

## Exponents Practice Test

1. Use exponent rules to **simplify**, then **evaluate**. You **MUST** show your work. Express answers with fractions when necessary and with positive exponents only.

a)  $\frac{2^5 2^{-3}}{2^{-2}} =$

b)  $\left(\frac{1}{2}\right)^3 =$

c)  $(-3^2)^3 =$

d)  $5^6 \div 5^4 =$

e)  $3^5 \times 3^4 =$

f)  $\left(\frac{2}{3}\right)^{-3} \left(\frac{2}{3}\right)^{-2} =$

g)  $(3^{-1})^2 (3)^7$

h)  $\frac{(-4)^3 \times (-4)^4}{(-4)^7}$

i)  $(-3)^4 =$

j)  $-2^4 =$

k)  $\frac{m^2(m^{-8})^3}{(m)^3}$

l)  $\left(\frac{p^3 v^5}{s^2}\right)^{-3}$

2. Given the equation  $y = 1823(1.47)^x$ , create a word problem that would produce the given equation.

3. Given the equation  $y = 189(3)^x$

a) What does the number 189 represent? \_\_\_\_\_

b) What does the number 3 represent? \_\_\_\_\_

c) Evaluate this equation for  $x = 5$ . Write the answer here: \_\_\_\_\_

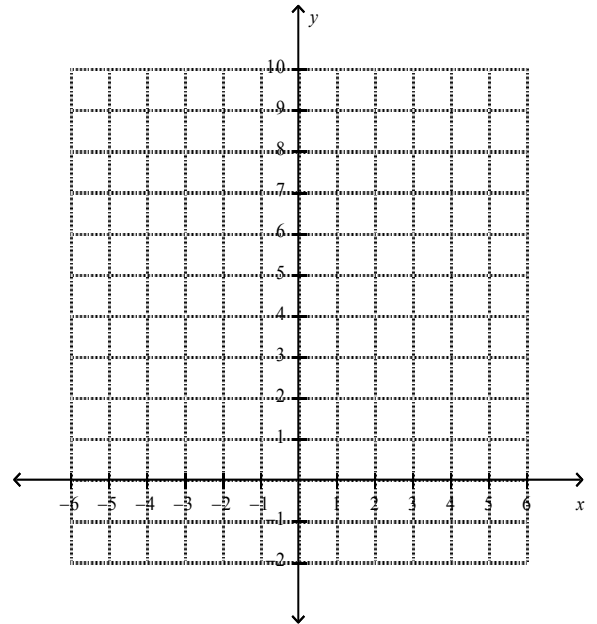
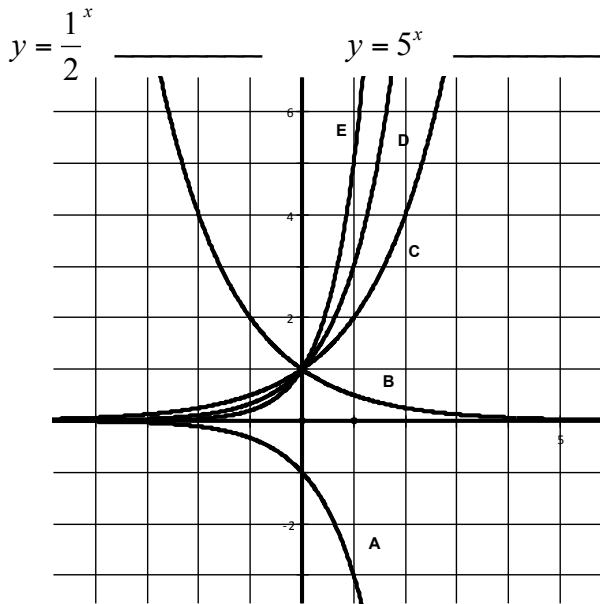
4. Given the following  $(2x)^5$ , identify

the base: \_\_\_\_\_

the exponent: \_\_\_\_\_

5. Which graph matches the given equations?

5. Graph  $y = 4^x$  and  $y = \left(\frac{1}{3}\right)^x$ .



6. The number of motor vehicles in the world,  $M$  million, can be modelled by the equation  $M = 45(1.075)^t$ , where  $t$  is the number of years since 1946.
- How many cars were there initially, in millions?
  - What is the rate of growth of the number of motor vehicles in the world?
  - Based on this model, how many cars are there in the world this year?
7. The value of a boat,  $V$ , in thousands, can be modelled by the equation  $V = 38\,500(0.91)^t$ , where  $t$  is the number of years since the boat was purchased.
- How much money did the boat cost?
  - What is the depreciation rate each year of the value of the boat?
  - Based on this model, how much is the boat worth 10 years after the boat was purchased?
8. Write the **equations** that represent the following. DO NOT SOLVE.
- If a certain substance has a half-life of 10 days, and there were initially 800 grams of the substance, how much of the substance is remaining after "x" days?
  - A bouncy ball **loses** 30% of its height when dropped. If the ball is dropped from a height of 10 m. What height will the ball bounce back up to after "n" bounces?
9. Given each of the following, describe how to determine whether or not a relation is exponential.
- a table of values
  - a graph
  - an equation
10. Consider the following data:
- Does this represent an exponential relationship?
  - What is the growth/decay rate?
  - What is the initial value?
  - Determine the equation that represents this data.

Year	0	1	2	3	4
# of Rabbits	60	78	101	131	171