Algebra Chapter 8 Test – Review with Answer Key

Simplify.
1. \(3y^5 \cdot y^3\)

2. \((9m^3n^5)(-2mn^2)\)

3. \((w^5y^4)^3\)

4. \(4a^3n^6 + 4(a^3n)^6 + 4(an^2)^3\)

For Questions 5–7, simplify. Assume that no denominator is equal to zero.

5. \(\frac{p^5y^2}{p^7q}\)

6. \(\frac{16r^2s^{-5}}{4r^{-1}s^2}\)

7. \(\frac{-8x^2y^2z^2}{(4x^2y)^3}\)

8. Express 0.000498 in scientific notation.

9. Express \(1.27 \times 10^5\) in standard notation.

For Questions 10 and 11, express each result in scientific and standard notation.

10. Evaluate \((2.5 \times 10^{-2} \times 4 \times 10^6)\).

11. The radius of Earth is approximately \(2.51 \times 10^8\) inches. The radius of the Sun is approximately \(2.74 \times 10^{10}\) inches. How many times greater is the radius of the Sun than the radius of Earth?

12. Find the degree of the polynomial \(2x^3y^3 + 4xy - 10x^3y\).

13. Arrange the terms of the polynomial \(4 + 3x^3y^3 - x^5y + xy\) so that the powers of \(x\) are in descending order.
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Find each sum or difference.
14. \((5n^2 - 2ny + 3y^2) - (9n^2 - 8ny - 10y^2)\)  
15. \((11m^2 - 2mn + 8n^2) + (8m^2 + 4mn - 2n^2)\)
16. \((x^2 + 5y) - (2x^2 + 6y)\)

Find each product.
17. \(5hk(2h^2k - hk^2 + 4h^2k^2)\)
18. \((-4x^2 + 2y^2)(2x^2 - y^2)\)
19. \((3s + 5)(2s^2 - 8s + 6)\)
20. \((5c - 4)^2\)
21. \((7a - 3b)(7a + 3b)\)
22. \((4n + 1)^2\)

For Questions 23 and 24, solve each equation.
23. \(-6(3n - 2) = 4(-3 - 2n)\)
24. \(8n + 11 = 4 + 5(2n - 1)\)

25. GARDENING The length of a rectangular garden is 8 feet longer than the width. The garden is surrounded by a 4-foot sidewalk. The sidewalk has an area of 320 square feet. Find the dimensions of the garden.

Bonus If you multiply \((x + 1)^20\), how many terms will there be? (Hint: Look for a pattern in the smaller powers of \((x + 1)\).)

B: ___________
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**Bonus** If you multiply \((x + 1)^{20}\), how many terms will there be? *(Hint: Look for a pattern in the smaller powers of \((x + 1)\).)*
\[ 3y^5 \cdot y^3 = 3y^8 \]

\[ (a^3 n^5)(-2n^2) = -18m^4 n^7 \]

\[ (w^5 y^4)^3 = w^{15} y^{12} \]

Multiply

\[ 4a^3 n^6 + 4(a^3 n^6) + 4(a^3 n^6) \]
\[ = 4a^3 n^6 + 4a^{18} n^6 + 4a^3 n^6 \]
\[ = 8a^3 n^6 + 4a^{18} n^6 \]

\[ \frac{p^6 q^2}{p^3 q^1} = p^3 q \]

Subtract the exponents

\[ \frac{4r^4 s^{-5}}{s^{-2}} = \frac{4r^4}{s^7} \]

\[ \frac{-8x^2 y^2}{(4x^3 y^3)^3} = \frac{64x^4 y^4}{64x^9 y^9} = \frac{y}{x^5} \]
8. \(0.000498\)

\[0.000498 \times 10^{-4}\]

9. \(1.27 \times 10^5\)

\(1.27 \times 10^5\) to the right

\(1.27000\) \(\rightarrow 5\)

10. \((2.5 \times 10^{-2})(4 \times 10^6)\)

\((2.5 \times 4)(10^{-2} \times 10^6)\) \(\leftarrow\) regroup

\((10)(10^4)\)

\(10 \times 10^4 = 100000\)

100,000 \(\rightarrow\) \(1 \times 10^5\)

11. \[
\frac{\text{sun}}{\text{earth}} = \frac{2.74 \times 10^8}{2.51 \times 10^{10}} = 1.09163347 \times 10^{-2}
\]

\[
\begin{array}{c}
2.51 \div 2.74,000 \\
\underline{-2.51} \\
2.00 \\
\underline{-2.259} \\
0.410 \\
\underline{2.51}
\end{array}
\]

4 \(\times 9\)

\[
\begin{array}{c}
4 \\
\underline{251} \\
\underline{2259}
\end{array}
\]
12. \[ 2x^3y^3 + 4xy' - 10x^3y' \]
   \[ \text{degree: 6} \]

13. \[ 4 + 3x^3y^3 - x^5y + xy \]
   \[ \text{descending to greatest to least} \]
   \[ -x^5y + 3x^3y^3 + xy + 4 \]

14. \[ (5n^2 - 2ny + 3y^2) - (9n^2 - 8ny - 10y^2) \]
   \[ = 5n^2 - 2ny + 3y^2 - 9n^2 + 8ny + 10y^2 \]
   \[ = -4n^2 + 6ny + 13y^2 \]

15. \[ (11m^2 - 2mn + 8n^2) + (8m^2 + 4mn - 2n^2) \]
   \[ = 19m^2 + 2mn + 6n^2 \]

16. \[ (x^2 + 5y) - (2x^2 + 6y) \]
   \[ = x^2 + 5y - 2x^2 - 6y \]
   \[ = -x^2 - y \]
17. \[ 5hk^2(2h^2k - hk^3 + 4h^2k^2) \]
   \[ 10h^3k^3 - 5h^2k^5 + 20h^3k^4 \]

18. \[ (4x^2 + 2y^2)(2x^2 - y^2) \]
   \[ 8x^4 - 4x^2y^2 + 4x^2y^2 - 2y^4 \]
   \[ 8x^4 - 2y^4 \]

19. \[ (3s + 5)(2s^2 - 8s + 6) \]
   \[ 6s^3 - 24s^2 + 18s + 10s^2 - 40s + 30 \]
   \[ 6s^3 - 14s^2 - 22s + 30 \]

20. \[ (5c - 4)^2 = (5c - 4)(5c - 4) \]
   \[ 25c^2 - 20c - 20c + 16 \]
   \[ 25c^2 - 40c + 16 \]

21. \[ (7a - 3b)(7a + 3b) \]
   \[ 49a^2 + 21ab - 21ab - 9b^2 \]
   \[ 49a^2 - 9b^2 \]
22. \[(4n + 1)^2 = (4n + 1)(4n + 1)\]
\[= 16n^2 + 4n + 4n + 1\]
\[= 16n^2 + 8n + 1\]

23. \[-6(3n - 2) = 4(-3 - 2n)\]
\[-18n + 12 = -12 - 8n\]
\[+18n\]
\[+18n\]
\[12 = -12 + 10n\]
\[+12 + 12\]
\[24 = 10n\]
\[\frac{24}{10} = \frac{10n}{10}\]
\[2.4 = n\]

24. \[8n + 11 = 4 + 5(2n - 1)\]
\[8n + 11 = 4 + 10n - 5\]
\[8n + 11 = 10n - 1\]
\[-8n\]
\[-8n\]
\[11 = 2n - 1\]
\[+1\]
\[12 = 2n\]
\[6 = n\]
The entire figure - the garden = area of sidewalk.

\[(x+16)(x+8) - (x)(x+8) = 320\]

\[x^2 + 8x + 16x + 128 - x^2 - 8x = 320\]

\[16x + 128 = 320\]

\[-128\]

\[16x = 192\]

\[16 \times \frac{x}{12} = \frac{192}{32}\]

\[x = 12\]

Dimensions of the garden: 12 by 20