PRACTICE Exponential Transformations and Sketches

For each of the following:
a. state the parent function
b. state the transformations BEFORE you simplify the equation
c. predict if this is growth or decay
d. identify the asymptote and domain & range
e. sketch using the simplified form.

1. $f(x) = (0.8)^{3x} - 3$
2. $g(x) = 5(3.5)^{\frac{x-8}{2}} - 10$
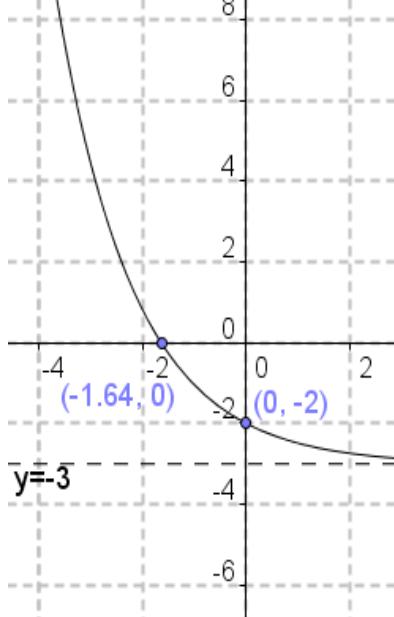3. $h(x) = -0.5(2)^{4-1.5x} + 8$
4. $p(x) = -4(0.9)^{10-2x}$
5. $q(x) = -400(3.1)^{x-5} + 2$
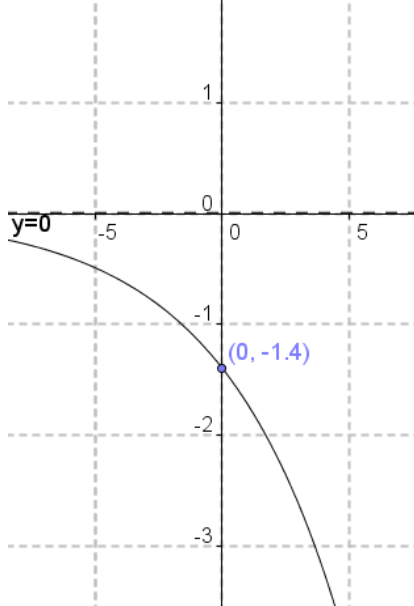6. $r(x) = 7(0.55)^{\frac{x}{4}} - 5$
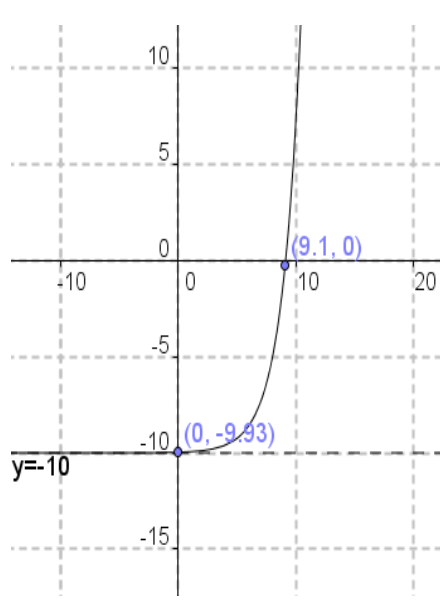
ANSWERS

All domains are real numbers

1. $f(x) = (0.8)^{3x} - 3$
Y=0.8^x, horiz compress,
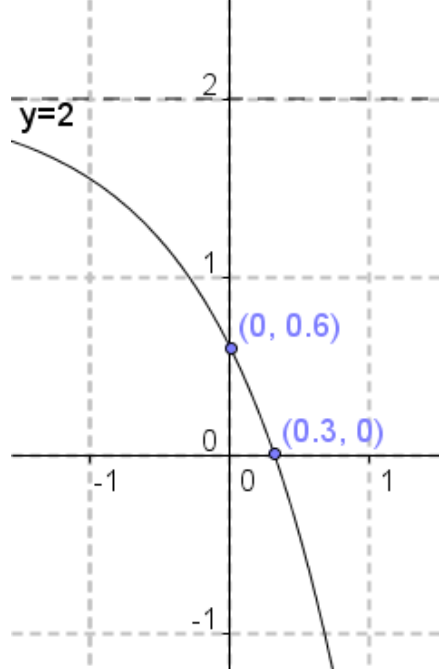shift down 3
Range y>-3
simplified $y = (0.512)^x - 3$

(-1.64, 0)   (0, -2)
y=-3

2. $g(x) = 5(3.5)^{\frac{x-8}{2}} - 10$
Y=3.5^x, vert. stretch, horiz stretch,
shift right 8 and down 10
Range y>-10
simplified $y = 0.033(1.87)^x - 10$

(9.1, 0)
(0, -9.93)
y=-10

3. $h(x) = -0.5(2)^{4-1.5x} + 8$
Y=2^x, reflect in x-axis, vert. compress,
reflect in y-axis, horiz compress,
shift right by 8/3, up by 8
Range y<8
simplified $y = -8(0.35)^x + 8$

y=8
(0, 0)

4. $p(x) = -4(0.9)^{10-2x}$
Y=0.9^x, reflect in x-axis, vert
stretch, reflect in y-axis, horiz
compress, shift right 5
Range y<0
simplified $y = -1.4(1.23)^x$

y=0
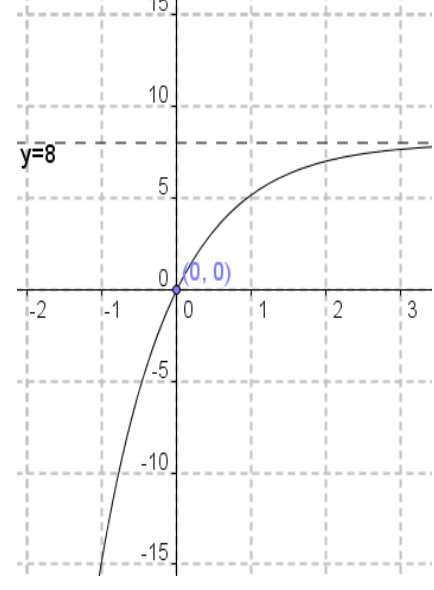(0, -1.4)

5. $q(x) = -400(3.1)^{x-5} + 2$
Y=3.1^x, reflect in x-axis, vert.
stretch, shift right 5, up 2
Range y<2
simplified $y = -1.4(3.1)^x + 2$

y=2
(0, 0.6)
(0.3, 0)

6. $r(x) = 7(0.55)^{\frac{x}{4}} - 5$
Y=0.55^x, vert stretch, horiz stretch, shift
down 5
Range y>-5
simplified $y = 7(0.86)^x - 5$

(0, 2)
(2.25, 0)
y=-5

2