Chapter 3 Practice Test

For #1 to 5, select the best answer.

1. In the equation $-(-2)^5 = -32$, which number represents the base of the power?

A -32 **B** -2 **C** -1 **D** 2

2. Which expression is equivalent to $(-2) \times (-2) \times (-2) \times (-2) \times (-2)$?

A 2^5 **B** 32 **C** $(-2)^5$ **D** $-(-2)^5$

3. What is the product of 5^2 and 5^4?

A 650 **B** 25^6 **C** 5^8 **D** 5^6

4. Devin was asked to simplify the expression $10 - 2^3 \times (3 - 2^0)^2$. His work is shown below.

$10 - 2^3 \times (3 - 2^0)^2$

$= 10 - 6 \times (3 - 1)^2$ Step 1

$= 10 - 6 \times 4$ Step 2

$= 10 - 24$ Step 3

$= -14$ Step 4

In which step did Devin make his first mistake?

A Step 1 **B** Step 2 **C** Step 3 **D** Step 4

5. Two students were asked to write each product of powers as a single power. Their work is shown below.

Danica

$3^3 \times 3^2 = (3 \times 3 \times 3)(3 \times 3)$

$= 3^5$

Frank

$3^3 \times 3^2 = 3^{3 \times 2}$

$= 3^6$

Which of the following statements about their procedures is true?

A Frank's procedure contains an error and Danica's does not.

B Danica's procedure contains an error and Frank's does not.

C Both Danica and Frank have no errors in their procedure.

D Both Danica and Frank have errors in their procedure.

Complete the statements in #6 and 7.

6. The value of $3^3 + 3^0$ is $\square$.

7. The expression $-\left(\frac{5}{10}\right)^3$ written as a fraction in simplified form is $\square$.

Short Answer

8. Arrange the powers in order from smallest value to largest value.

$(-4)^2$, $(2)^3$, $-(4)^3$, $(-1)^5$

9. Write each expression as repeated multiplication.

a) 3^7 **b)** $-(-6)^5$ **c)** $(4 \times 5)^3$

10. Write each expression as a power in simplified form.

a) $6^7 \div 6^4$ **b)** $(2^2 + 3)^4$ **c)** $\left(2^4\right)^3$

11. Explain in words the difference between the powers 11^3 and 3^{11}.

Extended Response

12. For every metre a scuba diver dives below the water surface of a lake, the light intensity is reduced by 5%. The percent of light intensity can be represented by the equation $I = 100(1 - 0.05)^d$, where I is the intensity of light, as a percent, and d is the depth of the dive, in metres. The intensity of light at the surface of the lake is 100%. Austin wanted to determine the light intensity at a depth of 3 m. His solution is shown below.

$I = 100(1 - 0.05)^d$

$I = 100(1 - 0.05)^3$

$I = 100(1^3 - 0.05^3)$

$I = 100(0.999875)$

$I \approx 100$

Austin realized that it is not possible for the light intensity to be approximately 100% at a depth of 3 m. Explain where Austin made his mistake.

a) Correct Austin's mistake and provide a detailed solution to determine the percent of light intensity at a depth of 3 m. Give your answer to the nearest whole percent.

b) What is the light intensity at a depth of 15 m? Give your answer to the nearest whole percent.

Chapter 3 Practice Test Answers

1. D

2. C

3. D

4. A

5. D

6. 28

7. $-\frac{1}{8}$

8. $-(4)^3$, $(-1)^5$, 2^3, $(-4)^2$

9. a) $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$
b) $(-1) \times (-6) \times (-6) \times (-6) \times (-6) \times (-6)$
c) $4 \times 4 \times 4 \times 5 \times 5 \times 5$

10. a) 6^3 **b)** 7^4 **c)** 2^{12}

11. 11^3 means that a base of 11 is multiplied 3 times: $11^3 = 1331$. 3^{11} means that a base of 3 is multiplied 11 times: $3^{11} = 177\ 147$.

12. a) In the third line, Austin incorrectly distributed the exponent over subtraction to the bases of 1 and 0.05. You can only distribute an exponent over multiplication: $(ab)^x = a^x b^x$.
$I = 100(0.95)^3$; $I = 100(0.857375)$; $I \approx 86$. The light intensity is approximately 86%.

b) When $d = 15$, $I = 46\%$.