Exponent Laws Review

Date: Feb. 8/18
(Every lesson)

Product Rule: $(a^m)(a^n) = a^{m+n}$ Quotient Rule: $\frac{a^m}{a^n} = a^{m-n}$

Power of a Power Rule: $(a^m)^n = a^{m\times n} = a^{mn}$ Zero Rule: $a^0 = 1$

Ex. 1: Simplify, then evaluate (if possible). (*Explain the difference*)

a) $(-1)^0 + (-2)^2$

$= 1 + 4$
$= 5$

b) $(x)^3(x)^7$ $x^3 \cdot x^7$

$= x^{3+7}$
$= x^{10}$

c) $(x^3)^7$

$= x^{3\times 7}$
$= x^{21}$

d) $\frac{x^{10}}{x^2}$

$= x^{10-2}$
$= x^8$

e) $\left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right)^3$

$= \left(\frac{1}{2}\right)^{2+3}$
$= \left(\frac{1}{2}\right)^5$ ← Simplified
$= \frac{(1)^5}{(2)^5}$
$= \frac{1}{32}$ ← Evaluated

f) $\left(\frac{1}{2}\right)^3\left(\frac{2}{3}\right)^2$

$= \frac{(1)^3}{(2)^3} \cdot \frac{(2)^2}{(3)^2}$
$= \frac{1 \cdot 4^1}{8_2 \cdot 9}$
$= \frac{1}{18}$

g) $(x^3y^2)(xy^3)$

$= x^{3+1}y^{2+3}$
$= x^4y^5$

h) $\frac{(5x^2)^2}{(5x^2)^0}$

$= \frac{(5)^2(x^2)^2}{1}$
$= 25x^4$

i) $(4u^3v^2)^2 \div (-2u^2v^3)$

$= (4)^2(u^3)^2(v^2)^2 \div (-2u^2v^3)$
$= 16u^{3\times 2}v^{2\times 2} \div (-2u^2v^3)$
$= 16u^6v^4 \div (-2u^2v^3)$
$= \frac{16}{-2}u^{6-2}v^{4-3}$
$= -8u^4v$

j) $\frac{(3^2)(3^3)}{(3^4)^2}$

$= \frac{3^{2+3}}{3^{4\times 2}}$
$= \frac{3^5}{3^8}$
$= 3^{5-8}$
$= 3^{-3}$ ←?
$= \left(\frac{1}{3}\right)^3$
$= \frac{1^3}{3^3}$
$= \frac{1}{27}$

What can you tell the person beside you about the Pythagorean Theorem?

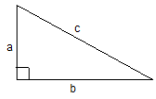
Does it apply to ALL triangles?

Does it matter what letters are used on the triangle?

Could you use the letters P, Q, and R for the vertices?

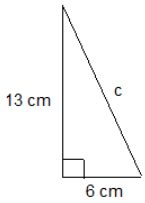
Would the equation automatically be $p^2 + q^2 = r^2$?

The Pythagorean Theorem

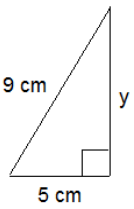


$$a^2 + b^2 = c^2$$

Ex. 1: For each right triangle:
(i) write the equation for the Pythagorean theorem.
(ii) calculate the length of the unknown side.

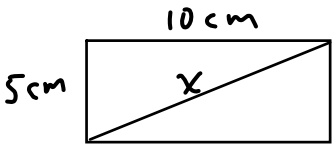


$c^2 = 13^2 + 6^2$
$= 169 + 36$
$= 205$
$\therefore c = \sqrt{205}$
$\doteq 14.317$
$\doteq 14.32$ cm



$9^2 = y^2 + 5^2$
or
$y^2 = 9^2 - 5^2$
$= 81 - 25$
$= 56$
$\therefore y = \sqrt{56}$
$\doteq 7.483$
$\doteq 7.48$ cm

Ex. 2: Determine the length of the diagonals of a rectangle with width 5 m and 10 m.



$x^2 = 5^2 + 10^2$
$= 25 + 100$
$= 125$
$\therefore x = \sqrt{125}$
$\doteq 11.180$
$\doteq 11.18$ cm

Homework Practice (Revised)

p. 533 #1 - 5

Bring Graph Paper for Friday.

pp. 534-535 #1ad, 2ad, 3cd, 4bc, 6