3 Practice Test

Chapter 3 Practice Test

For #1 to #6, choose the best answer.

1. What is the value 3 in the power 4^3 called?
A base **B** power
C exponent **D** coefficient

2. What is the coefficient in the expression $-(-3)^2$?
A -3 **B** -1
C 1 **D** 3

3. What expression is represented by $(3^2)^4$?
A $(3 \times 3)(3 \times 3 \times 3 \times 3)$
B $(3 \times 3 \times 3 \times 3 \times 3 \times 3)$
C $(3 \times 3)(3 \times 3)(3 \times 3)(3 \times 3)$
D $(3 \times 3 \times 3 \times 3)(3 \times 3 \times 3 \times 3)$
$(3 \times 3 \times 3 \times 3)(3 \times 3 \times 3 \times 3)$

4. What expression is equivalent to $(5 \times 4)^2$?
A 10×8 **B** 5×4^2
C $5^2 \times 4$ **D** $5^2 \times 4^2$

5. What is $\frac{(-7)^3(-7)^5}{(-7)^2}$ expressed as a single power?
A $(-7)^6$ **B** $(-7)^{10}$
C $(-7)^{13}$ **D** $(-7)^{17}$

6. Evaluate $(7 - 2)^3 + 48 \div (-2)^4$.
A 338 **B** 128
C 10.8125 **D** -10.8125

Complete the statements in #7 and #8.

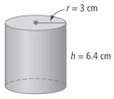
7. The expression $10^5 \times 5^5$ written with only one exponent is ■.

8. The expression $\frac{5^6}{8^6}$ written with only one exponent is ■.

Short Answer

9. Write the expression $\frac{4^4 \times 4}{4^2}$ in repeated multiplication form, and then evaluate.

10. The formula for the volume of a cylinder is $V = \pi r^2 h$. Find the volume, V, of a cylinder with a radius of 3 cm and a height of 6.4 cm. Express your answer to the nearest tenth of a cubic centimetre.



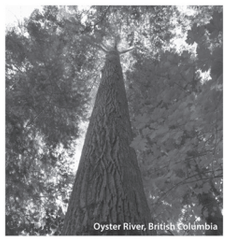
11. A skydiver free falls before opening the parachute. What distance would the skydiver fall during 7 s of free fall? Use the formula $d = 4.9t^2$, where d is distance, in metres, and t is time, in seconds.

12. Write the calculator key sequence you would use to evaluate each expression. Then, evaluate.
a) $(1 - 3)^4 \div 4$
b) $(-2)^0 + 4 \times 17^0$
c) $16 - 9(2^3) + (-4)^2$

13. The prime factorization of 243 is $3 \times 3 \times 3 \times 3 \times 3$. Write 243 as the product of two powers of 3 in as many ways as possible.

122 MHR • Chapter 3

14. A formula for estimating the volume of wood in a tree is $V = 0.05hc^2$. The volume, V, is measured in cubic metres. The height, h, and the trunk circumference, c, are in metres. What is the volume of wood in a tree with a trunk circumference of 2.3 m and a height of 32 m? Express your answer to the nearest tenth of a cubic metre.


Oyster River, British Columbia

Extended Response

15. Nabil made an error in simplifying the following expression.
a) Explain his mistake.
b) Determine the correct answer.
$(12 + 4)^2 + (5 + 3)^2$
$= (3)^4 + 5^2 + 3^2$
$= 81 + 25 + 9$
$= 106 + 9$
$= 115$

16. A type of bacterium triples in number every 24 h. There are currently 300 bacteria.
a) Create a table to show the number of bacteria after each of the next seven days. Express each number of bacteria as the product of a coefficient and a power.
b) Determine a formula that will calculate the number of bacteria, B, after d days.
c) Use the formula to find the number of bacteria after 9 days.
d) How many were there 24 h ago? Explain your reasoning.

Math Link: Wrap It Up!

Create a mobile that uses at least three different types of regular three-dimensional shapes such as a cube, a square-based prism, and a cylinder. You may wish to choose a different type of geometric shape to build as well.

- Choose whole-number dimensions between 10 cm and 20 cm for each shape.
- Use a ruler and a piece of construction paper or other heavy paper to draw a net for each shape.
- Build each shape.
- Use expressions in exponential form to label the surface area and the volume of each shape.
- Evaluate each expression. Show all of your work.
- Make your mobile. Use colour and creativity!

Chapter 3 Practice Test • MHR 123

***MathLinks 9*, pages 122–123**

Suggested Timing
40–50 minutes

Materials
• calculator

Blackline Masters
BLM 3–12 Chapter 3 Test

Planning Notes

Suggest to students that they start the practice test by writing the question numbers in their notebook. Have them indicate which questions they need a little help with, a lot of help with, or no help with. Have students first complete the questions they know they can do. Then, have them complete the questions they know something about. Finally, have students do their best on the questions that they are struggling with.

This practice test can be assigned as an in-class or take-home assignment. Provide students with the number of questions they can comfortably do in one class. Since the questions represent a reasonable level of difficulty, students should be able to complete all of these questions during one class. These are the minimum questions that will meet the related curriculum outcomes: #1, 2, 4–6, 11.

Study Guide

Question(s)	Section(s)	Refer to	The student can …
#1	3.1	Explore	✓ determine the difference between exponent and base
#2, 12	3.1	Example 3	✓ evaluate powers that include parentheses
#3, 9	3.1	Example 2	✓ describe how powers represent repeated multiplication
#4, 7, 8, 13	3.2	Example 3	✓ explain the exponent law for raising a product and a quotient to an exponent
#5	3.2	Examples 1, 2	✓ explain the exponent laws for multiplying or dividing powers with the same base
#6, 9, 10, 11, 14	3.1	Examples 2, 3	✓ evaluate powers with integral bases (excluding base 0) and whole number exponents
#6	3.1	Example 3	✓ evaluate powers that include parentheses
#6, 10, 11, #12, 14, 16	3.3	Examples 1, 2	✓ use the order of operations on expressions with powers
#10, 11, 14, 16	3.4	Example 1	✓ solve problems by applying the order of operations
#12	3.2 3.3	Example 4 Example 2	✓ apply the laws of exponents ✓ explain the exponent law for powers with an exponent of zero ✓ determine the sum or difference of two powers
#13	3.1	Example 1	✓ represent repeated multiplication with exponents
#15	3.3	Check Your Understanding	✓ identify the error in applying the order of operations in an incorrect solution
#16	3.4	Example 2	✓ use powers to solve problems that involve repeated multiplication

Answers

Chapter 3 Practice Test

1. C **2.** B **3.** C **4.** D **5.** A **6.** B **7.** Examples: $(10 \times 5)^5$, 50^5

8. $\left(\frac{5}{8}\right)^6$ **9.** $\frac{4 \times 4 \times 4 \times 4 \times 4}{4 \times 4} = 64$ **10.** 181.0 cm^3 **11.** 240.1 m

12. Calculator sequence should show the following.

a) $(1 - 3)^4 \div 4 = 4$

b) $(-2)^0 + 4 \times 17^0 = 5$

c) $16 - 9 \times (2^3) + (-4)^2 = -40$

13. $3^0 \times 3^5$, $3^1 \times 3^4$, $3^2 \times 3^3$ **14.** 8.5 m^3

15. a) Mabil should have added 5 and 3, and then applied the exponent of 2 to the sum of 8.

b) 145

16. a)

Days	Number of Bacteria as a Product	Number of Bacteria
Start	$300(3)^0$	300
1	$300(3)^1$	900
2	$300(3)^2$	2 700
3	$300(3)^3$	8 100
4	$300(3)^4$	24 300
5	$300(3)^5$	72 900
6	$300(3)^6$	218 700
7	$300(3)^7$	656 100

b) $B = 300(3)^d$

c) 5 904 900

d) 100. To find the previous number of bacteria, divide by 3: $300 \div 3 = 100$.

Assessment	Supporting Learning
Assessment *as* Learning	
Chapter 3 Self-Assessment Have students review their earlier responses in the What I Need to Work On section of their Foldable.	• Have students use their responses on the practice test and work they completed earlier in the chapter to identify areas in which they may need to reinforce their understanding of skills or concepts. Before the chapter test, coach them in the areas in which they are having difficulties.
Assessment *of* Learning	
Chapter 3 Test After students complete the practice test, you may wish to use **BLM 3–12 Chapter 3 Test** as a summative assessment.	• Consider allowing students to use their Foldable. • Since the Wrap It Up! and Challenges provide additional reinforcement of chapter content, you may wish to have students complete these activities before doing the Chapter 3 Practice Test and **BLM 3-12 Chapter 3 Test**. • Consider using the Challenges to assess the knowledge and skills of students who have difficulty with tests.