MID-TERM EXAM PREPARATION

CHAPTER 2 – POWERS AND EXPONENT LAWS

1. Label the diagram.

Exponent

Base

5^3
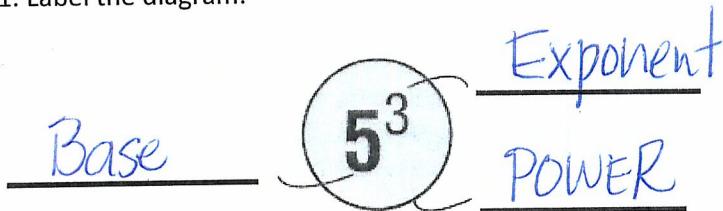
POWER

2. Fill in the blanks.

A power with an integer base and exponent 2 is a

Square

A power with an integer base and exponent 3 is a

cube

$-(2)^6 \quad -(2)(2)(2)(2)(2)(2)$

$-(4)^3 \quad -(4)(4)(4)$

$-(8)^2 \quad -(8)(8)$

3. Fill in the chart.

Repeated multiplication	As a power	Standard Form
6 x 6 x 6 x 6 x 6	6^5	7776
(-3)(-3)(-3)	$(-3)^3$	-27
this one could be a number of ways		-64
-(-10)(-10)(-10)(-10)	$-(10)^4$	-10000

4. Predict whether each answer is positive or negative, then evaluate.

a) $(-2)^3$ b) -2^1 c) $(-4)^0$ d) 5^1

Negative   Negative   positive   positive

$(-2)(-2)(-2)$ -2 1 5

-8

5. Write each number as a power with base 2.

a) 4 $= 2^2$ b) 16 $= 2^4$ c) 64 $= 2^6$

d) 256 $= 2^8$ e) 32 $= 2^5$ f) 128 $= 2^7$

6. Evaluate each power of 10.

a) 10^2 b) -10^6 c) $(-10)^0$

10×10 $-(10)(10)(10)(10)(10)(10)$ 1

100 $-1\,000\,000$

7. Fill in the chart.

Standard Form	As powers of 10
23, 409	$(2 \times 10^4) + (3 \times 10^3) + (4 \times 10^2) + (9 \times 10^0)$
40,053,030	$(4 \times 10^7) + (5 \times 10^4) + (3 \times 10^3) + (3 \times 10^1)$
3,210	$(3 \times 10^3) + (2 \times 10^2) + (1 \times 10^1)$

8. Evaluate.

a) $[3 \times (-2)^3 - 4]^2$

$[3 \times (-8) - 4]^2$

$[-24 - 4]^2$

$(-28)^2$

784

b) $(-7 + 5)^2 - [4 + (-1)^3]$

$(-2)^2 - (3)^2$

$4 - 9$

-5

c) $9^2 \div (-3)^3 - 5^2 - 2^5$

$81 \div (-27) + 25 - 32$

$-3 + 25 - 32$

$22 - 32$

-10

d) $(3^7 - 2^{11})^1 \div (4^7 + 3^8)^0$

$(2187 - 2048)^1 \div 1$

$139 \div 1$

139

e) $[8^4 \div (-4)^6 \times 2^0]^{10}$

$[4096 \div 4096 \times 1]^{10}$

$[1 \times 1]^{10}$

$(1)^{10}$

1

f) $(-4)^2 - 3^3 + (-2)^4 - 1^5$

$16 - 27 + (+16) - 1$

$-11 + 16 - 1$

$5 - 1$

4

9. Use a calculator to evaluate.

a) $(36 \div 2^2 + 11)^3 - 10^5$

$(36 \div 4 + 11)^3 - 100000$

$(9 + 11)^3 - 100000$

$(20)^3 - 100000$

$8000 - 100000$

-92000

b) $\dfrac{12^3}{36(12^0 - 13^1)}$

$\dfrac{1728}{36(1 - 13)}$

$\dfrac{1728}{36(-12)} = \dfrac{1728}{-432}$

-4

10. Write each as a single power.

a) $6^5 \times 6^{11} \div 6^8$ $\quad$ $5+11-8$

6^8

b) $(-3)^6 \div (-3)^2 \times (-3)^4$ $\quad$ $6-2+4$

$(-3)^8$

c) $\dfrac{(-5)^6 \times (-5)^9}{(-5)^7 \times (-5)^5}$ $\quad 6+9$ $\quad 7+5$

$\dfrac{(-5)^{15}}{(-5)^{12}}$

$(-5)^3$

d) $\dfrac{2^8}{2^2} \times \dfrac{2^{12}}{2^4}$

$2^6 \times 2^8$

2^{14}

11. Evaluate

a) $7^2 - (4^3 \times 4^0) + 3^2$

$49 - 64 + 9$

$-15 + 9$

-6

b) $[(-2)^8 \div (-2)^4] - [(-2)^7 \div (-2)^5]$ $\quad 8-4 \quad 7-5$

$(-2)^4 - (-2)^2$

$16 - 4$

12

c) $-5^2(5^4 \div 5) - 5^3$ $\quad 4-1$

$-5^2(5^3) - 125$

$-5^5 - 125$

$-3125 - 125$

-3250

d) $\dfrac{8^{13} \times 8^{14}}{8^{15} \times 8^9}$

$\dfrac{8^{27}}{8^{24}}$

8^3

512

12. Simplify by applying your exponent laws and then evaluate.

a) $(6^2)^8 \div (6^4)^2$

$6^{16} \div 6^8$

6^{16-8}

6^8

b) $(7^4 \div 7^2)^3 + (3^5 \div 3^2)^3$

$7^{12} \div 7^6 + 3^{15} \div 3^6$

$7^6 + 3^9$

$117649 + 19683 \rightarrow 137332$

c) $[(-2)^5 \div (-2)^4]^3 - [(-5)^2 \times (-5)^3]^0$

$[(-2)^1]^3 - [(-5)^5]^0$

$(-2)^3 - 1$

$-8 - 1 \Rightarrow -9$

d) $(4 \times 9)^4 + (3^5)^2$

$(36)^4 + 3^{10}$

$1679616 + 59049 = 1738665$

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13. A wheat field is 10 000 m wide. The area of the field is $10^8 \ m^2$. $\quad 10^4$ SQUARE

a) Use the exponent laws to determine the length of the field.

$A = l \times w$

$\dfrac{A}{w} = l$

$l = \dfrac{10^8}{10^4} = 10^{8-4} = 10^4$

b) What is the perimeter of the field? Did you use any exponent laws to calculate the perimeter? Explain.

$P = 4 \times (10^4)$

$P = 4 \times 10000$

$P = 40000 \ m$ or $40 \ Km$

14. TRY THESE HARDER ONES!!!

a) $[(-3)^4]^2 \times [(-4)^0]^2 - [(-3)^2]^0$

$(-3)^8 \times [(-4)]^0 - [(-3)]^0$

$6561 \times 1 - 1$

6560

b) $[(-2)^4]^3 + [(-4)^3]^2 - [(-3)^2]^4$

$(-2)^{12} + [(-4)^6] - [(-3)]^8$

$4096 + 4096 - 6561$

$8192 - 6561$

1631

c) $[(-5) \times (-4)]^3 + [(-6)^3]^2 - [(-3)^9 \div (-3)^8]^5$

$(20)^3 + (-6)^6 - [(-3)^1]^5$

$8000 + 46656 - [(-3)^5]$

$8000 + 46656 - (-243)$

$54656 + 243$

54899