AGENDA - Unit 10-8

Applications and Word Problems

- Go over HW 10.7
- Notes - Practice - 10.8
- HW - Finish 10-8 Packet
- Test - Next - Tuesday/ Wednesday

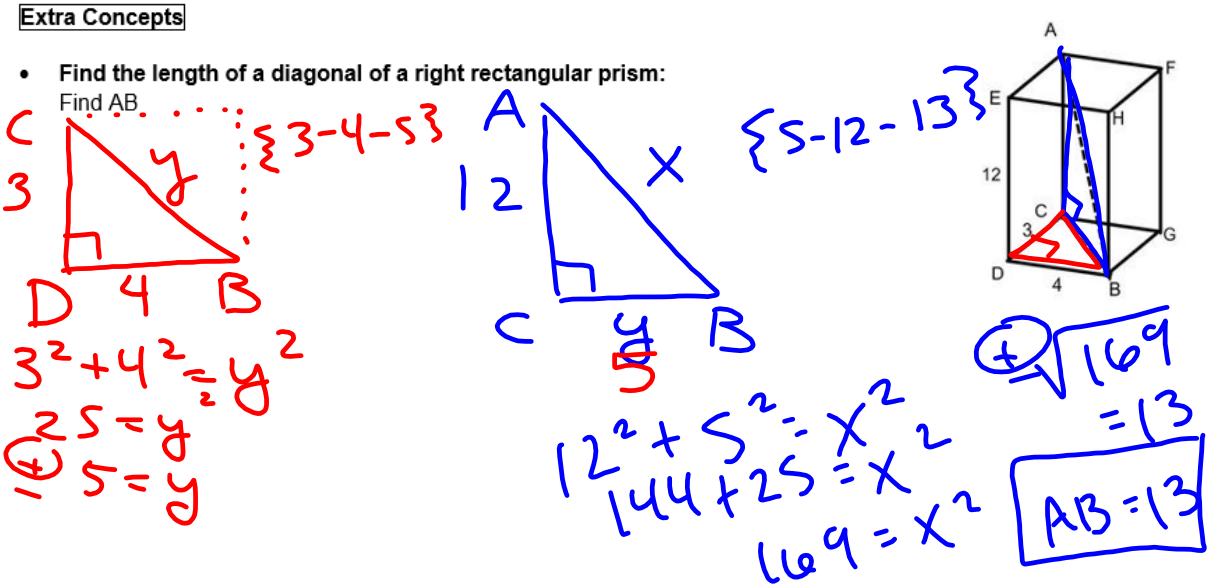
Name _____ Date Due _____ Section _____

10-5R & 10-8L Applications and Word Problems with Solid Geometry: Density, Modeling, Pouring Rate, Design

Extra Concepts

- **Find the length of a diagonal of a right rectangular prism:**

Find AB



$3^2+4^2=y^2$

$25=y^2$

$\pm 5=y$

$12^2+5^2=x^2$

$144+25=x^2$

$169=x^2$

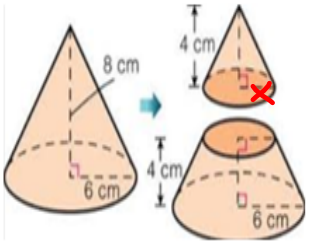
$\pm\sqrt{169}$

$=13$

$AB=13$

- **Find a missing dimension through similar triangles in a cone**

Find the radius of the cross section parallel to the base that divides the altitude of the right cone in half.



$\frac{\Delta I}{\Delta II} : \frac{x}{6} = \frac{4}{8}$

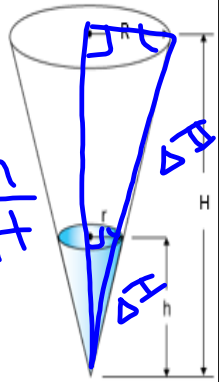
$8x = 24$

$x = 3\text{ cm}$

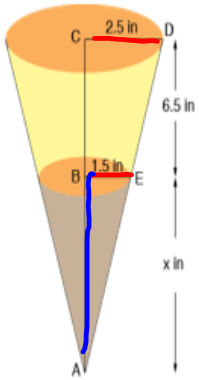
$\frac{\Delta I}{\Delta II} : \frac{r}{R} = \frac{h}{H}$

AA~

$\| \rightarrow \cong$ CORR $\angle$'s



If the height of the frustum (cut off cone) is 6.5 inches and the parallel bases are 2.5 in and 1.5 in, find the height of the right cone that was cut off. Round the nearest tenth.



H

$x + 6.5$

$= ?$

$\frac{\Delta I}{\Delta II} : \frac{1.5}{2.5} = \frac{x}{x+6.5}$

$1.5(x+6.5) = 2.5x$

$1.5x + 9.75 = 2.5x$

$-1.5x \quad -1.5x$

$9.75 = 1x$

$H = 6.5 + 9.75 = 16.25$

16.3 IN

WHOLE CONE

9.8 = IN HEIGHT OF CONE CUT OFF

- **Unit Conversions**
  A box has a volume of 8400.00 cubic inches. What is the volume in cubic feet?

HUNDREDTH

$8400.00\ IN^3$

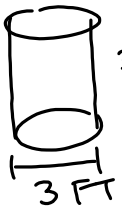
$8400.00\ \cancel{IN}\cdot\cancel{IN}\cdot\cancel{IN}\cdot\frac{1FT}{12\cancel{IN}}\cdot\frac{1FT}{12\cancel{IN}}\cdot\frac{1FT}{12\cancel{IN}}$

$\frac{8400.00}{12\cdot12\cdot12}=4.8611\ FT^3$

$\boxed{4.86\ FT^3}$

- **Density =** $\frac{\text{MASS}}{\text{VOLUME}}$ ✓

American Red Oak trees have a density of 45 lb/ft³. A company is removing a limbed tree trunk that is 30 feet high with a diameter of 3 feet. What is the mass of this tree, to the nearest hundredth of a pound?



FIND VOLUME

$V=\pi r^2 H=\pi(1.5)^2 30\ FT^3$

$=67.5\pi\ FT^3$

$D=\frac{m}{V}$

$\frac{45\ lb}{1\ FT^3}=\frac{m}{67.5\pi\ FT^3}$

$m=(45)(67.5\pi)=9542.58$

Cost: If the company can get $30.00 per ton of mixed hardwood pulpwood, how much can they earn for this tree? (1 ton = 2000 lb).

$\boxed{9542.59\ lb}$

$9542.59\ lb\cdot\frac{1\ TON}{2000\ lb}$

$\frac{lb}{TON}:\frac{9542.59}{X}=\frac{2000}{1}$

$2000X=9542.59$

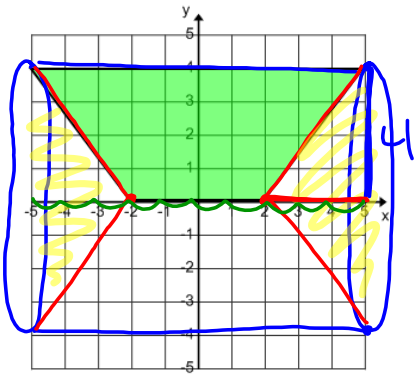
$X=\frac{9542.59}{2000}$

$4.7712\ TONS$

$\$30.00\left(4.7712\ \cancel{TONS}\right)=\$143.1388$

$\boxed{\$143.14}$

- **Rotations about an axis in the coordinate plane:**
  Find the volume of the cylinder created by the rotation of the 2-D figure about the x-axis.



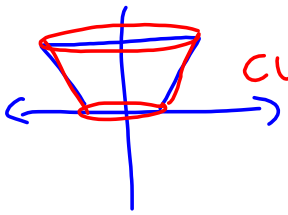
$V = V_{CYL} - 2V_{CONE}$

$V_{CYL} = \pi r^2 H$
$= \pi 4^2 10$
$= 160\pi$

$V_{CONE} = \frac{BH}{3}$
$= \frac{\pi r^2 H}{3}$
$= \frac{\pi 4^2 (3)}{3}$
$= 16\pi$

$V = 160\pi - 2(16\pi)$
$V = 128\pi$

What solid would the trapezoid create if it was rotated around the y-axis instead?



CUT OFF CONE