

Unit 3: Powers & Exponents

3.3 Order of Operations With Exponents

Recall BEDMAS

Ex. Evaluate

a) $3(2)^4$

coefficient = 3
+ number that multiplies an expression

$$= 3(16)$$

$$= \boxed{48}$$

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

coefficient = -3

$$= -3(25)$$

$$= \boxed{-75}$$

c) -4^4

coefficient = -1

$$= -1(256)$$

$$= \boxed{-256}$$

d) $4^2 - 8 \div 2 + (-3)^2$

$$= 16 - 8 \div 2 + 9$$

$$= 16 - 4 + 9$$

$$= 12 + 9$$

$$= \boxed{21}$$

e) $-2(15 - 4^2) + 4(2 + 3)^3$

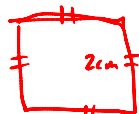
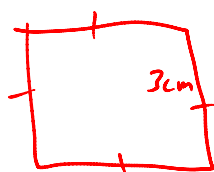
$$= -2(15 - 16) + 4(5)^3$$

$$= -2(-1) + 4(125)$$

$$= 2 + 500$$

$$= \boxed{502}$$

Ex. Write and evaluate an expression with powers to find the difference in area between a square with sides of length 3 cm and a square with sides of length 2 cm.



Area_□ = s^2

$$3^2 - 2^2 = 9 - 4$$

$$= \boxed{5 \text{ cm}^2}$$

Ex. Two bacterial cultures grow at different rates:

Culture A: starts 5 bacteria and doubles every hour

5, 10, 20, 40, ...

$\times 2$

$\times 4 = 2^2$

$\times 8 = 2^3$

Culture B: starts 4 bacteria and triples every hour

4, 12, 36, 108, ...

$\times 3$

$\times 9 = 3^2$

$\times 27 = 3^3$

Write and evaluate an expression using exponents to find the total combined population of both cultures after 10 hours.

$$5(2)^{10} + 4(3)^{10}$$

$$= 5(1024) + 4(59049)$$

$$= 5120 + 236196$$

$$= \boxed{241,316 \text{ bacteria}}$$