Chapter 2

Test review

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2.1

1. Write as repeated multiplication, then in standard form.

a) 4^3

$4 \times 4 \times 4$

$= 64$

b) 7^2

7×7

$= 49$

c) $-(-2)^5$

$-(-2)(-2)(-2)(-2)(-2)$

$= -(-32)$

$= 32$

d) -3^4

$-3 \times 3 \times 3 \times 3$

$= -81$

e) -1^8

$-1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$

$= -1$

f) $(-1)^8$

$(-1)(-1)(-1)(-1)(-1)(-1)(-1)(-1)$

$= 1$

3. Write as a power, then in standard form.

a) $3 \times 3 \times 3 \times 3 \times 3 \times 3$ $3^6 = 729$

b) $(-8)(-8)(-8)$ $(-8)^3 = -512$

c) $-(2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2)$ $-(2^7) = -128$

d) 12×12 $12^2 = 144$

e) $4 \times 4 \times 4 \times 4 \times 4$ $4^5 = 1024$

f) $(-5)(-5)(-5)(-5)$ $(-5)^4 = 625$

7. a) Evaluate each expression.

i) -3^2 ii) $-(3)^2$ iii) $-(-3)^2$ iv) $(-3)^2$

3. Write as a power of 10.

a) one hundred million 10^8

b) $10 \times 10 \times 10 \times 10$ 10^4

c) 1 10^0

d) 1 000 000 000 10^9

e) one thousand 10^3

9. Use powers of 10 to write each number.

a) 700 000 000 7×10^8

b) 345 $(3 \times 10^2) + (4 \times 10^1) + (5 \times 10^0)$

c) 80 027 $(8 \times 10^4) + (2 \times 10^1) + (7 \times 10^0)$

10. a) Copy and complete this table.

Power	Repeated Multiplication	Standard Form
3^5	$3 \times 3 \times 3 \times 3 \times 3$	243
3^4	$3 \times 3 \times 3 \times 3$	81
3^3	$3 \times 3 \times 3$	27
3^2	3×3	9
3^1	3	3

12. Write each number in standard form.

a) $(4 \times 10^3) + (7 \times 10^2) + (2 \times 10^1) + (9 \times 10^0)$

$= 4729$

b) $(3 \times 10^5) + (2 \times 10^2) + (8 \times 10^0)$

$= 300\,208$

14. Evaluate.

a) $2^3 + (5 - 2)^4$

$2^3 + (3)^4$

$8 + 81$

$= 89$

b) $100 \div 2 + (4 + 1)^3$

$100 \div 2 + (5)^3$

$100 \div 2 + 125$

$50 + 125$

$= 175$

c) $(6^2 + 7^2)^0 - (8^4 + 2^4)^0$

$1 - 1$

$= 0$

d) $3 \times 2^3 + 8 \div 4$

$3 \times 8 + 8 \div 4$

$24 + 2$

$= 26$

e) $(21 \div 7)^4 - 2^3$

$3^4 - 2^3$

$81 - 8$

73

f) $[(-4)^0 \times 10]^6 \div (15 - 10)^2$

$[1 \times 10]^6 \div (5)^2$

$10^6 \div 5^2$

$1\,000\,000 \div 25$

$40\,000$

17. Identify, then correct, any errors in the student work below. Explain how you think the errors occurred.

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

$= (-2)^5 - 9 \div (-3) + 16$

$= -32 - 3 + 16$

$= -35 + 16$

$= -19$

$4 \times 8 - 9 \div (-3) + 16$

$32 - 9 \div (-3) + 16$

$32 - (-3) + 16$

$32 + 3 + 16$

51

Not same bases so can't use laws of exponents

18. Write each product as a power, then evaluate the power.

a) $5^3 \times 5^4$

5^7

$= 78\,125$

b) $(-2)^3 \times (-2)^2$

$(-2)^5$

$= -32$

c) $3^2 \times 3^3 \times 3^1$

3^6

$= 729$

d) $-10^4 \times 10^0$

-10^4

$= -10\,000$

19. There are about 10^{11} galaxies in the universe. Each galaxy contains about 10^{11} stars. About how many stars are in the universe?

$10^{11} \times 10^{11}$

10^{22} stars in the universe

20. Write each quotient as a power, then evaluate the power.

a) $7^5 \div 7^3$

7^2

$= 49$

b) $(-10)^9 \div (-10)^3$

$(-10)^6$

$= 1\,000\,000$

c) $\frac{8^4}{8^2} = 8^2$

$= 64$

d) $-\frac{6^7}{6^4} = -6^3$

$= -216$

23. Write each expression as a product or quotient of powers, then evaluate it.

a) $(3 \times 5)^3$

$3^3 \times 5^3$ or $(15)^3$

27×125 $= 3375$

3375

b) $(12 \div 3)^5$

$12^5 \div 3^5$ or $(4)^5$

$248\,832 \div 243$ $= 1024$

1024

c) $[(-4) \times 2]^4$

$(-4)^4 \times (2)^4$ or $(-8)^4$

256×16 $= 4096$

4096

d) $(63 \times 44)^0$

$= 63^0 \times 44^0$

$= 1 \times 1$

$= 1$

e) $\left(\frac{3}{2}\right)^5 = \frac{3^5}{2^5}$

$= \frac{243}{32}$

$\div 7.2$

f) $\left(\frac{15}{2}\right)^2 = \frac{15^2}{2^2}$

$= \frac{225}{4}$

$= 56.25$

24. Write each expression as a power.

a) $(3^2)^3 = 3^6$

b) $(4^0)^6 = 4^0$

c) $[(-2)^3]^3$

$= (-2)^9$

d) $(5^5)^2$

$= 5^{10}$

26. Write each expression as a power, then evaluate.

a) $6^4 \times 6^3$

6^7

$= 279\,936$

b) $(-11)^7 \div (-11)^5$

$(-11)^2$

$= 121$

c) $\dfrac{3^4 \times 3^5}{3^3} = \dfrac{3^9}{3^3}$

$= 3^6$

$= 729$

d) $\dfrac{5^5}{5^3 \times 5^2} = \dfrac{5^5}{5^5}$

$= 5^0$

$= 1$

e) $\dfrac{(-4)^3 \times (-4)^6}{(-4)^2 \times (-4)^4}$

$= \dfrac{(-4)^9}{(-4)^6}$

$= (-4)^3$

$= -64$

f) $\dfrac{10^6 \times 10^0}{10^3 \times 10^2}$

$= \dfrac{10^6}{10^5}$

$= 10^1$

$= 0$

27. Simplify, then evaluate each expression.

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

$2^5 - 2^0 + 2^1$

$32 - 1 + 2$

$= 33$

b) $\dfrac{(-2)^3 \times (-2)^2}{(-2)^3 - (-2)^2}$

$\dfrac{(-2)^5}{(-2)^3 - (-2)^2} = \dfrac{-32}{-8 - 4} = \dfrac{-32}{-12}$

$= \dfrac{8}{3}$

c) $12^2 \times 12^4 \div (-2)^4 - 12^0$

$12^6 \div (-2)^4 - 12^0$

$2\,985\,984 \div (16) - 1$

$186\,624 - 1$

$186\,623$

d) $\dfrac{(-12)^2 \times (-12)^4}{(-2)^4 - 12^0}$

$\dfrac{(-12)^6}{(-2)^4 - 1} = \dfrac{2\,985\,984}{16 - 1}$

$= \dfrac{2\,985\,984}{15}$

$= 199065.6$

Chapter 2

Test review

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Practice Test

1. Write as a product or quotient of powers.

a) $(3 \times 4)^3$ $3^3 \times 4^3$ or 12^3

b) $[(-5) \times 2]^4$ $(-5)^4 \times 2^4$ or $(-10)^4$

c) $\left(\frac{1}{4}\right)^4$ $\frac{1^4}{4^4}$

d) $-\left(\frac{9}{3}\right)^3$ $-\left(\frac{9^3}{3^3}\right)$ or $-(3)^3$

2. Simplify.

a) $-(2^3)^3$ $-(2)^9$

b) $(6^2)^0$ 6^0

c) $[(-5)^2]^3$ $(-5)^6$

d) $-[(-3)^2]^4$ $-(-3)^8$

3. Simplify each expression, then evaluate it.

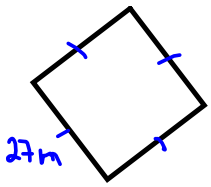
a) $[(-3) \times (-2)]^4$ $(6)^4$ $= 1296$

b) $\left(\frac{1}{2}\right)^5$ $\frac{1^5}{2^5}$ $= \frac{1}{32}$

c) $(6^0)^4$ 6^0 $= 0$

d) $[(-3)^2]^3$ $(-3)^6$ $= 729$

5. A baseball diamond is a square with side length about 27 m.
Is the area of the baseball diamond greater or less than 10^3 m^2?
How do you know?



$A = b^2$
$A = (27)^2$
$A = 729\ m^2$

↳ $1000\ m^2$

Less

4. Is the value of a power with a negative base always negative?
Or, is it always positive? Or, is it sometimes negative and sometimes positive?
Illustrate your answer with some examples.

→ neg base to even exponent gives (+)

→ neg base to odd exponent gives (-)

6. Explain why the brackets are not necessary in this expression:
$(-3^5 \times 10) - (9 \div 3)$
Evaluate the expression, showing each step.

Brackets are not required because according to BEDMAS you MUST Multiply and Divide befor subtracting

7. Identify the correct answer for $(2^3 + 4)^2 \times (-10)^3 \div (5 + 5)^2$.

a) -240 b) -1440 c) 1440 d) $-28\,825$

$(2^3+4)^2 \times (-10)^3 \div (5+5)^2$

$(8+4)^2 \times -1000 \div (10)^2$

$12^2 \times -1000 \div 100$

144×-10

-1440

8. Evaluate only the expressions with a positive value. Explain how you know the sign of each expression before you evaluate it.

a) $(-5)^3 \times (-5)^2 \div (-5)^1$

$(-5)^6$

$= 15625$

b) $[(-9)^6 - (-9)^3]^0$

$= 1$

c) $\dfrac{(-1)^2 \times (-1)^4}{(-1)^3 \times (-1)^2}$

$= \dfrac{(-1)^6}{(-1)^5} = (-1)^1$

d) $(-4)^6 + (-4)^4 \times (-4)^0$

$(-4)^6 + (-4)^4$

$4096 + 256$

$= 4352$