Unit 2 Review

Multiple Choice

For #1 to #16, choose the best answer.

1. Which of the following numbers is *not* a perfect square?

A 196

B 625

C 1000

D 1600

2. The value of the expression $16^{-\frac{1}{2}}$ is

A 4

B $\frac{1}{4}$

C $-\frac{1}{4}$

D -4

3. Identify the irrational number.

A $\sqrt{25}$

B $\sqrt{10}$

C $(\sqrt{5})^2$

D $\frac{3}{4}$

4. The expression that represents the simplified form of the radical $-2\sqrt{24}$ is

A $-8\sqrt{6}$

B $-4\sqrt{6}$

C $-12\sqrt{4}$

D -24

5. The mixed radical $3\sqrt[3]{5}$ expressed as an entire radical would be

A $\sqrt[3]{15}$

B $\sqrt[3]{45}$

C $\sqrt[3]{135}$

D $\sqrt{45}$

6. Which equation best illustrates the use of the distributive property?

A $2(3 + 3) = (2)(6)$

B $3(7 - 4) = 9$

C $4(7 + 5) = 4(5 + 7)$

D $9(5 - 6) = (9)(5) - (9)(6)$

7. The trinomial $8m^2 - 19m + 6$ is the product of which two binomials?

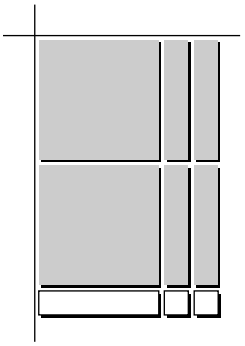
A $(8m - 3)(m - 2)$

B $(4m - 3)(2m - 2)$

C $(4m + 2)(2m + 3)$

D $(m - 3)(8m - 2)$

8. What product does the algebra tile model show?



A $2x^2 + 3x - 2$

B $(2x + 1)(x - 2)$

C $2x^2 + 4x - 2$

D $(x + 2)(-1)$

9. Which expression represents the product of $(5a - 2)(3a^2 - 6a - 7)$?

A $15a^3 - 17a^2 - 47a + 14$

B $15a^3 - 30a^2 - 35a - 9$

C $3a^2 - a - 9$

D $15a^3 - 36a^2 - 23a + 14$

10. The greatest common factor in the set of terms $48x^3y^2(z-1)^3$ and $56x^2y^4(z-1)^2$ is

A $8x^2y^2(z-1)$

B $8x^2y^2(z-1)^2$

C $4x^3y^4(z-1)^3$

D $8x^3y^4$

11. One factor of the trinomial $x^2 - 19x - 20$ could be

A $x - 5$

B $x - 1$

C $x + 1$

D $x + 4$

12. Which of the following expressions shows the trinomial $12x^2 + 6x - 60$ written as a product of its prime factors?

A $12(x-6)(x+10)$

B $6(x+2)(x-5)$

C $6(x-2)(2x+5)$

D $2(3x-6)(2x+5)$

13. The expression $\frac{2a^6b^2c}{10a^2b^{-2}c}$ written in simplest form is

A $5a^4b^4$

B $\frac{a^4}{5}$

C $\frac{a^4b^4}{5}$

D $5a^8b^0c^2$

14. The algebra tiles in the diagram represent which expression?

A $(x^2+1)(x^2+6)$

B $(x+1)(x+6)$

C $x^2 + 7x - 6$

D $(x-1)(x+6)$

15. When $\left(\frac{1}{2}r^2s^{-5}\right)\left(\frac{1}{4}r^3s^2\right)^{-1}$ is expressed in simplest form, the result is

A $\frac{r^5}{8s^3}$

B $\frac{2}{rs^7}$

C $\frac{8s^3}{r^5}$

D $\frac{1}{8r^6s^{10}}$

16. Which expression is equivalent to $\sqrt[3]{\frac{16a^6}{27}}$?

A $\frac{4}{3}a^{\frac{1}{2}}$

B $\frac{2a^2}{3}\sqrt[3]{2}$

C $\frac{2a^3}{3}\sqrt[3]{2}$

D $\frac{4a^3}{3}\sqrt[3]{\frac{1}{3}}$

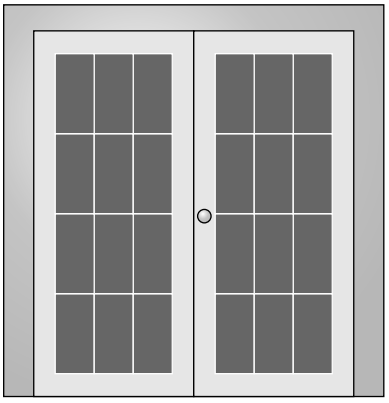
Numerical Response

17. What must be the index of the radical to make the equation $\sqrt[?]{64} = \sqrt{16}$ true?

18. If the irrational numbers $\sqrt{12}$, $\sqrt[3]{12}$, $\sqrt[5]{4}$, and $\sqrt[4]{5}$ were placed on a number line, what would be their order from least to greatest?

19. What is the value of a when the expression $\left(8^{\frac{1}{2}}\right)^3$ is written in the simplified form $a\sqrt[i]{b}$?

20. The overall dimensions of the glass in one French door can be stated as $(2x-1)$ by $(6x+2)$. If $x = 25$ cm, what is the area of glass used in both doors?



21. Given the trinomial $x^2 + kx + 64$, what is the smallest positive value of k that would make the trinomial factorable over the integers?

22. What is the value of the missing factor, m, in the equality $25x^2 - 16 = (5x - m)(5x + m)$?

23. Use a calculator to determine the value of $32^{\frac{3}{5}}$.

24. Determine the value of -9^0.

25. When $(3x - 4)$ and $(-x + 6)$ are multiplied and expressed in the form $ax^2 + bx + c$, what is the value of b?

26. What is the value of r that would make the equation $\left(\frac{a^{-2}b}{a^2b^{-1}}\right)^{-r} = \frac{a^2}{b}$ true?

27. Determine two values of k that allow each polynomial to be a perfect square trinomial. Then, factor.

a) $a^2 + ka + 9$

b) $y^2 + ky + 144$

c) $16d^2 + kd + 64$

d) $49r^2 + kr + 100$

28. Find three values of k such that the trinomial $6x^2 + kx + 15$ can be factored over the integers.

29. Determine one value of c that allows the trinomial $cy^2 + 36y - 18$ to be factored over the integers.

30. The expression $144 - 72s + 9s^2$ represents the area of a square. The variable s represents a positive integer. What are the possible values for the perimeter of the square?

31. The volume of a pyramid with a square base is $4x^3 - 12x^2 + x$. If the height of the pyramid is $3x$, what is the side length of the base expressed in terms of x?

Extended Response

32. A new Internet service is launched to allow subscribers to download and share music online. The growth in the number of people who signed up in the first four months can be modelled by the equation $U = 1(26.7)^t$, where U is the number of users and t is the number of months since the service started.

a) Using the model equation, how many people subscribed to the service in the first four months of release?

b) If the subscription pattern continued according to this model, how many subscribers would there be after five months?

c) Could the number of subscribers continue to grow at this rate for one year? Explain.

33. The partial solution for the multiplication of two polynomials is shown.

$$\begin{aligned}&(5a - 3)(4a + 7)\\ &= 5a(4a + 7) - 3(4a + 7)\\ &= 20a^2 + 7 - 12a + 7\\ &= 8a^2 + 14\end{aligned}$$

a) Identify and explain the error in the solution for the polynomial multiplication.

b) Provide a correct product for the multiplication.

c) Verify your solution for the product by substituting $a = 2$.

34. Demonstrate algebraically the complete factorization of the following trinomials.

a) $x^2 + 8x + 16$

b) $x^2 + 8x + 15$

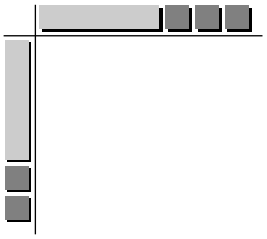
c) $3y^2 - 6y - 24$

d) $2a(b - 7) - 5(b - 7)$

e) $x^2 - 121$

f) $64x^2 - 196y^2$

35. The algebra tiles in the diagram represent the multiplication of two binomials.



a) Write an expression that represents each binomial.

b) Complete the diagram to represent the product of the two binomials.

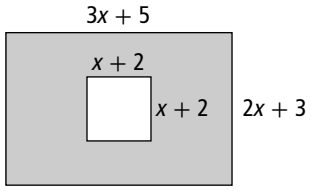
c) Express the product of the two binomials in simplified form.

36. The length of one edge of a cube is represented by $2k - 1$.

a) Write an expression in simplest form for the volume of the cube.

b) A smaller cube with a side length of $k + 1$ is removed from the larger cube. Write an expression in simplified form for the volume that remains.

37. Determine the area of the shaded region. Express the answer in simplest form.



38. Consecutive integers are integers that follow each other in order.

a) Would it be possible to factor $ax^2 + bx + c$ if the values of a, b, and c were positive consecutive integers?

b) Find three consecutive integers for a, b, and c that would make the trinomial $ax^2 + bx + c$ have binomial factors.

39. Factor $2r^5 - 4r^3 + 2r$ completely.

40. The Golden Ears Bridge in British Columbia, which opened in 2009, spans the Fraser River.

a) Factor the expression $20x^2 - 97x - 15$ to find the binomials that represent the length and width of the bridge.

b) Calculate the length and width of the bridge if $x = 40$ m.

41. You have been asked to factor the expression $84ab^2 - 54abc + 6ac^2$.

a) What is the first step when factoring this expression?

b) What are the factors?

42. a) Consider the following three factored differences of squares.

$9x^2 - 9 = (3x + 3)(3x - 3)$
$16m^2 - 64 = (4m - 8)(4m + 8)$
$36d^2 - 100 = (6d - 10)(6d + 10)$

In each case, is the product of the factors the original expression?

b) Are these differences of squares factored correctly? Explain.

c) If your answer to part b) is no, factor the expressions correctly.

d) Suggest a guideline to follow in cases of this type to ensure that the difference of squares expression has been factored completely.

43. a) Rewrite the polynomial $3y^2 + cy - 12$, replacing the variable c with an integer so that it is possible to remove a common factor from the rewritten polynomial.

b) What do we know about the integer that replaces the variable c?