

7.1 – Exponential Functions

PRACTICE 7.1

Solve each equation for the unknown variable.

1. $27^{3x} = 9$
 $(3^3)^{3x} = 3^2$
 $3^{9x} = 3^2$
 $9x = 2$
 $x = \frac{2}{9}$

2. $25^{-k} \cdot 5^3 = 625$
 $(5^2)^{-k} \cdot 5^3 = 5^4$
 $5^{-2k} \cdot 5^3 = 5^4$
 $5^{-2k+3} = 5^4$
 $-2k+3 = 4$
 $k = -\frac{1}{2}$

3. $(\frac{1}{3})^{-3x+3} = 27^x$
 $(3^{-1})^{-3x+3} = (3^3)^x$
 $3^{3x-3} = 3^{3x}$
 $3 = 3$
 $3x-3 = 3x$
 $-3x = -3x$
 $-3 = 0$
NO Solution!

4. $(5^{2x})(x+2) = 1$
 $5^{2x^2+4x} = 5^0$
 $2x^2+4x = 0$
 $2x(x+2) = 0$
 $2x = 0$ or $x+2 = 0$
 $x = 0$ or $x = -2$

5. $\frac{(7)^{4x^2}}{7^8} = 7$
 $4x^2 - 8 = 1$
 $7 = 7$
 $4x^2 - 8 = 1$
 $4x^2 - 9 = 0$
 $(2x-3)(2x+3) = 0$
 $x = \pm \frac{3}{2}$

6. $32^{-3a-2} = 64^{a-1}$
 $(2^5)^{-3a-2} = (2^6)^{a-1}$
 $2^{-15a-10} = 2^{6a-6}$
 $-15a-10 = 6a-6$
 $-4 = 21a$
 $-\frac{4}{21} = a$

7. The website Bankrate.com publishes a weekly list of the top savings deposit yields. In the category of 3-year certificates of deposit, the following were listed. Which bank should you chose for a \$5000 investment? Decide by completing the table. **BEAN COUNTERS ARE THE CHEAPEST!**

Bank	APR	Compounded	Initial Investment	Value after 3 Yrs
The Brust Price Bank	3.12%	Quarterly $n=4$	\$5000	5488.61
Sully.com	3.00%	Daily $n=365$	\$5000	5470.85
Kelly-Green\$ Bank	2.96%	Monthly $n=12$	\$5000	5463.71
BeanCounters.com	2.75%	Continuously	\$5000	5429.99

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

$A = Pe^{rt}$

8. Find each missing value in the table.

Initial Value	% Change	Growth or Decay?	Equation
1.25	Loss of 25%	Decay	$y = 1.25(1 - 0.25)^x$
1.25	GAIN 25%	GROWTH	$y = 1.25(1.25)^x$
0.75	GAIN 25%	GROWTH	$y = 0.75(1.25)^x$
0.75	LOSS 25%	DECAY	$y = 0.75(0.75)^x$
3	GAIN 100%	GROWTH	$y = 3(2)^x$
-5	Loss of 94%	DECAY	$y = -5(.06)^x$
2.45	Gain of 415%	GROWTH	$y = 2.45(5.15)^x$
a	Loss of r%	DECAY	$y = a(1-r)^x$

$100\% - 94\% = 6\%$

7.1 – Exponential Functions

9. The equation $y = 25,000(1 + 0.04)^x$ models the salary of an employee who receives an annual raise.

Give the meaning of each number and variable in this equation.

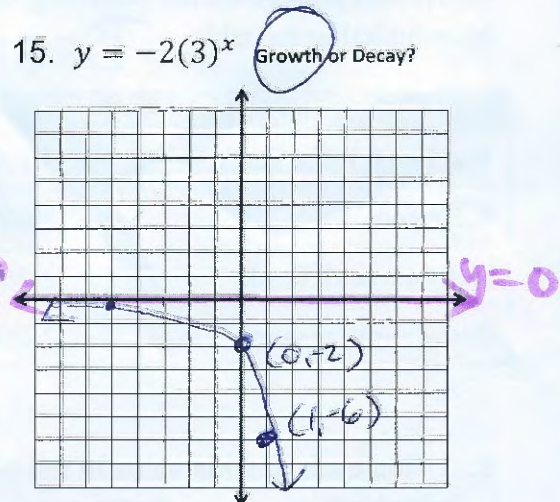
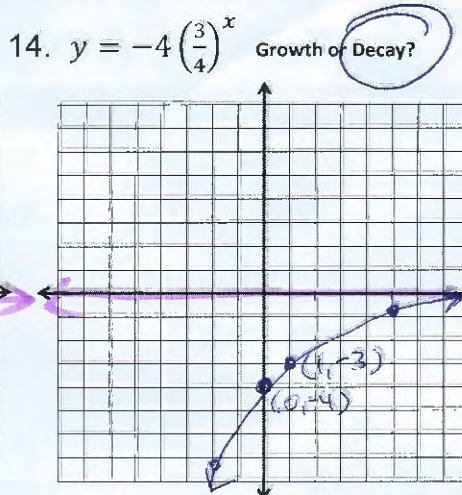
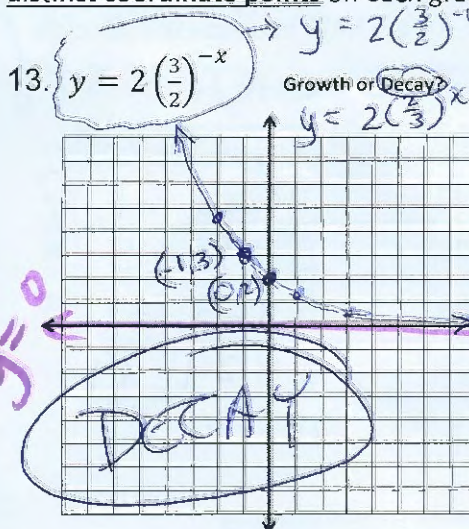
25,000: STARTING SALARY 0.04: 4% RAISE 1: 100% of CURRENT SALARY

A ball is dropped from a height of 12 feet and is allowed to bounce over and over. The height of each bounce is modeled in the exponential DECAY model below.

Bounce	0	1	2	3	4	...	8	...	100
Height (ft)	12	7.8	5.07	3.2955	2.142075	...	???	...	???

10. Function: $y = 12(.65)^x$ 11. 8th Bounce: 0.3824 ft 12. 100th Bounce: 2.3×10^{-18}
 $\frac{7.8}{12} = .65$

For 13 -15, sketch the graph of each exponential function by doing the following: Sketch the asymptote, label at least **two** distinct coordinate points on each graph, and write the domain and range of each function.



Domain: \mathbb{R} Range: $y > 0$ Domain: \mathbb{R} Range: $y < 0$ Domain: \mathbb{R} Range: $y < 0$

Change Up! Solve for the missing side lengths. Leave your answers in simplest radical form.

