

Curriculum Outcome

(N1) Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by: representing repeated multiplication using powers; using patterns to show that a power with an exponent of zero is equal to one; solving problems involving powers.

(N2) Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.

Student Friendly:



Warm Up Grade 9



1)
Complete the following:

a) $(-2)^5$

Base: -2
Exponent: 5
Evaluate: -32

b) -3^4

Base: 3
Exponent: 4
Evaluate: -81

c) $(-4)^3$

Base: -4
Exponent: 3
Evaluate: -64

d) $-(-5)^3 (7)^2$

Base: (-5) , 7
Exponent: 3 , 2
Evaluate: 6125

2)
Write as a power then evaluate

a) $(-4)(-4)(-4)(-4)$

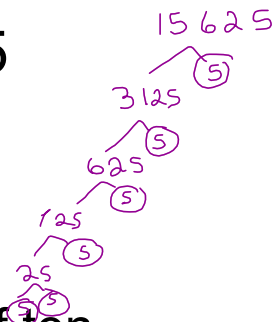
$(-4)^4 = 256$

b) $(-2)(2)(-3)(-3)(5)(5)$

$-(2)^2 (-3)^2 (5)^2$
 $- 4 (9) (25)$
 $- 900$

3)
Write 15 625 as a base of 5

5^6



4)
Write the 580 227 as a power of ten

$(5 \times 10^5) + (8 \times 10^4) + (2 \times 10^3) + (2 \times 10^1) + (7 \times 10^0)$

5)
Write the following in standard form:

a) $(5 \times 10^6) + (3 \times 10^2) + (2 \times 10^7) + (3 \times 10^0) + (6 \times 10^3)$

7 6 5 4 3 2 1 0
2 5 0 0 6 3 0 3

Warm Up

$$1) -2^3 + 2^5 \div 2^4 \times 2^2 + (4+6^2)^0$$

$$2) [-(2-5)^3 \div (-3+2)^7 + (-2)^0 \times (-4)^2] + (-1^0)^3$$

Warm Up

$$1) -2^3 + 2^5 \div 2^4 \times 2^2 + (\text{scribble})^0$$

$$-8 + 32 \div 16 \times 4 + 1$$

$$-8 + 2 \times 4 + 1$$

$$-8 + 8 + 1$$

$$0 + 1$$

$$= 1$$

Warm Up

$$2) \left[-(2-5)^3 \div (-3+2)^7 + (-2)^0 \times (-4)^2 \right] + (-1^0)^3$$

$$\left[-(-3)^3 \div (-1)^7 + 1 \times 16 \right] + (-1^0)^3$$

$$\left[-(-27) \div (-1) + 1 \times 16 \right] + (-1^0)^3$$

$$\left[-27 \div (-1) + 16 \right] + (-1^0)^3$$

$$\left[27 + 16 \right] + (-1)^3$$

$$\left[43 \right] + (-1)$$

$$= 42$$

Mid Unit Review

•
Page 69
Questions

1,2ade, 4,5,6,8,9,10

Page 69

Mid-Unit Review

2.1

1. Write each power in standard form.

- a) 14^2 b) 5^1 c) -8^3
 d) $-(-4)^4$ e) $(-6)^3$ f) $(-2)^8$

2. Copy and complete this table.

| Power | Base | Exponent | Repeated Multiplication | Standard Form |
|----------|------|----------|--------------------------------|---------------|
| a) 4^3 | | | | |
| b) 2^5 | | | | |
| c) 8^6 | | | | |
| d) | 7 | 2 | | |
| e) | | | $3 \times 3 \times 3 \times 3$ | |

3. a) Evaluate the first 8 powers of 7.
Copy and complete this table.

| Power of 7 | Standard Form |
|------------|---------------|
| 7^1 | |
| 7^2 | |
| 7^3 | |
| 7^4 | |
| 7^5 | |
| 7^6 | |
| 7^7 | |
| 7^8 | |

- b) What pattern do you see in the ones digits of the numbers in the second column?
 c) Verify that the pattern continues by extending the table for as many powers of 7 as your calculator displays.
 d) Use the pattern. Predict the ones digit of each power of 7. Explain your strategy.
- i) 7^{12} ii) 7^{14}
 iii) 7^{17} iv) 7^{22}

2.2

4. Write in standard form.

- a) 10^6 b) 10^0 c) 10^8 d) 10^4

5. Write as a power of 10.

- a) one billion b) one
 c) 100 d) 100 000

6. Evaluate.

- a) $(-5)^0$ b) 25^0 c) -6^0 d) 9^0

7. The area of land is measured in hectares (ha). One hectare is the area of a square with side length 100 m. Write the number of square metres in 1 ha as a power.

2.3

8. Evaluate. State which operation you do first.

- a) $(-21 - 6)^2 + 14$
 b) $6 \div (-2) + (2 \times 3)^2$
 c) $[5 - (-4)]^3 - (21 \div 7)^4$
 d) $[(6 - 21)^3 \times (2 + 2)^6]^0$
 e) $(3 - 5)^5 \div (-4)$
 f) $-30 - (7 - 4)^3$

9. Both Sophia and Victor evaluated this expression: $-2^4 \times 5 + 16 \div (-2)^3$
 Sophia's answer was -82 and Victor's answer was 78 . Who is correct? Find the likely error made by the other student.

10. Identify, then correct, any errors in the student work below. How do you think the errors occurred?

$$\begin{aligned}
 & (-2)^4 - (-3)^3 \div (-9)^0 \times 2^3 \\
 & = 16 - 27 \div (-1) \times 8 \\
 & = -11 \div (-1) \times 8 \\
 & = 11 \times 8 \\
 & = 88
 \end{aligned}$$

2.1 1. Write each power in standard form.

a) 14^2 b) 5^1 c) -8^3

d) $-(-4)^4$ e) $(-6)^3$ f) $(-2)^8$

2. Copy and complete this table.

| | Power | Base | Exponent | Repeated Multiplication | Standard Form |
|----|-------|------|----------|--------------------------------|---------------|
| a) | 4^3 | | | | |
| b) | 2^5 | | | | |
| c) | 8^6 | | | | |
| d) | | 7 | 2 | | |
| e) | | | | $3 \times 3 \times 3 \times 3$ | |

3. a) Evaluate the first 8 powers of 7. Copy and complete this table.

| Power of 7 | Standard Form |
|------------|---------------|
| 7^1 | |
| 7^2 | |
| 7^3 | |
| 7^4 | |
| 7^5 | |
| 7^6 | |
| 7^7 | |
| 7^8 | |

- b) What pattern do you see in the ones digits of the numbers in the second column?
- c) Verify that the pattern continues by extending the table for as many powers of 7 as your calculator displays.
- d) Use the pattern. Predict the ones digit of each power of 7. Explain your strategy.
 - i) 7^{12} ii) 7^{14}
 - iii) 7^{17} iv) 7^{22}

4. Write in standard form.

a) 10^6 b) 10^0 c) 10^8 d) 10^4

c) 100

d) 100 000

5. Write as a power of 10.

a) one billion b) one

6. Evaluate.

a) $(-5)^0$ b) 25^0 c) -6^0 d) 9^0

7. The area of land is measured in hectares (ha). One hectare is the area of a square with side length 100 m. Write the number of square metres in 1 ha as a power.

8. Evaluate. State which operation you do first.

a) $(-21 - 6)^2 + 14$

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

c) $[5 - (-4)]^3 - (21 \div 7)^4$

d) $[(6 - 21)^3 \times (2 + 2)^6]^0$

e) $(3 - 5)^5 \div (-4)$

f) $-30 - (7 - 4)^3$

9. Both Sophia and Victor evaluated this expression: $-2^4 \times 5 + 16 \div (-2)^3$
Sophia's answer was -82 and Victor's answer was 78 . Who is correct? Find the likely error made by the other student.

10. Identify, then correct, any errors in the student work below. How do you think the errors occurred?

$$\begin{aligned} & (-2)^4 - (-3)^3 \div (-9)^0 \times 2^3 \\ & = 16 - 27 \div (-1) \times 8 \\ & = -11 \div (-1) \times 8 \\ & = 11 \times 8 \\ & = 88 \end{aligned}$$