

**Gateway Exam #1 Practice Problems
Laws of Exponents**

1. If x is a positive quantity, the expression $\sqrt{\frac{x^{10}}{x^6}}$ could be simplified to:

- (a) x^{-2}
- (b) x^2
- (c) x^{18}
- (d) x^9
- (e) x

2. The expression $(a^2)^3$ could be simplified to:

- (a) a^6
- (b) a^5
- (c) $a^{2/3}$
- (d) $a^{3/2}$
- (e) a^{-1}

3. If b is a positive quantity, the expression $\frac{b}{\sqrt{b}}$ could be simplified to:

- (a) b^2
- (b) $b^{1/2}$
- (c) b
- (d) $b^{3/2}$
- (e) The given expression cannot be simplified any further.

4. The expression $\sqrt[3]{u^{18}}$ could be simplified to:

- (a) u^9
- (b) u^{54}
- (c) u^{27}
- (d) u^6
- (e) u^{15}

5. The expression $\frac{3}{x^2}$ could be simplified to:

- (a) $3 + x^2$
- (b) $(3x)^{-2}$
- (c) $3x^{-2}$

- (d) 9
- (e) $\left(\frac{3}{x}\right)^2$

6. The expression $\frac{w^{10}}{w^9}$ could be simplified to:

- (a) $w^{10/9}$
- (b) w^{19}
- (c) $10w^9$
- (d) w^{-1}
- (e) w

7. The expression $\left(\frac{a^2}{b}\right)^4$ could be simplified to:

- (a) $\frac{a^2}{b^4}$
- (b) $\frac{a^6}{b}$
- (c) $\frac{a^8}{b}$
- (d) $\frac{a^6}{b^4}$
- (e) $\frac{a^8}{b^4}$

8. The expression $(a^2b)^5$ could be simplified to:

- (a) $a^{10}b^5$
- (b) a^2b^5
- (c) a^7b
- (d) a^7b^5
- (e) $a^{10}b$

9. The expression $x^{10}x^3$ could be simplified to:

- (a) x^{30}
- (b) x^{13}
- (c) x^7
- (d) $x^{10/3}$
- (e) The given expression cannot be simplified further.

10. The expression $b^4\frac{b^2}{b^{10}}$ could be simplified to:

- (a) b^{16}
- (b) $b^{0.6}$
- (c) b^{-8}
- (d) b^{-4}
- (e) b^{14}

11. The expression $a^0\sqrt{a}$ could be simplified to:

- (a) $a^{1/2}$
- (b) a^2
- (c) a
- (d) $a^{-1/2}$
- (e) 0

12. The expression $\frac{\sqrt[3]{b}}{a^0}$ could be simplified to:

- (a) $\left(\frac{b}{a}\right)^{1/3}$
- (b) $\left(\frac{b}{a}\right)^3$
- (c) $b^{1/3}$
- (d) More information on a and b is needed in order to simplify the given expression any further.
- (e) The given expression cannot be simplified because it is undefined.

13. If x is a positive quantity, the expression $\sqrt[4]{\frac{1}{x}}$ could be simplified to:

- (a) $4x^{-1/2}$
- (b) x^{-4}
- (c) $4x$
- (d) $\frac{4}{x}$
- (e) $x^{-1/4}$

14. The expression $(\sqrt[3]{u})^9$ could be simplified to:

- (a) $u^{1/3}$
- (b) u^3
- (c) $u^{9/2}$
- (d) $3u^{9/2}$
- (e) u^{27}

15. The expression $(a^{-4})^4$ could be simplified to:

- (a) a^0
- (b) 1
- (c) a^8
- (d) a^{-16}
- (e) a^{-8}

Answers:

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|-------|-------|-------|-------|-------|
| 1. e | 2. a | 3. b | 4. d | 5. c |
| 6. e | 7. e | 8. a | 9. b | 10. d |
| 11. a | 12. c | 13. e | 14. b | 15. d |