✓	✓	✓	✓

Evaluating Exponential Functions

If $f(x) = 2^x - 3$, find:

a $f(2)$ **b** $f(1)$ **c** $f(0)$ **d** $f(-1)$ **e** $f(-2)$

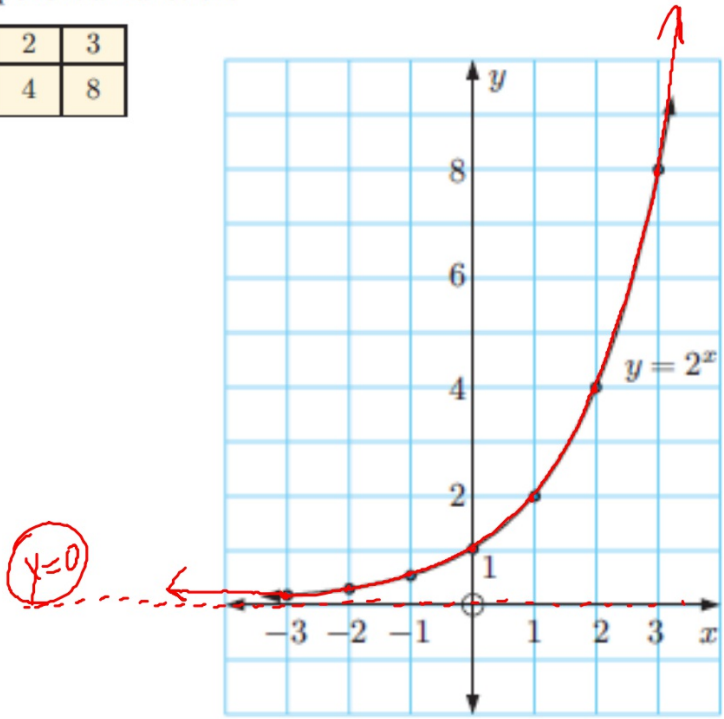
$2^0 - 3$

1

Graphing of Exponential Functions

For example, $y = 2^x$ is an exponential function.

x	-3	-2	-1	0	1	2	3
y	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8



Graphing Exponential Function using T-Tables

1 Consider the exponential function $y = 4^x$.

a Copy and complete the table of values.

x	-3	-2	-1	0	1	2	3
y			$\frac{1}{4}$	1	4		

.....

.....

f $y = 4^x$.

ii As $x \to -\infty$, $y \to$ .....

Growth & Decay Models of Exponential Functions

A weed in a field covers an area of $A(t) = 3 \times (1.08)^t$ square metres after t days.

initial — growth or Decay factor

a Find the initial area the weed covered.

b Find the area after: **i** 2 days **ii** 10 days **iii** 30 days.

c Sketch the graph of $A(t)$ against t using the results of **a** and **b** only.

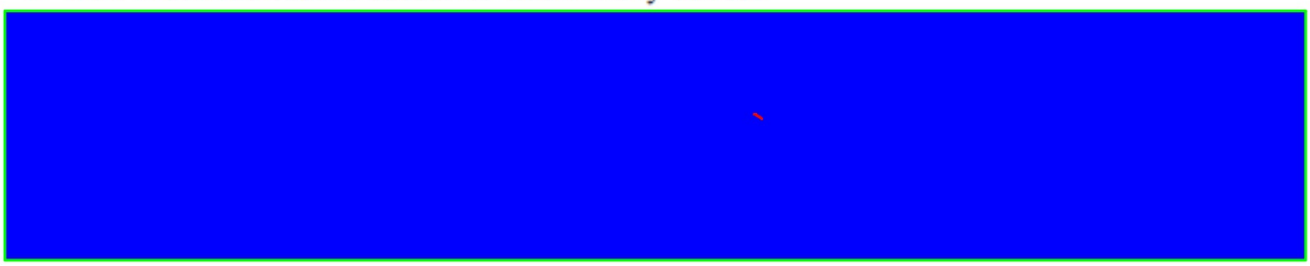
d Use technology to graph $A(t)$ and check your answers to **a**, **b**, and **c**.

t	$A(t)$
2	
10	
30	

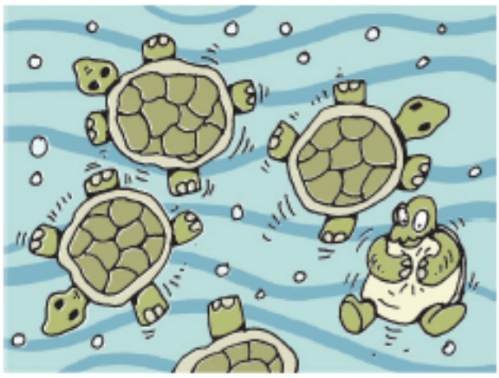
Growth & Decay Models of Exponential Functions

1 The weight of a radioactive substance t years after being buried is given by $W(t) = 250 \times (0.998)^t$ grams.

a How much radioactive substance was initially buried?



The population of turtles in a lake decreases by 7% each year. In 2005 there were 340 turtles in the lake.



a Find an exponential model for the number of turtles T in the lake, n years after 2005.

b Graph your model from **a**.

c How many turtles were in the lake in 2010?

d If the population falls as low as 10, conservationists will not be able to save the turtle colony. According to your model, when will this occur?

48 yrs

a.) $y = 340 \times (0.93)$

c.) $y = 340 \times 0.93^{5} = 236.53$

≈ 236

d.) $10 = 340 \times (0.93)^{x}$

$x \approx 48$ yrs

Solving Exponential Functions using Technology

1 Solve using technology:

a $2^x = 20$ $x = 4.322$ **b** $2^x = 100$ **c** $3^x = 30$

d $(1.2)^x = 3$ **e** $(1.04)^x = 4.238$ **f** $(0.9)^x = 0.5$

2 Solve using technology:

a $3 \times 2^x = 93$ **b** $40 \times (0.8)^x = 10$ **c** $8 \times 3^x = 120$

$\frac{3}{3} \quad \frac{93}{3}$

$2^x = 31$

$y = 2^x$

$y = 20$

$2^x = 20$

$y = 3$

$y = 3 \times 2^x$

$y = 93$