Name: _____ Date: _____

Chapter 7 Review

7.1 Exponent Rules, pages 356-363

1. Write as a single power and then evaluate.

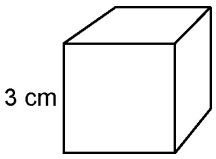
a) $5^3 \times 5$ **b)** $4^9 \div 4^7$

c) $(2^4)^2$ **d)** $(-3)^2 \div (-3)^3$

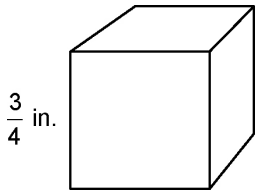
e) $\left(\frac{2}{3}\right)^2 \times \left(\frac{2}{3}\right)^2$ **f)** $\left(\left(-\frac{1}{4}\right)^2\right)^2$

2. Calculate the volume of each cube using the formula $V = s^3$.

a)



b)



7.2 Zero and Negative Exponents, pages 364-371

3. Evaluate. Express each answer as a whole number or a fraction.

a) $\left((-3)^2\right)^0$ **b)** 2^{-3}

c) 3^{-2} **d)** $5^{-2} \times 5^3$

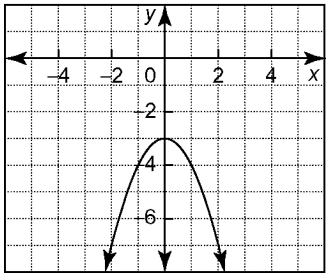
e) $\left(4^{-1}\right)^{-2}$ **f)** $\frac{3}{2^{-4}}$

g) $\frac{3^{-2}}{3^{-4}}$ **h)** $\left(5^{-1}\right)^2$

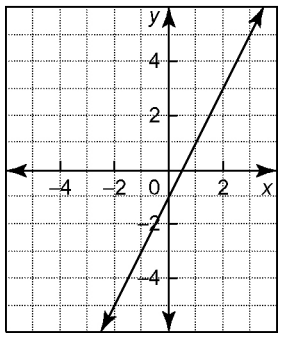
7.3 Investigate Exponential Relationships, pages 372-381

4. Identify each relation as linear, quadratic, or exponential.

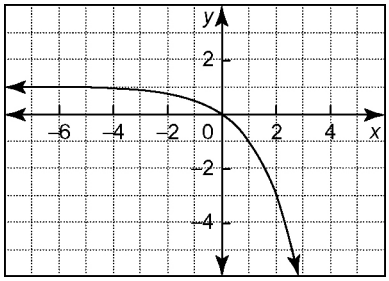
a)



b)



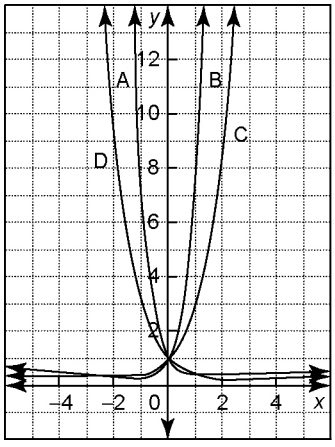
c)



5. The value of an investment doubles every 8 years. Today, Armin invested $25 000. How much money will he have after 8 years? after 16 years? after 40 years?

7.4 Exponential Relations, pages 382-394

6. Identify which graph represents each relation.



a) $y = 3^x$ **b)** $y = \left(\frac{1}{8}\right)^x$

c) $y = \left(\frac{2}{3}\right)^x$ **d)** $y = 8^x$

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7. The population, P, of a small community can be modelled by the equation $P = 12\,000(1.031)^t$, where t is the time in years after 2005.
a) Sketch the graph of this relation.
b) What was the population in 2005?
c) What will the population be in 2010?
d) In what year will the population reach 16 800?
e) What assumption must be made for your answer to part d) to be accurate?

7.5 Model Exponential Growth, pages 395-405

8. As the sun starts to set, the distance Hong can see decreases exponentially. The table shows this distance every half hour starting at 7:00 P.M. Let $t = 0$ correspond to 7:00 P.M.

Time (h)	t	Distance (ft)
7:00	0.0	97.0
7:30	0.5	86.0
8:00	0.1	76.0
8:30	1.5	68.0
9:00	0.2	60.0
9:30	2.5	53.0
10:00	0.3	47.0
10:30	3.5	44.2

a) Use a graphing calculator. Make a scatter plot comparing t to Distance. Find the equation of the exponential curve of best fit. Sketch the graphing calculator display.
b) Use the equation from part a) to determine how far Hong can see at 11:30 P.M.
c) Would you expect this trend to continue? Why or why not?

9. The population at an elementary school has grown exponentially over the past 3 years according to the relation $P = 775(1.037)^t$, where P is the population and t is the time in years ($t = 0$ represents 3 years ago).
a) What was the population of the school 3 years ago?
b) What is the population of the school today?
c) When will the school reach its capacity of 1000 students?

7.6 Solve Problems Involving Exponential Growth and Decay, pages 406-413

10. The half-life of a radioactive material is 8 min. The mass, M, present in a sample can be modelled by the relation $M = M_0\left(\frac{1}{2}\right)^{\left(\frac{t}{8}\right)}$ where t is the time in minutes and M_0 is the intital mass in milligrams.
a) How much of a 75-mg sample would be present after 24 min?
b) How much of a 75-mg sample would be present after 1.5 h?
c) How long would it take for the 75 mg sample to decay to 0.0025 mg?

11. The fish population of a stocked pond can be modelled by the relation $A = A_0(2)^{\frac{t}{50.25}}$, where A_0 is the fish population now and t is the time in years.
a) If the pond is stocked with 30 000 fish today, how many fish will there be in 10 weeks time?
b) How many fish will be in the pond 46 weeks from the start of the measurements?