

**Study | Aid**

- See Lesson 2.5, Examples 1, 2, 3, 4, and 5.
- Try Chapter Review question 12.

**Study | Aid**

- See Lesson 2.6, Examples 1, 2, and 3 and Lesson 2.7, Example 4.
- Try Chapter Review questions 13 and 14.

**Study | Aid**

- See Lesson 2.7, Examples 1, 2, and 3, and Lesson 2.8, Examples 1, 2, 3, and 4.
- Try Chapter Review questions 15, 16, 17, 18, and 19.

**FREQUENTLY ASKED Questions**

**Q:** How can you simplify a power involving products and quotients?

**A:** In a product, the exponent applies to each factor.  $(ab)^m = a^m b^m$   
For example,  $(2 \times 3)^5 = 2^5 \times 3^5$ .

In a quotient the exponent applies to both the numerator and denominator.  $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ .

For example,  $\left(\frac{3}{5}\right)^2 = \frac{3^2}{5^2}$ .

**Q:** How can you evaluate an expression involving many operations?

**A:** Use BEDMAS (Brackets, Exponents, Division, Multiplication, Addition, Subtraction) to help you remember the order to perform the operations. For example,

$4 + 6[2^3 + (6 - 4)] \div 2$  Evaluate what is in the **B**rackets. Start with the innermost brackets, if there is more than one set.

$= 4 + 6[2^3 + 2] \div 2$  Evaluate powers next, using the **E**xponents.

$= 4 + 6[8 + 2] \div 2$  Divide and **M**ultiply from left to right.

$= 4 + 6(10) \div 2$

$= 4 + 60 \div 2$

$= 4 + 30$  Add and **S**ubtract from left to right.

$= 34$

**Q:** How can you calculate or estimate a square root?

**A1:** You can use the square root key on your calculator ( $\sqrt{\quad}$ ). For example,  $\sqrt{27.4} = 5.234500931$

You can check your answer by multiplying the square root by itself to see if you get the original number.

**A2:** You can use perfect squares as benchmarks to estimate the square root of numbers that are not perfect squares. For example,  $\sqrt{27.4}$  is between  $\sqrt{25}$  and  $\sqrt{36}$ , and is much closer to  $\sqrt{25}$ . It is likely about 5.2.

## Practice

### Lesson 2.1

- Sketch a model to represent the following. Label each side length.
  - a square field with an area of  $225 \text{ m}^2$
  - $10^2$
  - a cube with a side length of three units
- Calculate the side length of a square with an area of  $196 \text{ mm}^2$ .
  - Calculate the side length of a cube with a volume of  $125 \text{ cm}^3$ .
- Nita is planting 49 carrot seeds to grow in her garden. She wants to plant them in a square plot. She needs to plant them 3 cm apart, and 3 cm apart from the edge of the plot.
  - Sketch the square garden with the seeds.
  - Determine the dimensions of the garden.
  - Determine the area of the garden.



### Lesson 2.2

- Complete the table.

	Power	Base	Exponent	Repeated Multiplication	Value
a)	$(-3)^4$				
b)				$-(6)(6)(6)$	
c)		$-4$			256

- Evaluate without using a calculator. Show your work.
  - $6^2$
  - $-2 \cdot 3^3$
  - $-(-1)^3$
- Susan needs to wrap two gift boxes in the shape of cubes. She has a sheet of wrapping paper 140 cm by 30 cm. One box is 7 cm by 7 cm by 7 cm. Each side of the other box has an area of  $529 \text{ cm}^2$ . Does she have enough wrapping paper to wrap both boxes? Show your work.

### Lesson 2.4

- Simplify.
  - $(5^5)^5(5^2)$
  - $\frac{(12^2)^3}{12^2}$
  - $(19^7)(19) \div (19^2)^2(19^2)$
- Evaluate.
  - $(6^2)(6^3)^2$
  - $\frac{(4^5)^2}{4^6}$
  - $\frac{(-3^2)(-3^7)}{(-3^2)^3(-3^3)}$
- Simplify.
  - $[(x^5)(x^2)]^2$
  - $a^9 \div a^5 \div a$
  - $(v^4)^6 \div (v^3)^5$

10. Use repeated multiplication to explain why each statement is true.

a)  $\frac{8^5}{8^3} = 8^2$                       b)  $6^2 \times 6^5 = 6^7$

11. Express  $32^2$  with a base of 2.

### Lesson 2.5

12. Express as a power with a single base. Show your work.

a)  $(6^3 \times 36^4)^2$                       b)  $\left(\frac{7^6}{7^3}\right)^4$

### Lesson 2.6

13. Simplify without using a calculator. Show all your work.

a)  $16^2 - 8^2 \div 2^2$                       b)  $6^2 + 2 \times 3^2 - 8$

14. Which question would you ask to see if someone understands order of operations? Explain why.

A.  $9^4 \times 3^2 + 4^3$                       B.  $9^4 + 3^2 \times 4^3$

### Lesson 2.7

15. Evaluate.

a)  $\sqrt{289}$                                       d)  $\frac{\sqrt{121}}{\sqrt{144}}$   
b)  $\sqrt{39.69}$                                   e)  $\frac{\sqrt{25}}{5}$   
c)  $\sqrt{\frac{16}{36}}$                                       f)  $\sqrt{70.8964}$

16. Verify each statement. Show your work.

a)  $\sqrt{4.9} = 0.7$       b)  $\sqrt{4.8} = 2.4$       c)  $\sqrt{0.0036} = 0.06$

### Lesson 2.8

17. A square arena has an area of  $200 \text{ m}^2$ .

- Without using a calculator, state the two whole numbers between which its side length is located.
- Which whole number from part a) is a better estimate, and why?
- Determine the length of its side to two decimal places.

18. A square garden has an area of  $40 \text{ m}^2$ . Which is a better estimate for the length of the garden: 6.3 m or 6.9 m? Explain how you can answer this without using a calculator.

19. Katie and her brother Nick started a window washing business to earn money in the summer. In one job, they had to wash windows that were 4.8 m off the ground. There was a hedge of large bushes beside the house so they needed to set the base of the ladder 3.2 m away from the house. About how long did the ladder need to be?

