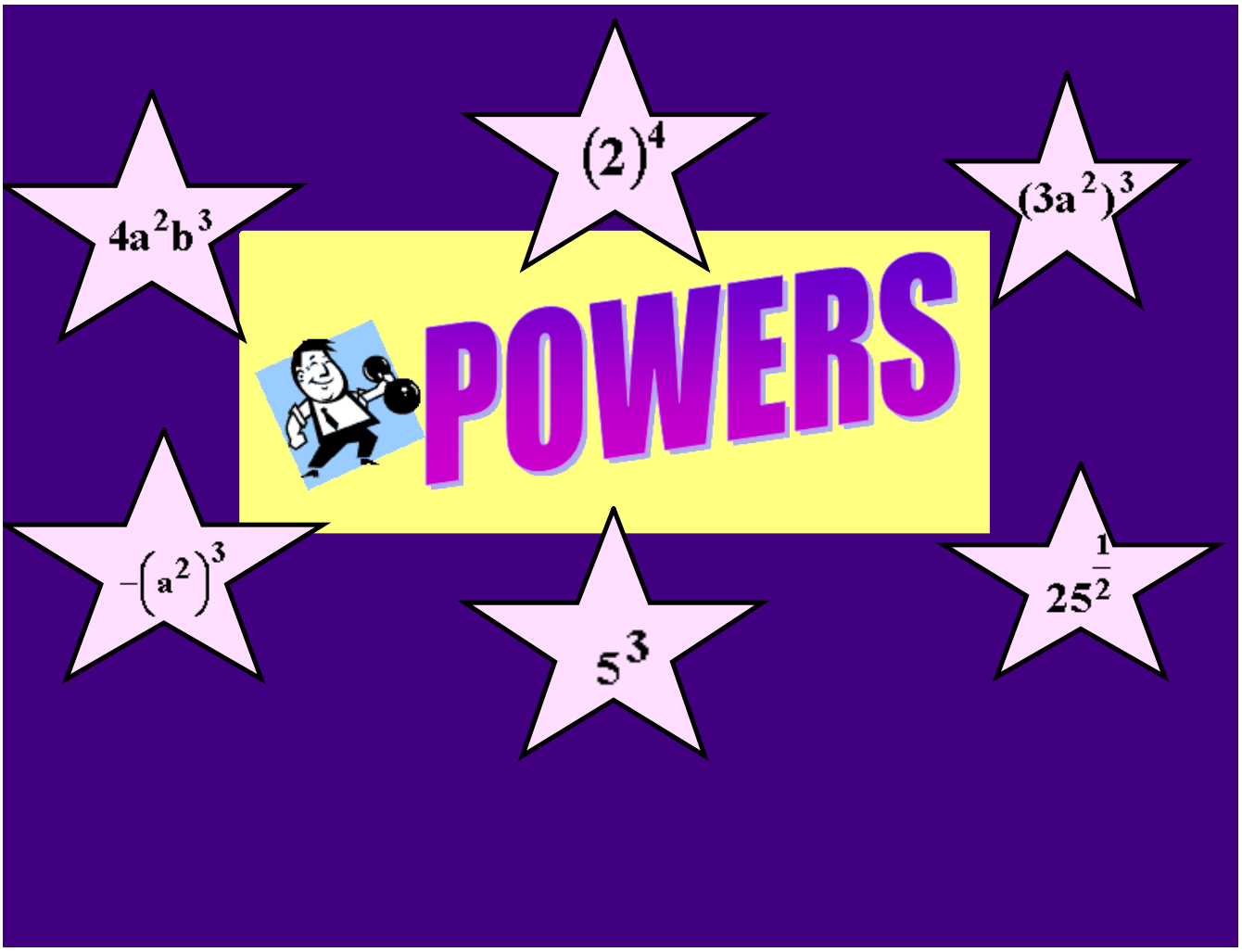
Curriculum Outcome

(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:
“What does an exponent do to a number"


$4a^2b^3$
$(2)^4$
$(3a^2)^3$
POWERS
$-(a^2)^3$
5^3
$25^{\frac{1}{2}}$


Power
exponent
8^3
base

Exponents

- Exponents are shorthand for multiplication:
  $(5)\,(5) = 5^2$, $(5)\,(5)\,(5) = 5^3$.

- The "exponent" stands for however many times the term is being multiplied.

Exponent → 5^3 (3 times) $5 \times 5 \times 5 = 125$

- The term that's being multiplied is called the "base".

Base → 5^3

Write each power as a product, then evaluate.

#1

a) 3^4

$= (3)(3)(3)(3)$

$= 81$

b) 5^3

$= (5)(5)(5)$

$= 125$

c) $\left(\frac{2}{3}\right)^3$

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

$= \frac{8}{27}$

Write each product as a power, then evaluate.

#2

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

$= (4)^3$

$= 64$

b) $(-6)(-6)(-6)(-6)(-6)$

$= (-6)^5$

$= -7776$

$x^y \quad y^x \quad x^0 \quad \wedge$

Powers with a Twist

Can you see the difference?

-4^2

$= -(4)(4)$

$= -16$

$(-4)^2$

$= (-4)(-4)$

$= 16$

$-(-2)^3$

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

$= -(-8)$

$= 8$

-2^5

$= -32$

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

$-(32)$

$(-1)^2 = (-1)(-1) = 1$

$(-1)^3 = (-1)(-1)(-1) = -1$

$(-1)^4 = (-1)(-1)(-1)(-1) = 1$

$(-1)^5 = -1$

Did you see a pattern??

$(-1)^{10247} = -1$ $(-1)^{29584} = 1$

$(-1)^{10247} = -1$ $(-1)^{29584} = 1$

- Evaluating powers when the base is negative...

  If the exponent is even the answer will be positive.
  If the exponent is odd the answer will be negative.

Check out pages 55 and 56.

Please complete questions...

Page 55-57
7ace,8ace,9

Page 56
#11
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