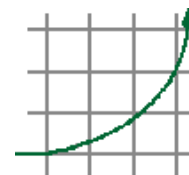# Ch. 7 Exponential Relations Exam Review Question Set

Always check FINAL ANSWERS after each question.

1. For each question, express as a single power.
   A FINAL ANSWER CANNOT HAVE A DECIMAL.

   a) $2^7 \times 2^2$ b) $3^{2010} \div 3^{2008}$ c) 4×4^5 d) $(3^2)^6$ e) $\dfrac{2^4 \times 2}{2^9}$

2. Evaluate. A FINAL ANSWER CANNOT HAVE A DECIMAL.

   a) $(\text{-}5)^0$ b) $3^{\text{-}5}$ c) 2^{-4} d) 3^3

3. Classify the growth of y as **linear**, **quadratic**, **exponential** or **unknown** for these relations.

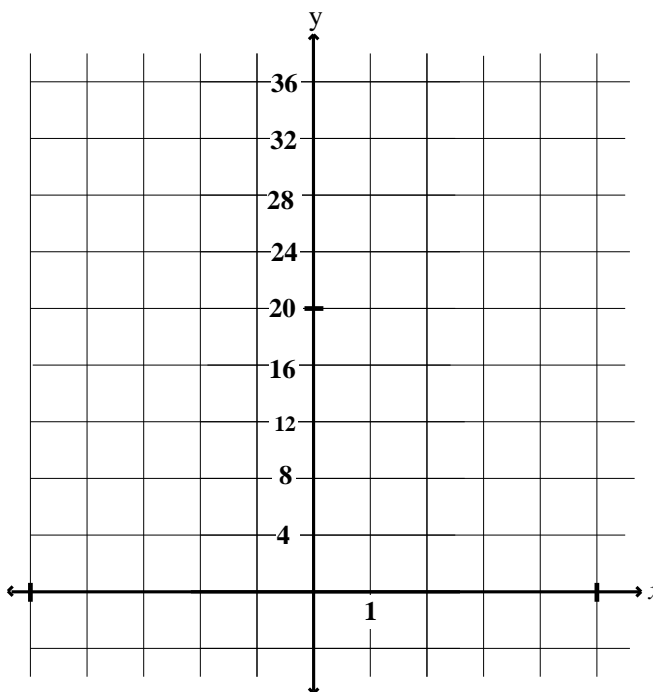   a) $y = 2x - 8$ Answer: _____ Reason: _____

   b) $y = 8^x$ Answer: _____ Reason: _____

4. Given the relation $y = 2^x$ …

   a) Do you know how the numbers were calculated in the second column of the table of values?

   b) On the same grid, graph both $y = 2^x$ and $y = 3(2^x)$

x	$y = 2^x$
-3	0.125
-2	0.25
-1	0.5
0	1
1	2
2	4
3	8

5. The population of *Mathville* today is 38 920 people. Each year the town grows by about 2%.
   a) **Fill in the blanks** in the formula below, which models the population, *P*, of *Mathville*

   x years from today: $P = ($ $)($ $)^{\mathbf{X}}$

   b) Predict the population of *Mathville* in 5 years from today.

6. *Multiple Choice.* The equation which represents an exponential relationship is …
   (a) $y = 2^x$ (b) $y = x^2$ (c) $y = 2x$ (d) $y = x + 2$

7. *Multiple Choice.* An equivalent form of $\dfrac{1}{a^5}$ is …

   (a) a^5 (b) $-a^5$ (c) $\dfrac{5}{a}$ (d) a^{-5}

8. *Multiple Choice.* The y-intercept of $y=3^x$ is …
    (a) 0   (b) 1   (c) 3   (d) there is no y-intercept

9. *Multiple Choice.* The second differences are always equal for an exponential relation.
    (a) TRUE   (b) FALSE

10. A sample of a radioactive atom is 14 g in mass.
Each day, 20% of the substance's mass decays. State the half-life of the substance.

11. A personal computer depreciates in value by about 30% each year.
Suppose a computer costs $899 today.
    a) Create a model that determines its value over time. Define your variables!
    b) When will the computer be worth $0 ?

12. **Find your Chapter 7 Exponential Relations Test from your notebook.**
Go through each question, **AND** make sure you understand how to get the correct answer.

FINAL ANSWERS

1.a) 2^9 b) 3^2 c) 4^6 d) 3^{12} e) 2^{-4} or $\left(\dfrac{1}{2}\right)^4$ or even $\dfrac{1}{2^4}$

2.a) 1   b) $\dfrac{1}{243}$ c) $\dfrac{1}{16}$ d) 27

3.a) linear, since it is in the form $y = mx+b$. Notice too that the highest exponent for x is 1
    b) exponential, since it is in the form $y = ab^x$. Notice too that the independent variable is in the exponent!

4.a) The number in the column for the x-coordinates is substituted into the formula $y = 2^x$,
    and then evaluated using a calculator.
    b)
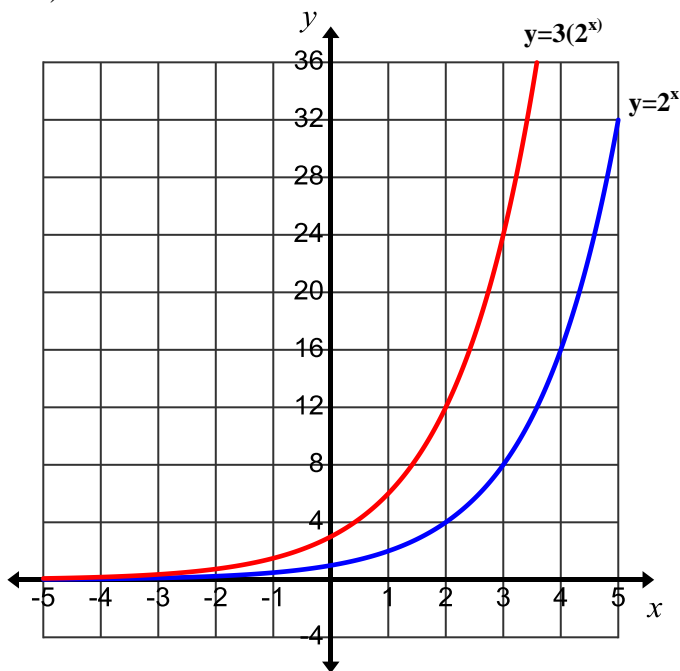
5. a) $P = 38920(1+0.02)^x$,
since the ratio (growth factor) is 1.02

    b) About 42970 people

6. a

7. d

8. b

9. b (the second differences are equal for a **quadratic** relation)

10. A little greater than 3 days

11. a) Let x be the number of years.
    Let y be the value of the computer.
    $y = 899(1-0.30)^x$ or $y = 899(0.70)^x$.

    b) Never, since it is an exponential relation (there are no x-intercepts!).