CHAPTER 1 – MATH 9 notes

1.1 Square root → ex $\sqrt{49} = \sqrt{7 \times 7} = 7$

a perfect square → when you square root a number = a whole number or fraction
→ does not have decimal that does not stop or have a pattern.

* $0.333^{\cdot} = \frac{1}{3}$ or $\frac{3}{9}$ $\quad 0.222^{\cdot} = \frac{2}{9}$
$0.111\ldots = \frac{1}{9}$

ex $\sqrt{\frac{225}{100}} = \sqrt{\frac{15 \times 15}{10 \times 10}} = \frac{15}{10}$

note – it is called a square because it makes a square

$\frac{15}{10}$

$A = \frac{15}{10} \times \frac{15}{10} = \frac{225}{100}$ ← perfect square

$\frac{15}{10}$ ← square root

1.2 non-perfect square – when you square root it; it does not equal an exact number or fraction
– estimation is used to find approx. square root

ex1 $\sqrt{7.5}$

perfect square on this side: $\sqrt{4} = 2$

perfect square on this side: $\sqrt{9} = 3$

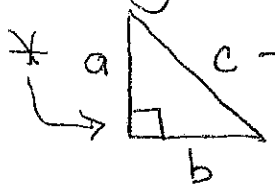
* 7.5 is closer to 9 so approx = 2.7

ex2 $\sqrt{\frac{3}{10}}$ → close to $\sqrt{0.25} = 0.5$ (perfect square)
or $\sqrt{0.36} = 0.6$

write as a decimal
or $\sqrt{0.30}$ or $\sqrt{\frac{30}{100}}$

* between 0.5 + 0.6
so ~ 0.55 or 0.54

1.2 Pythagorean Theorem



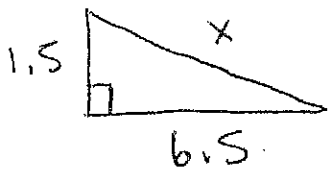
— remember c is <u>always</u> across from ∟

$a^2 + b^2 = c^2$ (use if you want longest side)

or

$c^2 - a^2 = b^2$ (use if you have longest side)

ex 1



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

$1.5^2 + 6.5^2 = c^2$

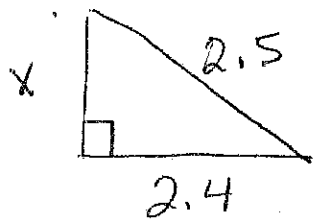
$44.5 = c^2$ * $\sqrt{\ }$ both sides

$c = \sqrt{44.5}$ or about

$\sqrt{36} = 6$ $\sqrt{44.5}$ $\sqrt{49} = 7$

~ 6.7

ex 2



$c^2 - a^2 = b^2$

$2.5^2 - 2.4^2 = b^2$

$6.25 - 5.76$

$0.49 = b^2$ * $\sqrt{\ }$ both sides

$\sqrt{0.49} = b$

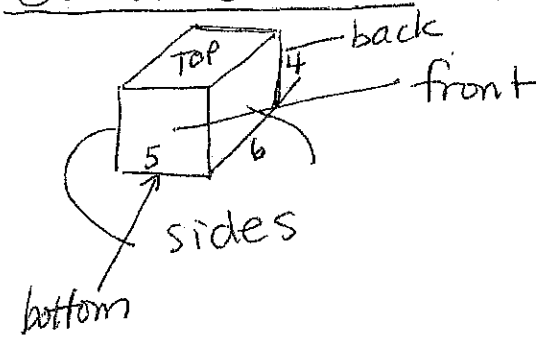
$0.7 = b$

1.3 Surface Area - Right Rectangular Prisms

$A = \frac{b \times h}{2}$

$A = l \times w$

Surface area - add all sides



$A_{front} = 5 \times 4 = 20$

A_{back} = same as front = 20

$A_{side} = 6 \times 4 = 24$

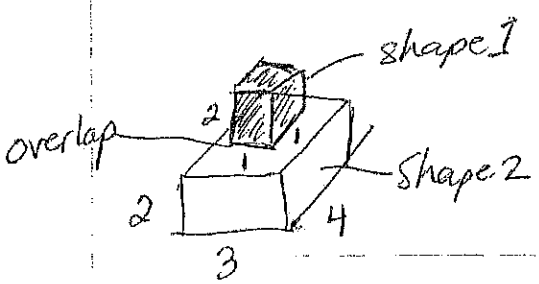
A_{side} = same as other side = 24

$A_{top} = 5 \times 6 = 30$

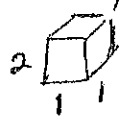
A_{bottom} = same as top = 30

$SA = 148$ (20+20+24+24+30+30)

* To find the surface area of $\boxed{\text{Composite}}$ objects - find surface area of each
- subtract where they overlap.



$SA_{shape\,1} = A_{front} = 2 \times 1 = 2$



back = 2×1 = 2

side = 2×1 = 2

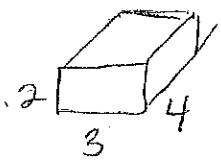
side = 2×1 = 2

top = 1×1 = 1

bottom = 1×1 = 1

$SA_{shape\,1} = 10$

$SA_{shape\,2} = A_{front} = 2 \times 3 = 6$



back = 2×3 = 6

side = 4×2 = 8

side = 4×2 = 8

top = 3×4 = 12

bottom = 3×4 = 12

$SA_{shape\,2} = 52$

Overlap

shape 1 - missing bottom = 1

shape 2 - missing part of top = shape 1 bottom = 1

= 2

∴ Total SA = 10 + 52 = 62

Subtract overlap −2 = 60

CHAPTER 2 - Math 9 notes

2.1

5^3 — exponent

base

5^3 = a power of 5

5^2 = a power of 5

To write a power:

The base is the number repeated
the exponent is the # of times it's repeated

$6 \times 6 \times 6 \times 6 = 6^4$ ← repeated 4x

6 is the number repeated

*pay attention to brackets!

$(-3)^2 = -3 \times -3 = 9$

but $-(3)^2 = -(3 \times 3) = -9$

2.2 Powers of 10 and Zero

238 in power of 10
$= (2 \times 10^2) + (3 \times 10^1) + (8 \times 10^0)$

When the base is 10 — the exponent just tells you how many 0's there are

ex. $10^1 = 10$ ← 1 zero

$10^2 = 100$ ← 2 zeros

$10^6 = 1000000$ ← 6 zeros

standard form
$6 \times 10^2 = 600$

What if you had 10^0 — means 0 zeros = 1

* same rule applies to all numbers

$2^0 = 1$ $(-243)^0 = 1$

2.3 Remember BEDMAS

( ) ^{2} ^{0} × + −

$\boxed{2.4}$ Exponent Laws + $\boxed{2.5}$

MULT — product of powers

When you have the same base
<u>add</u> exponents

$$5^4 \times 5^2 = (5\times5\times5\times5)\times(5\times5) = 5^6$$

or $5^{4+2} = 5^6$

DIVIDE — Quotient of powers

When you divide same base
<u>subtract</u> exponents

$$5^4 \div 5^2 = \frac{(5\times5\times5\times5)}{(5\times5)} = \frac{5\times5\times\cancel{5}\times\cancel{5}}{\cancel{5}\times\cancel{5}} = 5^2$$

or $5^{4-2} = 5^2$

$(x^2)^3$ — power of power

When you have an exponent on a bracket
<u>multiply</u> exponents

$$(2^2)^3 = (2^2)\times(2^2)\times(2^2) = 2^{2+2+2} = 2^6$$

use MULT RULE

or $2^{2\times3} = 2^6$

$(2\times3)^2$ — power of product

If you have more than 1 number in brackets (× with × between)
<u>distribute</u> exponent

$$(2\times3)^2 = (2\times3)(2\times3) = 6\times6 = 36$$

or $(2^2\times3^2) = (4\times9) = 36$

$(4\div2)^2$ or $\left(\frac{1}{3}\right)^2$ — power of a quotient

<u>Distribute</u>: $(4\div2)^2 = 4^2\div2^2 = 16\div4 = 4$

$$\left(\frac{1}{3}\right)^2 = \left(\frac{1}{3}\right)\left(\frac{1}{3}\right) \text{ or } \frac{1^2}{3^2} = \frac{1}{9}$$