Algebra 2

Assessment 1 [A]

Name: Kai Ash

Block: 2

W1 - Working with Exponents

W1.a) I can simplify expressions using the rules of exponents **(Priority Target)**

W1.b) I can translate between roots and rational exponents.

W1.c) I can apply the distributive, commutative, and associative properties to manipulate expressions.

W1.d) I can simplify and evaluate square roots and cube roots without a calculator.

W1.e) I can perform operations with numbers expressed in scientific notation.

W1.f) I can simplify roots of negatives using imaginary numbers.

Instructions
- No notes. <u>Four-function calculator only.</u>
- Show your work to demonstrate understanding

+8

---

1. If $x = -3$, what is the value of $2x^4$?

$$2(-3)^4 = 2(-81)$$
$$-162 \text{ is the value of } 2(-3)^4$$

2. Rewrite the rational exponent as a radical

$$4x^{2/3} = \sqrt[3]{4x^2}$$

3. Rewrite the expression using rational exponents:

$$2\sqrt{3x} = 6x$$

4. Evaluate the following:

$$64^{1/3} = \sqrt[3]{64^1} = \sqrt[3]{4}$$

$$2.6^3 = 17.58$$

$$49^{1/2} = \sqrt[2]{49} = \sqrt[8]{7}$$

$$\left(\frac{2}{3}\right)^{-2} =$$

$$8^{4/3} = \sqrt[3]{8^4} = \cancel{}$$

$$9^{2.5} =$$

5. Simplify:

$$\sqrt{300} = \sqrt{3 \cdot 10 \cdot 10} = \sqrt{3}\sqrt{2}\cdot\sqrt{5}\cdot\sqrt{2}\cdot\sqrt{5}$$

$$\sqrt{-45} =$$

$$\sqrt[3]{-27} =$$

$$\sqrt{8x^4} =$$

+1.5

Simplify each expression. Rewrite any negative exponents

✓ 6. $(6x^6)(4x^2)$

$24x^8$

✓ 7. $x^3(2x^3)^2$

$2^2 \cdot x^3(x^3)^2 = 4 \cdot x^3 \cdot x^6$

$= 4x^9$

P 8. $\dfrac{24x^4}{3x^8} = 8x^{-4} = \dfrac{1}{8x^4}$

✗ 9. $\dfrac{3x+x^5}{x^3} \cdot 2x^2$ $3x+x^2 \cdot 2x^2$

$3x+2x^4$

✗ 10. $\dfrac{6y}{x^3} \cdot \dfrac{x^4}{2xy^2}$ $12xy^3 \cdot x^7$

$12x^8y^3$

✗ 11. $3x^3(x^2+2)^2$

$(3x^5+6x^3)^2$

$9x^{10}+36x^6$

✓ 12. If $3^x = 7$, what is the value of $2 \cdot 9^x$?

$2 \cdot 9^x$ is the same as $2 \cdot 49$ because if 3^x is 7, then 9^x must be 49 because $3 \times 3 = 9$ so

Value is 98

✗ 13. The formula for the volume of a cylinder is $V = \pi r^2 h$. If the volume of a cylinder is $54\pi a^2 b^3$ and the height is $6b$, what is the radius?

$\dfrac{54\pi a^2 b^3}{-\pi} = \dfrac{\pi r^2 6b}{-\pi} \div \pi$

$54 a^2 b^3 = r^2 6b$

$\dfrac{\sqrt{54}\sqrt{a^2}\sqrt{b^3}}{6b} = \dfrac{r 6b}{6b}$

$r = \dfrac{\sqrt{54}\sqrt{a^2}\sqrt{b^3}}{6b}$

$+3.5$

14. Explain the error: $3x^{-2} = \dfrac{1}{3x^2}$

only x^{-2} should be down there.
The equation should be

$$3x^{-2} = 3 \cdot \dfrac{1}{x^2}$$

15. Explain the error: $\sqrt{x^9} = x^3$

16. Explain the steps used to simplify this expression: $4 \cdot 8^{x+1}$

These steps may contain errors, so point out anything that is wrong. For correct steps, write out the rule of exponents or the property of algebra that was used.

Step 1	$4 \cdot 8^{x+1}$	Original problem (no explanation needed)
Step 2	$2^2 \cdot 8^{x+1}$	
Step 4	$2^2 (2^3)^{x+1}$	
Step 5	$2^2 \cdot 2^{3x+1}$	
Step 6	2^{3x+3}	

+1

17. Write the number in scientific notation:

$45{,}800{,}000{,}000 = 4.58 \times 10^{10}$

18. Convert the number from scientific notation to write as a normal decimal:

$28.3 \times 10^{-5} = 0.0000283$

19. In Chemistry, the ideal gas law relates the pressure P (in Pascals), volume V (in cubic meters), temperature T (in Kelvin), and number of atoms N of an ideal gas via the constant $k = 1.381 \times 10^{-23}$ (in Joules per Kelvin) according to the equation:

$$P = \frac{NkT}{V}$$

What would be the pressure if 2.3×10^{24} Oxygen atoms were stored in a 4.2×10^{-3} m³ vessel at a temperature of 2.92×10^2 Kelvin?

$$P = \frac{(2.3 \times 10^{24}) \cdot (1.381 \times 10^{-23}) \cdot (2.92 \times 10^2)}{4.2 \times 10^{-3}}$$

$$P = \frac{9.27 \times 10^3}{4.2 \times 10^{-3}}$$

good work here!

$$P = 2.21 \times 10^6$$

+2