8.3 Part 2 The Number *e*

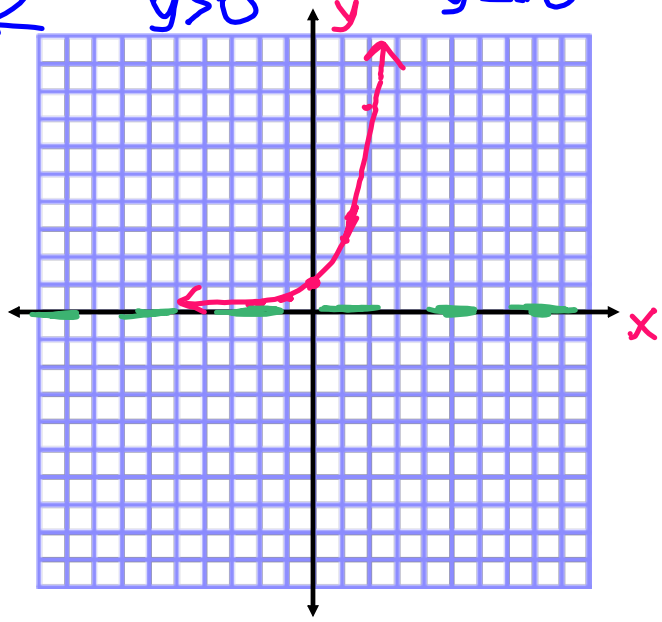
Sketch the graph of the functions.

State the domain, range, and asymptote.

$f(x) = e^x + 0$

R y>0 y y=0

x	y
−2	.135
−1	.368
0	1
1	2.718
2	7.389



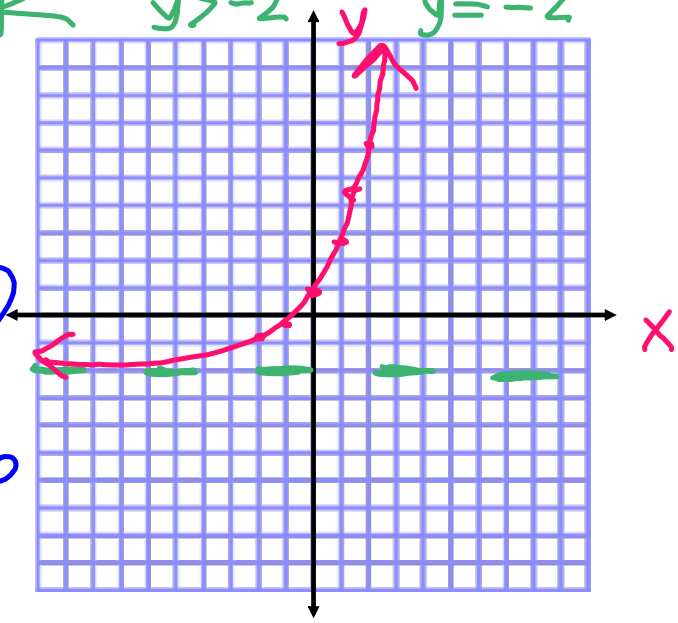
Sketch the graph of the functions.

State the domain, range, and asymptote.

asym: R y>−2 y y=−2

$g(x) = 3e^{.5x} - 2$

x	y
−2	−.896
−1	−.180
0	1
1	2.946
2	6.155



$x+2=0$
$-2\ \ -2$
$x=-2$

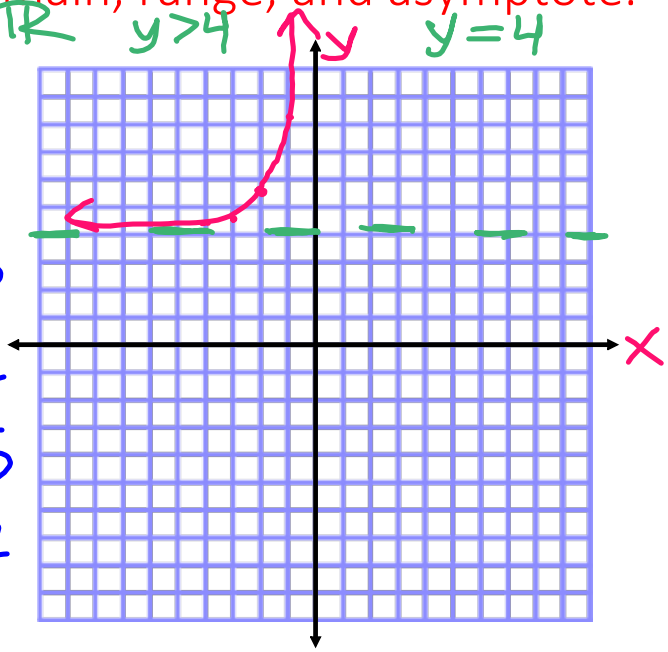
Sketch the graph of the functions.

State the domain, range, and asymptote.

asy.

$y = \frac{3}{2}e^{x+2} + 4$

x	y
−4	4.203
−3	4.552
−2	$\frac{11}{2} = 5.5$
−1	8.077
0	15.083



Continuous Compound Interest

$$A(t) = Pe^{rt}$$

$A(t)$ = the amount of $ after t years

P = the amount of $ invested or borrowed

e = e

r = the percent as a decimal

t = the number of years

Example

You deposit $1500 in an account that pays 12% annual interest compounded continuously. What is the balance after 1 year?

P, 12% = .12 = r, t = 1

$y = Pe^{rt}$

$y = 1500e^{(.12)(1)}$

$y \approx \$1691.25$

Example

Sallie deposits $2800 in an account that pays 7.5% annual interest compounded continuously. What is the balance after 2 years?

7.5% = .075

$y = 2800e^{(.075)(2)}$

$y \approx \$3253.14$

Example

A radioactive substance decays in such a way that the amount of mass remaining after t days is given by the function $m(t) = 13e^{-0.015t}$ where $m(t)$ is measured in kg.

a) Find the mass at time $t = 0$.

$m(0) = 13e^{-0.015(0)}$

$m(0) = 13$ kg

b) How much of the mass remains after 20 days?

$m(20) = 13e^{-0.015(20)}$

$m(20) \approx 9.6$ kg

c) How much of the mass remains after 45 days?

$m(45) \approx 6.62$ kg