**1) Represent repeated multiplication with exponents.**



53 x 52 = 5 x 5 x 5 x 5 x 5



**2) Describe how powers represent repeated multiplication.**

A power is a shorter way of repeated multiplication. So instead of 3 x 3 x 3 x 3 you add up the number of threes to replace it with 34



**3) demonstrate the difference between the exponent and the base by building models of a given power, Such as 23 and 32.**



23  32



The exponent or power represents how many times you multiply the base by it self

**4) demonstrate the difference between two given powers in which the exponent and the base are**



**Interchanged by using repeated multiplication, such as 23 and 32.**



Multiplying 5 four times will not have the same outcome as 4 multiplied five times.



**5) Evaluate powers with integral bases (excluding base 0) and whole number exponents.**

43 x 47 = 4 x 4 x 4 x 4 x 4 x 4 x 4 x 4 x 4 x 4 = 410 = 1 048 576

**6) Explain the role of parentheses in powers by evaluating a given set of powers such as (-2)4 (-24) -24**(-2)4 = (-2) (-2) (-2) (-2) =16 The parentheses determine how the equation is portrayed when evaluating.



(-24) = (-1 X 2 X 2 X 2 X 2) = **-**16

-24 = -1 X 2 X 2 X 2 X 2= **-**16

**7) Explain the exponent laws for multiplying powers with the same base**



when you multiply powers with the same base you need to take each exponent and add them together.

53 x 52 = 53+2 = 55

**8) Explain the exponent laws for dividing powers with the same base.**

When you divide powers with the same base you need to take each exponent and subtract them.

53 ÷ 52 = 53-2 = 51

**9) Explain the exponent laws for raising a product and quotient to an exponent.**

(3 x 2)2 = 32 x 22 = 9 x 4 = 36 because (3 x 2)2 = (6)2 = 36

(6 ÷ 2)2 = 62 ÷ 22 = 36 ÷ 4 = 9 because (6 ÷ 2)2 = (3)2 = 9

**10) Explain the law for powers with an exponent of zero.**

Whenever 0 is the exponent the answered will always be 1

**11) Use patterns to show that a power with an exponent of zero is equal to one.**

(57 ÷ 103)0 = 1 or (3 x 67)0 = 1

**12) I can apply the laws of exponents.**

Power law: keep the base-multiply the exponents

(32)4

Product law: multiply coefficients- keep the base- add the exponents

33 x 32 = 33+2

Quotient law: keep the base- subtract the exponents- divide coefficients

33 ÷ 32 = 33-2

Zero law: any number except 0 raised to an exponent of 0 equals 1

(33 x 32)0 = 1

**13) I can identify the error in a simplification of an expression involving powers.**

32 x 35 =910

I multiplied both the base and the exponents. I know this is wrong because the product law states that you keep the base and add the exponents.

32 x 35 = 37



**14) Use the order of operations on expressions with powers.**

6 x 34 ÷ (-32) + 7 x 53 = 929

6 x 81 ÷ (9) + 7 x 125

486 ÷ (9) + 7 x 125

54 + 7 x 125

54 + 875

929

Using BEDMAS and the exponent laws I was able to solve this equation successfully.

**15) Determine the sum and difference of two powers.**

Sum: 22 + 23 = 4 + 8 = 12

Difference: 23 – 22 = 8 – 4 = 4

**16) Identify the error in applying the order of operations in an incorrect solution.**

1) 6 x 34 ÷ (-32) + 7 x 53  The equation went wrong in step 4 because I didn’t use the order of

2) 6 x 81 ÷ (9) + 7 x 53 operations instead I did the exudation from left to right.

3) 486 ÷ (9) + 7 x 53

4) 54 + 7 x 53←

5) 61 x 125

6) 7625

**17) Use powers to solve problems (measurement problems)**

In the story Alice in wonderland, Alice could change her size dramatically by eating cake. If she needed to triple her height, she would eat a piece of cake. Imagine she is 1m tall. She needs to increase her height to 700m in order to see over the hill. How many pieces of cake does she need to eat? (pg. 92, math links 9 textbook)

3x = 700 x = 6

1. 2 3 4 5 6

3 9 27 81 243 729

I chose the trial and error method to figure this question out

18) Use powers to solve problems (growth problems)

A single bacterium double in number every hour. How many bacteria are present after 15 hours?

(pg. 98, math links 9 textbook)

215=32768

2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2