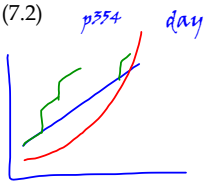
Transforming Exponential Functions (7.2) p354 day 2



Thomas Malthus

We're all going to die

Growth of resources

Growth of population

ential Functions (7.2) p355

12. Statistics indicate that the world population since 1995 has been growing at a rate of about 1.27% per year. United Nations records estimate that the world population in 2011 was approximately 7 billion. Assuming the same exponential growth rate, when will the population of the world be 9 billion?

2#7b, 9, 10, 12

1.27%

1.0127

2011 7

2012 7(1.0127)

$7(1.0127)^n = 9$

$1.0127^n = 1.2$

7. A flu virus is spreading through the student population of a school according to the function $N = 2^t$, where N is the number of people infected and t is the time, in days.
a) Graph the function. Explain why the function is exponential.
b) How many people have the virus at each time?
i) at the start when $t = 0$
ii) after 1 day
iii) after 4 days
iv) after 10 days

10. The CANDU (CANa Uranium) reactor is pressurized heavy-v uranium-235 (U-23 of approximately 7(
a) What exponentia used to represen decay of 1 kg of variables you us
b) Graph the functi
c) How long will it to decay to 0.12
d) Will the sample 0 kg? Explain.

9. Scuba divers know that the deeper they dive, the more light is absorbed by the water above them. On a dive, Petra's light meter shows that the amount of light available decreases by 10% for every 10 m that she descends.

a) Write the exponential function that relates the amount, L, as a percent expressed as a decimal, of light available to the depth, d, in 10-m increments.
b) Graph the function.
c) What are the domain and range of the function for this situation?
d) What percent of light will reach Petra if she dives to a depth of 25 m?

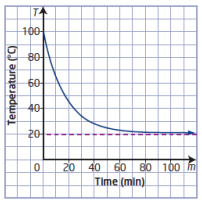
Transforming Exponential Functions (7.2) p354 day 2

don't write this down!

A cup of water is heated to 100 °C and then allowed to cool in a room with an air temperature of 20 °C. It is found that the temperature of the water decreases exponentially at a rate of 25% every 5 min.

Develop a function that models this situation.

answer later



Transforming Exponential Functions (7.2) p354 day 2

How does changing the value of k change the graph?

$y = a(c)^{b(x-h)} + k$

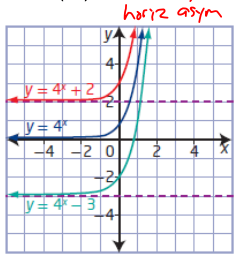
horiz asym

ex1: Sketch

$y = 4^x$

$y = 4^x + 2$

$y = 4^x - 3$



moves y-intercept and horiz asymptote

Transforming Exponential Functions (7.2) p354 day 2

How does changing the value of h change the graph?

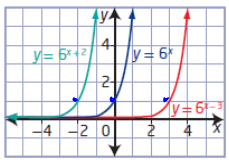
$y = a(c)^{b(x-h)} + k$

ex2: Sketch

$y = 6^x$

$y = 6^{x+2}$ 2 left

$y = 6^{x-3}$ 3 right



moves the y-intercept

Transforming Exponential Functions (7.2) p354 day 2

How does changing the value of a change the graph?

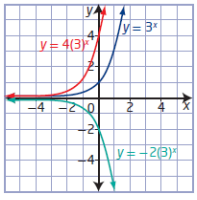
$y = a(c)^{b(x-h)} + k$

ex3: Sketch

$y = 3^x$

$y = 4(3)^x$

$y = -2(3)^x$



a is distance between asymptote and y-intercept

Transforming Exponential Functions (7.2) p354 day 2

How does changing the value of b change the graph?

$y = a(c)^{b(x-h)} + k$

ex4: Sketch

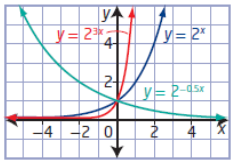
$y = 2^x$

$y = 2^{3x}$

$(2^3)^x$

horiz comp

$y = 2^{-0.5x}$



b is usually a fraction that slows down the function

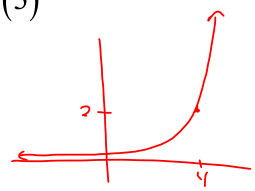
-b means decay

Transforming Exponential Functions (7.2) p354 day 2

ex5: Sketch and describe $y = 2(3)^{x-4}$

vert str 2

horiz trans 4 right



3ab, 4

Transforming Exponential Functions (7.2) p354 day 2

ex6: A cup of water is heated to 100 °C and then allowed to cool in a room with an air temperature of 20 °C. It is found that the temperature of the water decreases exponentially at a rate of 25% every 5 min.

0.75

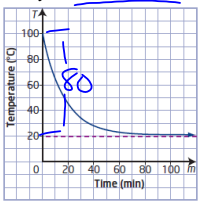
a) Develop a function that models this situation.

$T(t) = 80(0.75)^{\frac{t}{5}} + 20$

b) Find the temp after 20 minutes.

$T(20) = 80(0.75)^{\frac{20}{5}} + 20$

$= 45.3°C$



c) What do each of the numbers in this function mean?

Transforming Exponential Functions (7.2) p354 day 2

hw: p354 #3cde, 7ab