

$y = a(1+r)^x$
 $A = P(1+r)^t$
 amount = P (principal) $(1+r)$ (rate) t (time)
 $A = P(1-r)^t$
 $y = a(1-r)^x$

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Mr. Foster is starting a new job. His salary for the first year is \$30,000. He will receive a 5% raise each year after that. Write a formula to define Mr. Foster's salary, s , for the n th year.

$$s = 30000(1+0.05)^{n-1}$$

How much will Mr. Foster make after 7 years?

$$s = 30000(1.05)^6$$

$$\$40,202.87$$

Janet purchased a new car for \$25,000. The moment she drove the car off the lot, it began depreciating 15% per year. Write a formula to define the value of Janet's car, v , after n years.

$$v = 25000(1-0.15)^n$$

How much is Janet's car worth after 4 years?

$$v = 25000(0.85)^4$$

$$= 13,050$$

You take a 325 milligram dosage of ibuprofen. During each subsequent hour, the amount of medication in your bloodstream decreases by about 29% each hour. Write an exponential equation giving the amount y (in milligrams) of ibuprofen in your bloodstream t hours after the initial dose.

$$y = 325(1-0.29)^t$$

How much ibuprofen will remain in your bloodstream after 3 hours?

$$y = 325(.71)^3$$

$$= 116 \text{ mg}$$

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1. $y = 2^x + 1$ ← asymptote

	x	y
Growth vs. Decay	0	2
Transformations	1	3
a =	2	5
h =	-1	1.5 or $\frac{3}{2}$
k = +1	-2	1.25 or $\frac{5}{4}$
Domain	$(-\infty, \infty)$	
Range	$(1, \infty)$	

$$f(x) = ab^{x-h} + k$$

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Exponential equations have a variable in the exponent

We can solve these equations by rewriting both sides of the equation with a common base.

COMMON BASE PRACTICE

Rewrite the following with base 2:

$$\begin{aligned}
 32 &= 2^5 \\
 4^x &= (2^2)^x = 2^{2x} \\
 16^{2x} &= (2^4)^{2x} = 2^{8x} \\
 \frac{1}{8} &= \frac{1}{2^3} = 2^{-3} \\
 \frac{1}{4^{2x}} &= \frac{1}{(2^2)^{2x}} = \frac{1}{2^{4x}} = 2^{-4x}
 \end{aligned}$$

STEPS FOR SOLVING EQUATIONS

1. Rewrite both sides of the equation with a common base.
2. Set the exponents on each side equal to one another.
3. Solve the equation.
4. Check your answer!

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$$\begin{aligned}8^x &= 4 \\(2^3)^x &= 2^2 \\ \dots \quad 2^{3x} &= 2^2 \\ \frac{3x}{3} &= \frac{2}{3} \\ x &= \frac{2}{3}\end{aligned}$$

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