

Name: Answer Key

Lesson Topic:
Understanding Exponents

Last Name: _____

$$a^0 = 1 \quad a^1 = a$$

$$a^n \times a^m = a^{n+m}$$

$$a^n \div a^m = a^{n-m}$$

Exponents

I. Solve these for warm-up:

1. $15^2 = 225$

4. $5.5^2 = 30.25$

7. $(-5)^3 = (-5)(-5)(-5) = -125$

2. $45^2 = 2025$

5. $6.5^2 = 42.25$

8. $-5^4 = -625$

3. $0.1^2 = 0.01$

6. $(-5)^2 = 25$
 $(-5)(-5)$

9. $(-5)^4 = 625$

II. Using the laws of exponents first simplify, then (and only then!) solve:

1. $2^3 \div 2^1 = 2^2 = 4$

6. $15^4 \div 15^2 = 15^2 = 225$

2. $2^3 \div 2^2 = 2^1 = 2$

7. $101^4 \div 101^3 = 101^1 = 101$

3. $2^3 \div 2^3 = 2^0 = 1$

8. $2^3 \times 2^5 \div 2^5 = 2^3 = 8$

4. $2^7 \div 2^5 = 2^2 = 4$

9. $2^3 \times 2^0 \div 2^1 = 2^2 = 4$

5. $9^7 \div 9^5 = 9^2 = 81$

10. $3^{15} \times 3^{25} \div 3^{40} = 3^0 = 1$

III. Using the laws of exponents simplify the following:

1. $(a) + a^2 + (a) = a^2 + 2a$

5. $a^7 \times a^3 \div a^4 = a^6 = 1$

2. $a^1 \times a^2 \times a^1 = a^4$

6. $a^3 + \underbrace{a^5 \div a^2} = a^3 + a^3 = 2a^3$

3. $4b + 3b - 2b = 5b$

7. $a^7 - \underbrace{a^5 \times a^2} = a^7 - a^7 = a^0 = 1$

4. $\underbrace{4b^1 \times 3b^1} \div 2b^1 = 6b^1$
 $12 \div 2 = 6$

8. $a^n \div a^m = a^{n-m}$

Exponents

$$a^0 = 1 \quad a^1 = a$$

$$a^n \times a^m = a^{n+m}$$

$$a^n \div a^m = a^{n-m}$$

I. Solve these for warm-up:

$$1. 75^2 = 5625$$

$$5. 7.5^2 = 56.25$$

$$9. -0.2^2 = -0.04$$

$$2. 105^2 = 11025$$

$$6. 10.5^2 = 110.25$$

$$10. -0.2^3 = -0.008$$

$$3. 0.1^3 = 0.001$$

$$7. (-0.2)^2 = 0.04$$

$$11. -0.5^4 = -0.0625$$

$$4. 0.01^2 = 0.0001$$

$$8. (-0.2)^3 = -0.008$$

$$12. (-0.5)^4 = 0.0625$$

II. Using the laws of exponents first simplify, then (and only then!) solve:

$$1. 5^3 \div 5^0 = 5^2 = 25$$

$$8. 1.5^4 \div 1.5^2 = (1.5)^2 = 2.25$$

$$2. 5^3 \div 5^1 = 5^2 = 25$$

$$9. 0.1^6 \div 0.1^3 = (0.1)^3 = 0.001$$

$$3. 5^3 \div 5^2 = 5^1 = 5$$

$$10. 2^2 \times 2^3 \div 2^3 = 2^2 = 4$$

$$4. 5^3 \div 5^3 = 5^0 = 1$$

$$11. 2^2 + \underbrace{2^3 \div 2^3} = 2^2 + 2^0 = 2^2 = 4$$

$$5. 3^8 \div 3^5 = 3^3 = 27$$

$$12. 2^2 - \underbrace{2^3 \div 2^2} = 2^2 - 2^1 = 2^1 = 2$$

$$6. 3^7 \div 3^4 = 3^3 = 27$$

$$13. 7^3 \times 7^0 \div 7^1 = 7^2 = 49$$

$$7. 10^9 \div 10^5 = 10^4 = 10000$$

$$14. 7^5 \times 7^1 \div 7^5 = 7^1 = 7$$

III. Using the laws of exponents simplify the following:

$$1. a^2 + a^2 + a^2 = 3a^2$$

$$7. a^7 \times a^3 \div a^4 = a^6 = 1$$

$$2. a^2 \times a^2 \times a^2 = a^6$$

$$8. a^3 + \underbrace{a^5 \div a^2} = a^3 + a^3 = 2a^3$$

$$3. \underbrace{(a^2 + a^3)} + \underbrace{(a^2)} = a^3 + 2a^2$$

$$9. a^7 - \underbrace{a^5 \times a^2} = a^7 - a^7 = 0a = 0$$

$$4. a^2 \times a^3 \times a^2 = a^7$$

$$10. a^n \times a^m = a^{n+m}$$

$$5. 4a^2 + 3a^2 - 2a^2 = 5a^2$$

$$11. a^n \div a^m = a^{n-m}$$

$$6. \underline{4}a^{\underline{2}} \times \underline{3}a^{\underline{2}} \div \underline{2}a^{\underline{2}} = 6a^2$$

$$12. a^n \times a^m \div a^m = a^n$$

$$4 \times 3 \div 2 = 6$$

$$2 + 2 - 2 = 2$$