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Chapter 6 Test

For questions 1 to 4, select the best answer.

1. Which value is equal to $5 \div 5^{-3}$?

A $\frac{1}{25}$

B 625

C $\frac{1}{125}$

D 25

2. Which value is equal to $(-8)^{\frac{5}{3}}$?

A -2

B -32

C 32

D None of these. The expression cannot be evaluated.

3. Which expression is equal to 64^2?

A $\sqrt{64}$

B 4

C 8^4

D 4^5

4. What is the value of $x^{-1} \times x^3$ when $x = 6$?

A 6

B $\frac{1}{6}$

C $\frac{1}{36}$

D 36

5. Write each power as a power with base 8.

a) 64^3 **b)** 2^{12}

c) 32^6 **d)** 16^3

6. Simplify, then evaluate. Give your answer as a whole number or a fraction.

a) $\frac{(5^{-2})(5)}{5^{-4}}$

b) $[(-2)^3]^{-2}$

c) $(3a^{-4}b)^2$, for $a = -1$ and $b = 4$

d) $\frac{x^4y}{xy^{-2}}$, for $x = -2$ and $y = -1$

e) $(p^3q^{-1}) \times (p^{-2}q^{-3})$, for $p = 2$ and $q = 5$

7. Solve, then check your solution.

a) $81^5 = 9^{2x}$ **b)** $32^8 = 16^{5x}$

c) $6^{3(x+1)} = 36^{x-2}$

8. Evaluate.

a) $64^{\frac{1}{2}}$ **b)** $256^{\frac{1}{4}}$

c) $(-27)^{\frac{5}{3}}$ **d)** $\left(\frac{1}{32}\right)^{\frac{3}{5}}$

9. Evaluate, if possible. If not possible, explain why.

a) $(-64)^{\frac{1}{3}}$ **b)** $(-4)^{\frac{5}{2}}$

c) $\sqrt[4]{-16}$ **d)** $(-8)^{\frac{2}{3}}$

10. Use a calculator to evaluate to three decimal places.

a) $88^{\frac{2}{3}}$ **b)** $42^{\frac{5}{4}}$

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11. Consider these two investment options.

Option A: \$500 invested at 6% per year, simple interest. The amount, A, after n years is given by the equation $A = 500(1 + 0.06n)$.

Option B: \$450 invested at 5.9% per year, compounded annually. The amount, A, after n years is given by the equation $A = 450(1.059)^n$.

a) Graph both equations on the same set of axes. What types of relations are these? How do you know?

b) Which investment has the greater future value? Explain your answer.

12. The volume of a cone with equal height and radius is given by $V = \frac{1}{3}\pi r^3$. If the cone has a volume of 870 cm^3, determine the radius to the nearest tenth of a centimetre.

13. For each situation, state which type of model—linear, quadratic, exponential, or none of these—is most appropriate. Explain your choice.

a) The value of a vehicle, purchased for \$16 220, decreases by \$910 per year. How is the value of the vehicle related to the number of years since the purchase?

b) Annika folded a large piece of paper in half. When she unfolded the paper, she noticed that the foldline divided the paper into two sections. Annika continued folding the paper until she could not make any more folds. How is the number of sections related to the number of folds?

c) Mike won \$1000 in a contest. He decided he would spend half the money this week and he would spend half the remaining money each week that follows. How is the amount of money Mike has left related to time?

14. The table shows the mass, over time, of a substance that is growing.

Time (h)	Mass (g)
0	20.00
1	22.30
2	24.15
3	25.75
4	26.76
5	28.92
6	30.81
7	32.43
8	35.76
9	39.34
10	42.10
11	45.39
12	48.21

a) Determine the equation of the line of best fit.

b) Use the linear model to predict the mass after 25 h.

c) According to the linear model, when will the mass be 100 g?

d) Determine the equation of the parabola of best fit.

e) Use the quadratic model to predict the mass after 25 h.

f) According to the quadratic model, when will the mass be 100 g?

g) Determine the equation of the exponential curve of best fit.

h) Use the exponential model to predict the mass after 25 h.

i) According to the exponential model, when will the mass be 100 g?

978-0-07-013108-8