

**Algebra 1 CC**  
**Assignment #60**  
**Linear Versus Exponential**  
**\* Optional**

1. For each of the following problems a table of values is given where  $\Delta x = 1$ . For each, first determine if the table represents a linear function, of the form  $y = mx + b$ , or an exponential function, of the form  $y = a(b)^x$ . Then, write its equation.

(a)

$x$	-1	0	1	2	3
$y$	4	7	10	13	16

(b)

$x$	0	1	2	3	4
$y$	2	6	18	54	162

(c)

$x$	-2	-1	0	1	2
$y$	32	16	8	4	2

(d)

$x$	-2	-1	0	1	2
$y$	32	16	0	-16	-32

\*(e)

$x$	0	1	2	3	4
$y$	16	20	25	$31\frac{1}{4}$	$39\frac{1}{16}$

\*(f)

$x$	0	1	2	3	4
$y$	180	160	140	120	100

2. The data shown in the table below represents either a linear or an exponential function. Which of the equations below best models this data set?

(1)  $y = 5(2)^x$

(3)  $y = 2x + 10$

(2)  $y = 10(2)^x$

(4)  $y = 10x + 5$

$x$	1	2	3	4
$y$	10	20	40	80

3. Wildlife biologists are tracking the population of albino deer in an upstate New York forest preserve. They record the population every year since 2005, which they consider to be  $t = 0$ . Their data is shown in the table below.

Year	2005	2006	2007	2008	2009	2010
$t$	0	1	2	3	4	5
Population	86	98	111	128	147	168

(a) Although neither a linear nor an exponential function would model this data perfectly, justify why an exponential function would be a much better fit. Specifically, explain both why a linear function would *not* be a good fit while an exponential would be reasonable.

(b) Determine an equation for an exponential that models this data set in the form  $P = a(b)^t$ .

(c) Use your model to predict the population of deer in the year 2014.

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\*R1. Solve for a:  $2S = n(a + 1)$

\*R2. Simplify:  $2(4y - 1) + 5(y - 6)$

\*R3. Simplify:  $\frac{24xy^8z^{10}}{-6xy^2z^2}$

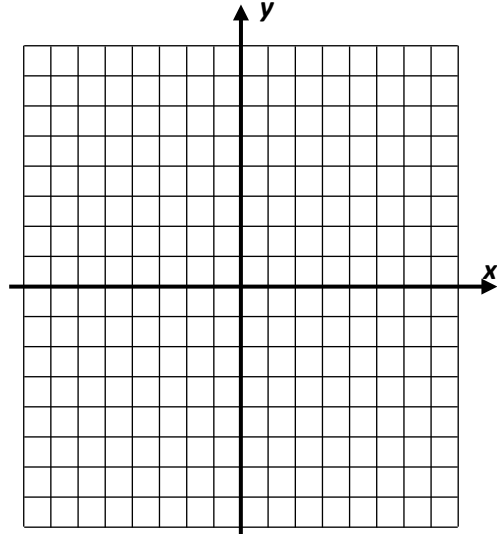
\*R4. Simplify:  $x^2 + 5x(x + 2) - 10x$

R5. Find the area of the triangular region defined by the system of inequalities shown below.

$$y \geq x$$

$$x \geq -3$$

$$y \leq 6$$



1. (a) Linear  $y=3x+7$

(b) Exponential  $y=2(3)^x$

(c) Exponential  $y = 8\left(\frac{1}{2}\right)^x$

(d) Linear  $y = -16x$

(e) Exponential  $y=16(1.25)^x$

(f) Linear  $y = -20x+180$

2. (1)

3. (a) The amount change each year is not a constant number but rather a percent increase that averages about 10%.

(b)  $P = 86(1.1)^t$

(c) 203

R1.  $\frac{2S}{n} - 1$

R2.  $13y - 32$

R3.  $-4y^6z^8$

R4.  $6x^2$

R5. 40.5