Before we begin, are there any questions from last day's work?

pp. 531-532 #1 - 4 (*Copy of sheet on next screen*)

p. 530 #3e ✳ Check.

3e) $(5)(-9) \div (-3)(7)$

$= -45 \div (-3)(7)$

$= +15(7)$

$= 105$

Bring Graph Paper for Monday.

Confirmed: The correct answer is 105;
the textbook is *incorrect*!
the answer is *NOT* 15/7.

Note for 4b) **the correct answer is 20;**
the textbook is *incorrect*! (the answer is *NOT* 3)

p. 531 **Practising**

1. Evaluate.

a) $\frac{1}{4}+\frac{-3}{4}$

b) $\frac{1}{2}-\frac{-2}{3}$

c) $\frac{-1}{4}-1\frac{1}{3}$

d) $-8\frac{1}{4}-\frac{-1}{-3}$

e) $\frac{-3}{5}+\frac{-3}{4}-\frac{7}{10}$

f) $\frac{2}{3}-\frac{-1}{2}-\frac{1}{6}$

p. 532

2. Evaluate.

a) $\frac{4}{5}\times\frac{-20}{25}$

b) $\frac{3}{-2}\times\frac{6}{5}$

c) $\left(\frac{-1}{3}\right)\left(\frac{2}{-5}\right)$

d) $\left(\frac{9}{4}\right)\left(\frac{-2}{-3}\right)$

e) $\left(-1\frac{1}{10}\right)\left(3\frac{1}{11}\right)$

f) $-4\frac{1}{6}\times\left(-7\frac{3}{4}\right)$

3. Evaluate.

a) $\frac{-4}{3}\div\frac{2}{-3}$

b) $-7\frac{1}{8}\div\frac{3}{2}$

c) $\frac{-2}{3}\div\frac{-3}{8}$

d) $\frac{-3}{-2}\div\left(\frac{-1}{3}\right)$

e) $-6\div\left(\frac{-4}{5}\right)$

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

4. Simplify.

a) $\frac{-2}{5}-\left(\frac{-1}{10}+\frac{1}{-2}\right)$

b) $\frac{-3}{5}\left(\frac{-3}{4}-\frac{-1}{4}\right)$

c) $\left(\frac{3}{5}\right)\left(\frac{1}{-6}\right)\left(\frac{-2}{3}\right)$

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

e) $\left(\frac{-2}{5}+\frac{1}{-2}\right)\div\left(\frac{5}{-8}-\frac{-1}{2}\right)$

f) $\dfrac{\frac{-4}{5}-\frac{-3}{5}}{\frac{1}{3}-\frac{-1}{5}}$

p. 532 #2

e) $\left(-1\frac{1}{10}\right)\left(3\frac{1}{11}\right)$

$=\left(\frac{-11}{10}\right)\left(\frac{34}{11}\right)^{17}$

$=-\frac{17}{5}$

or $-3\frac{2}{5}$

f) $-4\frac{1}{6}\times\left(-7\frac{3}{4}\right)$

$=\left(\frac{-25}{6}\right)\left(\frac{-31}{4}\right)$

$=+\frac{775}{24}$

#3 b) $-7\frac{1}{8}\div\frac{3}{2}$

$=\frac{-57}{8}\div\frac{3}{2}$

$=\frac{-57}{8}\times\frac{2}{3}$

$=\frac{-19}{4}$

p. 532 #4

a) $\frac{-2}{5}-\left(\frac{-1}{10}+\frac{1}{-2}\right)$

$=\frac{-2}{5}-\left(\frac{-1}{10}-\frac{1}{2}\right)$

$=\frac{-2}{5}-\left(\frac{-1}{10}-\frac{5}{10}\right)$

$=\frac{-2}{5}-\left(\frac{-6}{10}\right)$

$=\frac{-2}{5}+\frac{3}{5}$

$=\frac{1}{5}$

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

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

$=\left(\frac{4}{9}\right)\left(\frac{1}{-8}\right)$

$=-\frac{1}{18}$

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

e) $\left(\frac{-2}{5}+\frac{1}{-2}\right)\div\left(\frac{5}{-8}-\frac{-1}{2}\right)$

$=\left(\frac{-2}{5}-\frac{1}{2}\right)\div\left(\frac{-5}{8}+\frac{1}{2}\right)$

$=\left(\frac{-4-5}{10}\right)\div\left(\frac{-5+4}{8}\right)$

$=\frac{-9}{10}\div\left(\frac{-1}{8}\right)$

$=-\frac{9}{10}\times\left(\frac{-8}{1}\right)$

$=+\frac{36}{5}$

f) $\dfrac{\frac{-4}{5}-\frac{-3}{5}}{\frac{1}{3}-\frac{-1}{5}}$

$=\left(-\frac{4}{5}+\frac{3}{5}\right)\div\left(\frac{1}{3}+\frac{1}{5}\right)$

$=\left(\frac{-1}{5}\right)\div\left(\frac{5}{15}+\frac{3}{15}\right)$

$=\left(\frac{-1}{5}\right)\div\left(\frac{8}{15}\right)$

$=\frac{-1}{5}\times\frac{15}{8}$

$=\frac{-3}{8}$

MCF 3MI

Exponent Laws Review

Date: Sept 5/19
(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) $(-1)^0 + (-2)^2$

$= 1 + (-2)(-2)$
$= 1 + 4$
$= 5$

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

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

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

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

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

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

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

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

$(5x^2)/(5x^2)$

$(a^xb^y)^z$
$= (a^x)^z(b^y)^z$
$= a^{xz}b^{yz}$

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

$= (4)^2(u^3)^2(v^2)^2 \div (-2u^2v^3)$
$= 16u^6v^4 \div (-2u^2v^3)$
$= \frac{16}{-2}u^{6-2}v^{4-3}$
$= -8u^4v^1$

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

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

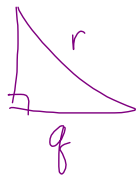
What can you tell the person beside you about the Pythagorean Theorem?

Does it apply to ALL triangles? – NO; only right triangles

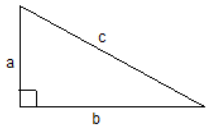
Does it matter what letters are used on the triangle? No

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

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

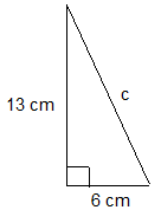
↳ NO, only if 

The Pythagorean Theorem (PT)



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

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



$13^2 + 6^2 = c^2$

$c^2 = 13^2 + 6^2$

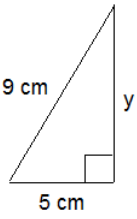
$= 169 + 36$

$c^2 = 205$

$c = \sqrt{205}$

$\doteq 14.317$

$\doteq 14.32$ cm



$5^2 + y^2 = 9^2$

$9^2 - 5^2 = y^2$

$y^2 = 9^2 - 5^2$

$= 81 - 25$

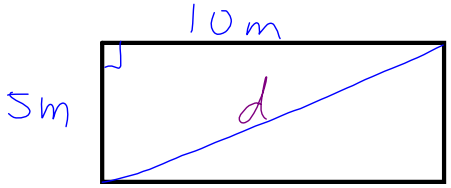
$y^2 = 56$

$y = \sqrt{56}$

$\doteq 7.483$

$\doteq 7.48$ cm

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



$d^2 = 5^2 + 10^2$

$= 25 + 100$

$= 125$

$\therefore d = \sqrt{125}$

$\doteq 11.180$

$\doteq 11.18$ m

$\therefore$ the length of the diagonal is 11.18 m.

Homework Practice

Bring Graph Paper for Monday.

p. 533 #1 - 5

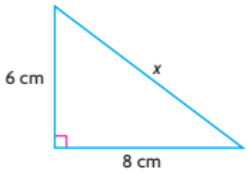
pp. 534-535 #1ad, 2ad, 3cd, 4bc, 6

Practising

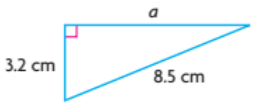
1. Evaluate to three decimal places where necessary.
   a) 4^2 c) 3^2 e) $(-5)^3$
   b) 5^0 d) -3^2 f) $\left(\frac{1}{2}\right)^3$
2. Evaluate.
   a) $3^0 + 5^0$ d) $\left(\frac{1}{2}\right)^3\left(\frac{2}{3}\right)^2$
   b) $2^2 + 3^3$ e) $-2^5 + 2^4$
   c) $5^2 - 4^2$ f) $\left(\frac{1}{2}\right)^2 + \left(\frac{1}{3}\right)^2$
3. Evaluate to an exact answer.
   a) $\frac{9^8}{9^7}$ c) $(4^5)(4^2)^3$
   b) $\frac{2(5^5)}{5^3}$ d) $\frac{(3^2)(3^3)}{(3^4)^2}$
4. Simplify.
   a) $(x)^5(x)^3$ d) $(a^b)^c$
   b) $(m)^2(m)^4(m)^3$ e) $\frac{(x^5)(x^3)}{x^2}$
   c) $(y)^5(y)^2$ f) $\left(\frac{x^4}{y^3}\right)^3$
5. Simplify.
   a) $(x^2y^4)(x^3y^2)$ c) $\frac{(5x^2)^2}{(5x^2)^0}$
   b) $(-2m^3)^2(3m^2)^3$ d) $(4u^3v^2)^2 \div (-2u^2v^3)^2$

Practising

1. For each right triangle, write the equation for the Pythagorean theorem.
   a)

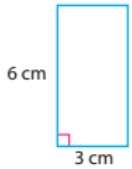


   d)

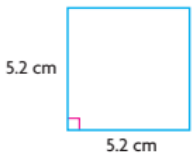


2. Calculate the length of the unknown side of each triangle in question 1. Round all answers to one decimal place.
3. Find the value of each unknown measure to the nearest hundredth.
   a) $a^2 = 5^2 + 13^2$
   b) $10^2 = 8^2 + m^2$
   c) $26^2 = b^2 + 12^2$
   d) $2.3^2 + 4.7^2 = c^2$
4. Determine the length of the diagonals of each rectangle to the nearest tenth.
   a)

   b)



   c)



   d)

5. An isosceles triangle has a hypotenuse 15 cm long. Determine the length of the two equal sides.
6. An apartment building casts a shadow. From the tip of the shadow to the top of the building is 100 m. The tip of the shadow is 72 m from the base of the building. How tall is the building?