Problems for Gateway #1: Laws of Exponents

1. If x is a positive quantity, the expression $\sqrt{\frac{x^{10}}{x^8}}$ could be simplified to:

(a) x^{-2} **(b)** x^2

(c) x^{18} **(d)** x^9

(e) x

2. The expression $\left(a^2\right)^3$ 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) This 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)** $(3\cdot x)^{-2}$

(c) $3\cdot x^{-2}$ **(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) $10 \cdot w^{9}$ **(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 $\left(a^{2} \cdot b\right)^{5}$ could be simplified to:

(a) $a^{10} \cdot b^{5}$ **(b)** $a^{2} \cdot b^{5}$

(c) $a^{7} \cdot b$ **(d)** $a^{7} \cdot b^{5}$

(e) $a^{10} \cdot b$

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

(a) x^{30} **(b)** x^{13}

(c) x^{7} **(d)** $x^{10/3}$

(e) The expression cannot be simplified any further.

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

(a) b^{16} **(b)** $b^{0.6}$

(c) b^{-8} **(d)** b^{-4}

(e) b^{14}

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

(a) $a^{1/2}$ **(b)** a^2

(c) a **(d)** $a^{-1/2}$

(e) 0

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

(a) $\left(\dfrac{b}{a}\right)^{1/3}$ **(b)** $\left(\dfrac{b}{a}\right)^3$

(c) $b^{1/3}$

(d) More information on a and b is needed in order to simplify any further.

(e) The expression cannot be simplified because it is undefined.

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

(a) $4 \cdot x^{-1/2}$ **(b)** x^{-4}

(c) $4x$ **(d)** $\dfrac{4}{x}$

(e) $x^{-1/4}$

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

(a) $u^{1/3}$ **(b)** u^3

(c) $u^{9/2}$ **(d)** $3 \cdot u^{9/2}$

(e) u^{27}

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

(a) a^0 **(b)** 1

(c) a^8 **(d)** a^{-16}

(e) a^{-8}

Answers:

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						