

UNIT 6: EXPONENTIAL RELATIONS

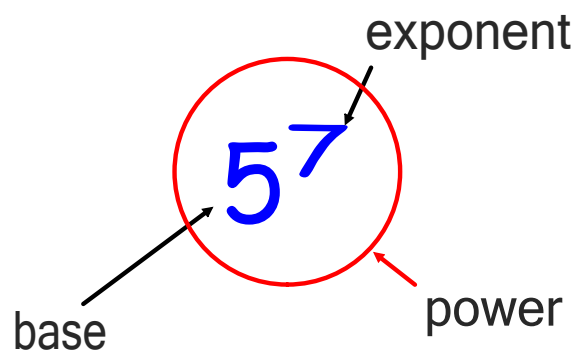
POWERS AND EXPONENT RULES

Learning Goals

- review powers
- review exponent rules
- practice using exponent rules

Evaluate - find the number answer 9
 \uparrow
Simplify - leave in power form $ex\ 3^2$

Power



What does the exponent represent?

$$5^3 = (5)(5)(5)$$

$$2^4 = (2)(2)(2)(2)$$

Write each product as a single power:

$$3 \times 3 \times 3 \times 3 = 3^4$$

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

Evaluate each power:

$$\text{a) } 6^3 = \Rightarrow 6 \times \square 3 = 216$$

$$\text{b) } (-3)^2 = 9$$

$$\star \text{ c) } \boxed{-3}^2 = -9$$

$$\text{d) } (-2)^4 = +16$$

$$\text{e) } -2^4 = -16$$

Evaluate each power:

$$f) (-5)^3 = -125$$

$$\star g) \left(\frac{1}{3}\right)^3 = \frac{1}{27}$$

$$h) \left(\frac{2}{5}\right)^4 = \frac{16}{625}$$

$$i) \left(\frac{-3}{7}\right)^2 = \frac{9}{49}$$

$$j) -\left(\frac{4}{7}\right)^3 = -\frac{64}{343}$$

Evaluate

$$a=5 \quad b=3$$

$$a^b = 5^3 = 125$$

$$b^a = 3^5 = 243$$

$$ab^2 = 5(3)^2 = 5(9) = 45$$

$$4a^3 + 5b^4$$

$$= 4(5)^3 + 5(3)^4$$

$$= 4(125) + 5(81)$$

$$= 500 + 405$$

$$= 905$$

On the Boards...

1. Write each product as a power.

a) $6 \times 6 = 36$

b) $7 \times 7 \times 7 \times 7 = 7^4$

c) $(-2) \times (-2) \times (-2) = -8$

d) $(4)(4)(4)(4)(4)(4)(4)(4) = 4^8$

e) $\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \left(\frac{1}{4}\right)^5$

f) $\left(-\frac{4}{5}\right)\left(-\frac{4}{5}\right) = \left(\frac{4}{5}\right)^2$

2. Evaluate each power.

a) $5^2 = 25$

b) $7^3 = 343$

c) $10^5 = 100000$

d) $(-3)^2 = 9$

e) $-3^2 = -9$

f) $-12^2 = -144$

g) $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$

h) $\left(-\frac{1}{3}\right)^4 = \frac{1}{81}$

i) $\left(-\frac{1}{5}\right)^3 = -\frac{1}{125}$

6. Substitute the indicated values.

Evaluate for the remaining variable.

a) $A = \pi r^2$, $r = 5$ cm

b) $I = Prt$, $P = \$200$, $r = 6\%$,
 $t = 2$ years

c) $V = s^3$, $s = 5$ m

d) $P = 2(l + w)$, $l = 10$ cm, $w = 7$ cm

a.) $3.14(5)^2$
 $= 78.5$

c.) 5^3
 $= 125$

b.) $200(0.06)(2)$
 $= 24$

d.) $2(10+7)$
 $= 2(17)$
 $= 34$

Seatwork

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