Name: _____ Date: _____

Chapter 6 Test

1. Simplify.
a) $(4ab^2)^2$
b) $(9x^3y)(4x^2y^2)$

2. Expand and simplify.
a) $3a^2(4a^2 + 7a - 5)$
b) $2\pi r(r + h)$
c) $(2m + 9n)^2$
d) $5(x + 9)(x - 3)$
e) $(2a - 7b)(5a + 4b)$

3. a) State the number of terms there would be, before simplifying, when multiplying a binomial by a trinomial.
b) Describe a systematic way of multiplying a binomial by a trinomial. Use an example as part of your answer.

4. The width of a box is 2 cm more than its height. The length is 3 cm more than twice the height.
a) Show this information in a diagram, using h to represent the height of the box.
b) Determine an expression for the area of the bottom of the box.

5. Solve the following equations by factoring.
a) $4a^2 + 12a = 0$
b) $3b^3 + 3b^2 - 6b = 0$
c) $2m^2 - 9m - 5 = 0$
d) $x^3 - 4x = 0$
e) $16y^4 - 81 = 0$

6. To solve the equation $3x^2 = 6x$, Viktor wrote the following solution.
$3x^2 = 6x$
$x^2 = 2x$ (Divide both sides by 3.)
$x = 2$ (Divide both sides by x.)
a) What other value is a solution?
b) What error did Viktor make?
c) What should have been Viktor's first step in solving this equation?

7. The graph shows the function $f(x) = x^3 + bx^2 + cx$. Determine the values of b and c. Note: Each tick mark on the axes represents 1 unit.

8. Solve the following equations without a calculator.
a) $x^3 = \frac{27}{8}$
b) $a^4 = 16$

9. Use a calculator to solve for the variable. Express your answers to one decimal place.
a) $x^2 = 150$
b) $\frac{4}{3}\pi r^3 = 300$

10. Use a calculator to evaluate the following expressions, to one decimal place.
a) $10^{\frac{1}{3}}$
b) $\sqrt[4]{20}$

11. a) Graph $y = x^2$ and $y = 9$ on the same set of axes.
b) Explain how to use the graph from part a) to solve $x^2 = 9$.
c) Explain how to show by graphing that there are no real roots to the equation $x^2 = -9$.

12. a) Describe how the graph defined by $y = (x - 1)^2$ compares to the graph defined by $y = x^2$.
b) Explain how to use your answer from part a) to solve $(x - 1)^2 = 16$.

978-007090899-4

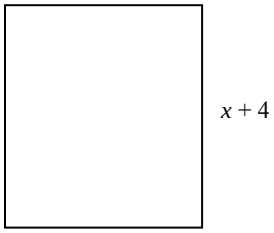
Name: _____ Date: _____

13. The formula for the surface area of a cube can be represented by $SA = 6x^2$, where x represents the side length.

a) Determine the side length of a cube with a surface area of 1000 cm^2. Express your answer to the nearest tenth of a centimetre.

b) Explain why a positive value for x is the only solution in this situation.

14. Answer the following questions for the rectangle shown.



a) What is an expression for the perimeter?

b) What is the perimeter of the rectangle if its area is 20 cm^2?

15. The formula $A = P(1 + i)^n$ relates to compound interest, where

- A is the final amount of an investment, in dollars
- P is the principal, in dollars
- i is the interest rate per period, as a decimal value
- n is the number of compounding periods

a) Ann invests $2000 at 3% per annum compounded semi-annually for 5 years.

i) State the values of the known variables.

ii) Determine the value of the missing variable.

b) Miguel invests a principal of $2000 that grows to $2530.64 with interest compounded monthly for 6 years. Determine the annual rate of interest, to the nearest percent.

16. The cost of material for a pool cover is $\$9/m^2$. At this price, a cover for a circular pool is estimated to cost $300.

a) Determine the diameter of the pool, to the nearest tenth of a metre.

b) If the radius of the pool increases by 20%, what is the cost of the pool cover?

c) Describe how to answer part b) without determining the new radius or area of the pool cover.

17. The formula for the volume of a cylinder is given by $V = \pi r^2 h$.

a) If the radius is fixed and the height is doubled, by what factor does the volume increase?

b) When the radius is fixed, is the relation linear, quadratic, cubic, or exponential?

18. Refer to the compound interest formula in #15. When P and i are fixed, is the relation linear, quadratic, cubic, or exponential?

19. The volume of a rectangular prism is given by $V = lwh$, and the surface area is given by $SA = 2(lw + lh + wh)$.

a) If you double all three dimensions, determine by what factor

i) volume increases

ii) surface area increases

b) Explain your reasoning for part a).

c) If you triple just the length, by what factor does the volume increase? Explain.

20. A rectangular prism has a surface area of 400 m^2, length of 5 m, and width of 10 m.

a) Using the formula for surface area of a rectangular prism from #19, solve for h by rearranging the formula first, then substituting the values for SA, l, and w.

b) Substitute the values for SA, l, and w into the formula from #19, and then solve for h. Verify that the results are the same as in part a).

c) Which of the two methods from parts a) and b) is more appropriate? Explain.

978-007090899-4