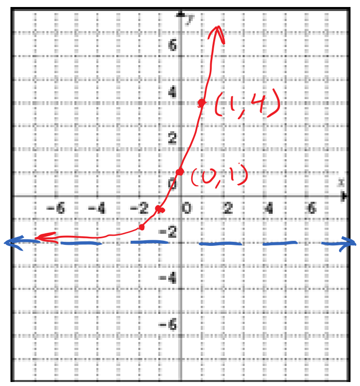
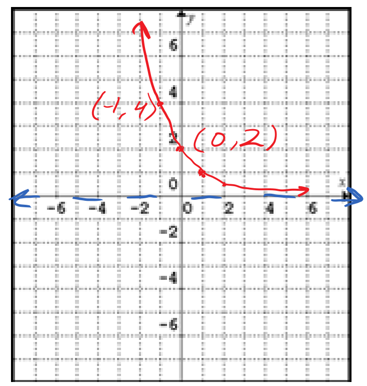
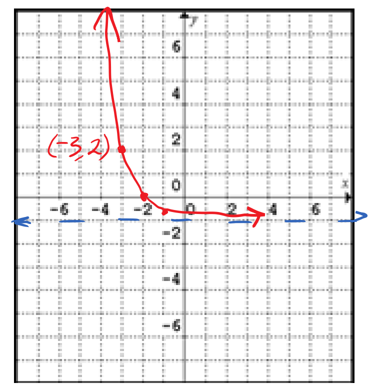
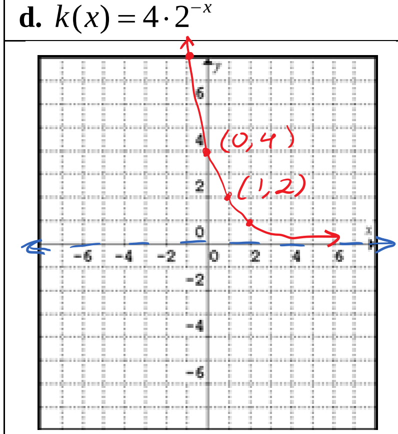
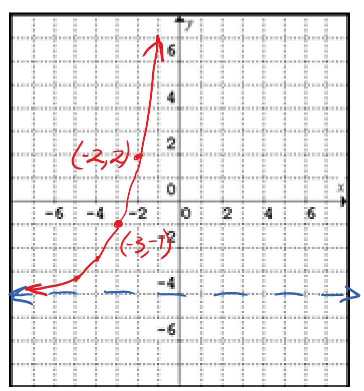
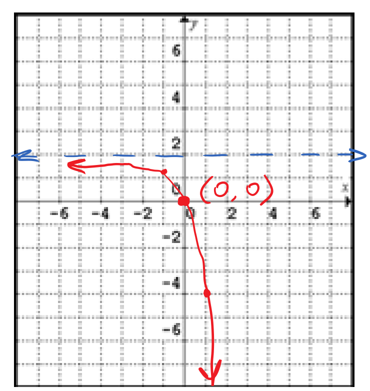
Name: Key **Class Period:** ________ **Date:** ___________

Algebra 2 **6.1-6.2 Review WS**

1. Sketch each graph, then answer the questions. ***NC*** *Note: AROC = Ave. Rate of Change*

a. $f(x)=3\cdot 2^{x}-2$	**b.** $g(x)=2\left(\frac{1}{2}\right)^{x}$	**c.** $h(x)=3^{-(x+2)}-1$
		
Domain: $x\in\mathbb{R}$	***y*-intercept:** $(0,2)$	***x*-intervals where** $h(x)>0$ $x\in(-\infty,-2)$
Range: $f(x)\in(-2,\infty)$	**Range:** $g(x)\in(0,\infty)$	***x*-intervals where** $h(x)<0$ $x\in(-2,\infty)$
***y*-intercept:** $(0,1)$	**End Behavior:** as $x\to\infty$, $g(x)\to 0^+$ as $x\to-\infty$, $g(x)\to\infty$	**Asymptote:** $y=-1$
d. $k(x)=4\cdot 2^{-x}$	**e.** $m(x)=3(2)^{x+3}-4$	**f.** $n(x)=-2\cdot 3^{x}+2$
		
AROC on $x\in[-1,1]$ $\frac{8-2}{-1-1}=-3$	**AROC on** $x\in[-3,-2]$ $\frac{-1-2}{-3--2}=3$	**AROC on** $x\in[-1,1]$ $\frac{\frac{4}{3}--4}{-1-1}=\frac{16}{3}\cdot\frac{-1}{2}=\boxed{\frac{-8}{3}}$
End Behavior: as $x\to\infty$, $k(x)\to 0^+$ as $x\to-\infty$, $k(x)\to\infty$	**Range:** $m(x)\in(-4,\infty)$	***x*-intervals where** $n(x)<0$ $x\in(0,\infty)$
***x*-intervals where** $k(x)>0$ $x\in(-\infty,\infty)$	***y*-intercept:** $(0,20)$	**Asymptote:** $y=2$

2. Write the equation for an exponential function with base 6 that has been reflected across the *y*-axis, vertically dilated by a scale factor of 12, translated right 2 and down 4.

$$\boxed{y=12\cdot 6^{-(x-2)}-4}$$

3. Calculate the account value if the principal is \$50,000, the interest rate is 4.5%, the compounding period is quarterly, and the investment is left untouched for 20 years. ***C***

$A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$

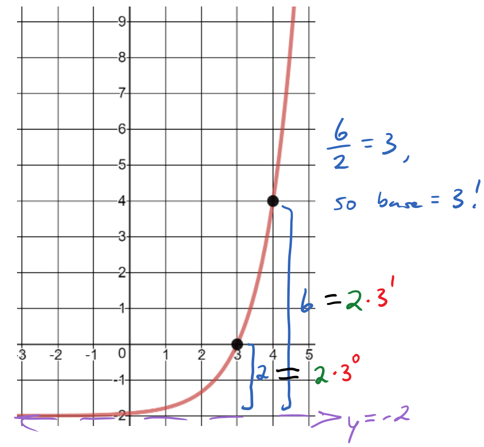
$A(20) = 50{,}000\left(1 + \frac{0.045}{4}\right)^{4 \cdot 20}$

$\boxed{A(20) \approx \$122{,}363.75}$

4. Write an exponential function for the graph shown. ***NC***

VD by s.f. of 2; translate right 3 + down 2

$\boxed{\therefore\ y = 2 \cdot 3^{x-3} - 2}$



5. A ball rebounds to a height of 30.0 cm on the third bounce (3, 30.0) and to a height of 5.2 cm on the sixth bounce (6, 5.2). ***C***

a. Write an equation for the exponential function of the form $h(n) = ab^n$, where n is the number of bounces and $h(n)$ is the height the ball reaches in cm.

$30 = a \cdot b^3$

$a = \frac{30}{b^3}$

$5.2 = \left(\frac{30}{b^3}\right)b^6$

$b^3 = \frac{5.2}{30}$

$b = \left(\frac{5.2}{30}\right)^{1/3} \approx 0.5575631\ldots$

$\therefore a \approx 173.0769231$

$\boxed{\therefore\ h(n) = 173.077(0.558)^n}$

b. From what height was the ball initially dropped?

$h(0) = 173.077(0.558)^0$ -OK- you know a is initial value!

$\boxed{\therefore \text{ The ball was dropped from about } 173.077 \text{ cm.}}$

6. A radioactive sample was created in 1980. In 2002, a technician measures the radioactivity at 42.0 rads. One year later the radioactivity is 39.8 rads. ***C***

a. Write an equation for the exponential function of the form $r(t) = ab^t$, where t is the number of years since 1980 and $r(t)$ is the radioactivity level of the sample in rads.

(22, 42) & (23, 39.8)

$42 = ab^{22}$

$a = \frac{42}{b^{22}}$

$39.8 = \frac{42}{b^{22}} \cdot b^{23}$

$b = \frac{39.8}{42} \approx 0.947619\ldots$

$\therefore a \approx 137.1848314$

$\boxed{\therefore\ r(t) = 137.185(0.948)^t}$

b. Calculate the radioactivity in 1980.

$r(0) = a$!

$\boxed{\therefore \approx 137.185 \text{ rads}}$

c. Predict the radioactivity in 2021.

$r(41) = 137.185(0.948)^{41}$

$\boxed{\therefore \text{ In 2021, the radioactivity is about } 15.362 \text{ rads}}$