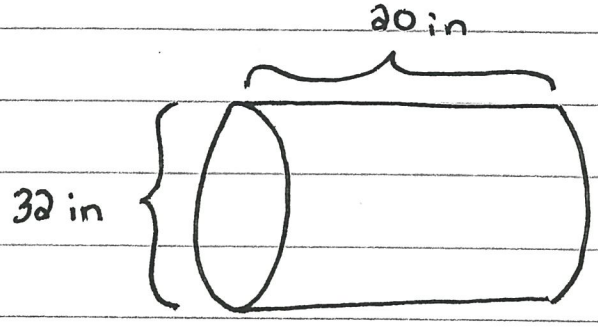
VOLUME AND SURFACE AREA NAME KEY

#1 FIND THE VOLUME (ANSWER WITH EXACT π)



$V = [\pi r^2]\, h$

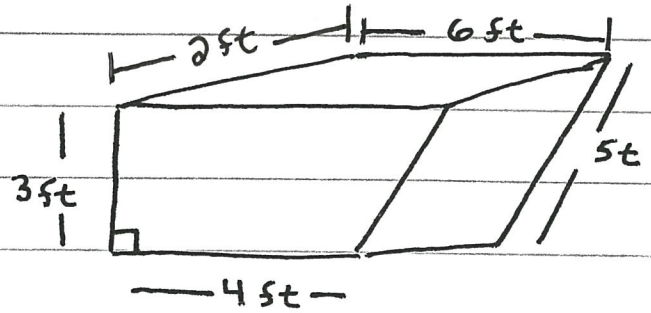
$V = \pi \cdot [16]^2 \cdot 20$

$V = 5120\pi$

#1 5120π in^3

FIND THE SURFACE AREA

#2



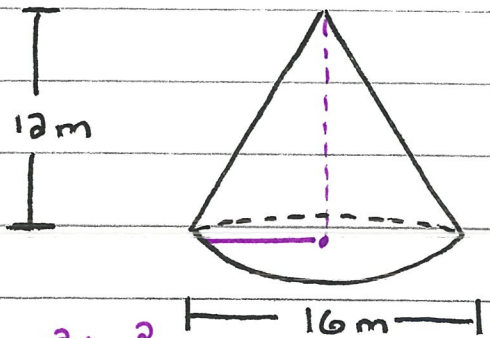
#2 66 ft^2

2 TRAPEZOIDS + ALL SIDES [BIG RECTANGLE]

$2 \cdot \frac{1}{2}[b_1 + b_2]\, h$ + PERIMETER [DEPTH]

$2 \cdot \frac{1}{2}[4+6] \cdot 3 + [3+4+5+6] \cdot 2 =$

#3 FIND THE SURFACE AREA (DECIMAL ONLY TO HUNDREDTHS)



$SA_{CONE} = \pi r^2 + \pi r s$

$= \pi \cdot 64 + \pi [8] \sqrt{208}$

$= 563.53$

#3 563.53

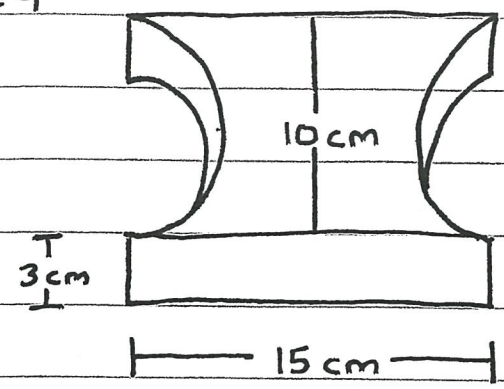
$s^2 = 8^2 + 12^2$

$s^2 = 64 + 144$

$s = \sqrt{208}$

SURFACE AREA [3 DECIMAL PLACES]

#4



2 × [TOP] + 2 × [FRONT RECTANGLE] + CIRCULAR BAN

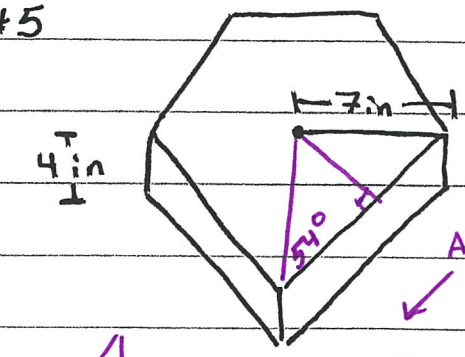
$2[\underset{\text{REC}}{10\times 15} - \underset{\text{CIRCLE}}{\pi(5)^2}] + 2[3\times 15] + \underset{\text{CIRCUMFERENCE}\cdot\text{HEIG}}{2\pi(5)\cdot 3}$

$2[150 - 25\pi] + 2[45] + 30\pi$

$= 327.168$

#4 $327.168\ cm^2$

#5



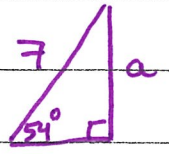
FIND VOLUME [2 DECIMAL PLACES]

EXTERIOR $\angle = 360/5 = 72°$

INTERIOR $\angle = 180 - 72 = 108°$

APOTHEM $= 7\cdot \sin 54°$ BASE × APOTHEM × # Δ's

AREA of PENTAGON $= \frac{1}{2}[2\cdot 7\cdot\cos 54°]\cdot 7\sin(54°)\cdot 5$



$\sin 54° = \frac{a}{7}$

$7\cdot \sin 54° = a$

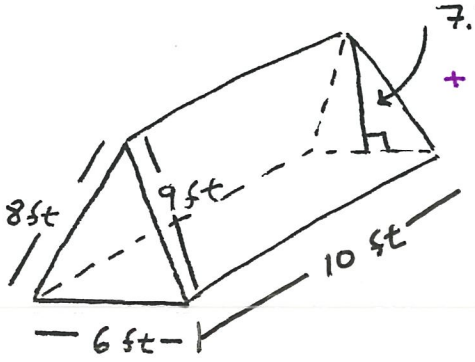
$* \ b = 7\cos 54°$

VOLUME $= B\cdot h$

$=$ AREA · PENTAGON [4]

#5 $466.02\ in^3$

#6 FIND THE SURFACE AREA [2 DECIMAL PLACES]



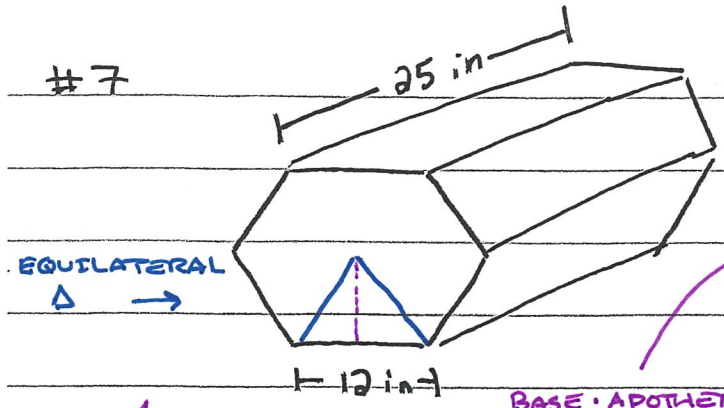
AREA of FRONT & BACK $= 2\cdot\frac{1}{2}[6]\cdot 7.32$

+ BIG RECTANGLE $= [6+8+9]\cdot[10]$

$= 6[7.32] + 23[10]$

#6 $273.92\ ft^2$

#7



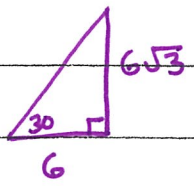
VOLUME [3 DECIMAL PLACES]

$V = [\text{AREA HEXAGON}][\text{DEPTH}]$

$= 216\sqrt{3}\,[25]$

$= 9353.074$

BASE · APOTHEM · # Δ's

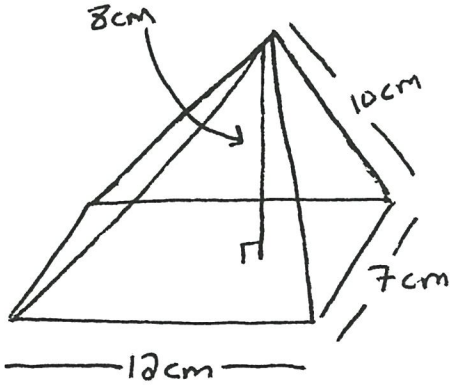


$\text{AREA} = \frac{1}{2}[12][6\sqrt{3}] \times 6$

$= 216\sqrt{3}$

#7 $9353.074\ in^3$

#8



VOLUME [2 DECIMAL PLACES]

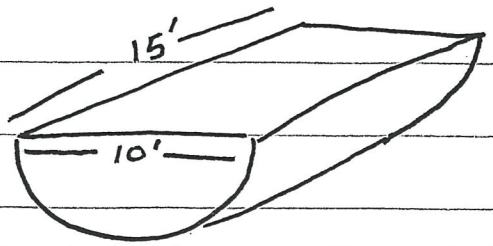
$V = \frac{1}{3}[\text{BASE AREA}] \cdot \text{HEIGHT}$

$= \frac{1}{3}[7 \times 12] \cdot [8]$

#8 $224\ cm^3$

SURFACE AREA [3 DECIMALS]

#9



#9 $464.159\ ft^2$

1] FRONT & BACK = 1 CIRCLE = $\pi[5]^2 = 25\pi$

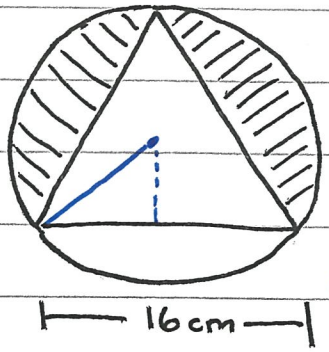
2] TOP RECTANGLE = $10[15] = 150$

3] BASE = $\frac{1}{2}$ CIRCUMFERENCE [DEPTH] = $\pi[5][15] = 75\pi$

$100\pi + 150$

NAME _____

#10



AREA of 2 SHADED REGIONS [2 DECIMALS]

AREA of CIRCLE: $\pi\left[\frac{16\sqrt{3}}{3}\right]^2 = \boxed{\frac{256\pi}{3}}$

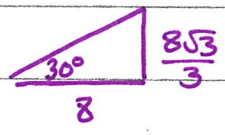
AREA of Δ: $\frac{1}{2}[16]\cdot\frac{8\sqrt{3}}{3}\cdot 3 = \boxed{64\sqrt{3}}$

AREA of SHADED: $\frac{2}{3}$[AREA CIRCLE − AREA Δ]

$\frac{2}{3}\left[\frac{256\pi}{3} - 64\sqrt{3}\right]$

=

#10 104.82 cm²



APOTHEM: $\frac{8\sqrt{3}}{3}$

RADIUS: $\frac{16\sqrt{3}}{3}$

#11 WHAT IS THE SUM of INTERIOR ANGLES FOR A REGULAR polygon WITH 14 SIDES?

EXTERIOR $\angle = 360/14 = 25.7142$

INTERIOR $\angle = 180 - 25.714\ldots$

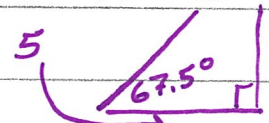
$\sum$ INT $\angle$'S $= [154.28\ldots]14 = 2160°$

#11 2160°

#12 WHAT IS THE MEASURE of THE APOTHEM FOR AN OCTAGON WITH SIDE LENGTHS of 10 m? [2 DECIMALS]

EXTERIOR $\angle = 360/8 = 45°$

INTERIOR $\angle = 180-45 = 135°$

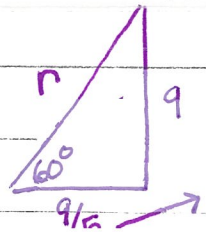


APOTHEM: TAN $67.5 = \frac{a}{5}$

$a = 5$ TAN 67.5

#12 12.07 m

#13 WHAT IS THE MEASURE OF THE RADIUS FOR A HEXAGON WITH APOTHEM LENGTH of 9 in? [EXACT ANSWER]



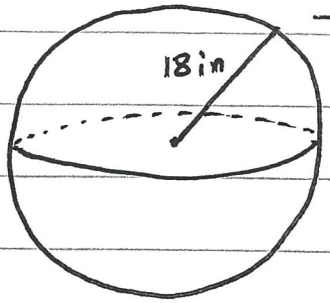
SL : LL : Hyp

X : X√3 : 2X

3√3 ← 9 → 6√3

#13 6√3 in

#14



→ SURFACE AREA [NO DECIMALS]

$SA_{SPHERE} = 4\pi r^2$

$= 4\pi [18]^2$

#14 1296π IN^2

#15

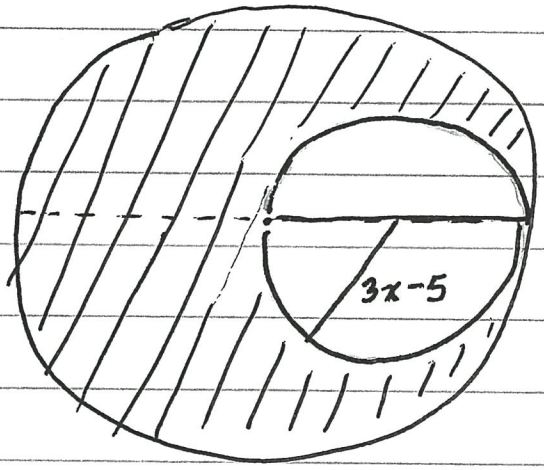
→ VOLUME [NO DECIMALS]

VOLUME $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi [18]^3$

#15 7776π IN^3

#16



AREA of SHADED REGION [NO DECIMALS]

AREA of LARGE CIRCLE: $\pi(6x-10)^2$

$(36x^2 - 120x + 100)\pi$

#16 $27\pi x^2 - 90\pi x + 75\pi$

AREA of SMALL CIRCLE: $\pi(3x-5)^2$

$(9x^2 - 30x + 25)\pi$

} SUBTRACT THE TWO

$36x^2 - 120x + 100$]

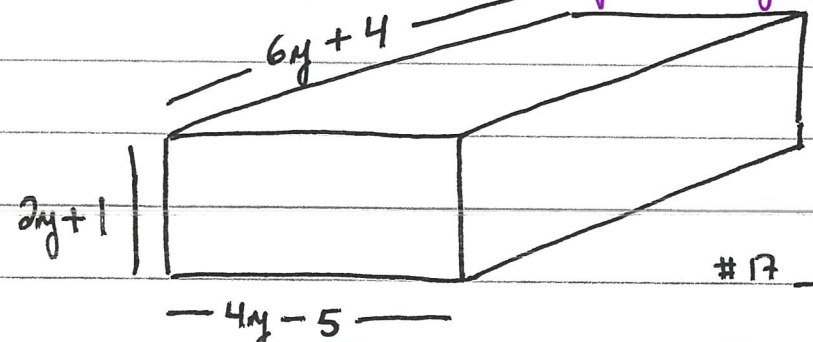
$-\ 9x^2 + 30x - 25$] DISTRIBUTE π ON LAST STEP

$27\pi x^2 - 90\pi x + 75\pi$

SURFACE AREA

#17

FRONT & BACK $2(4y-5)(2y+1) = 16y^2 - 12y - 10$



ADD RESULTS

$16y^2 - 12y - 10$

$72y^2 \quad -32$

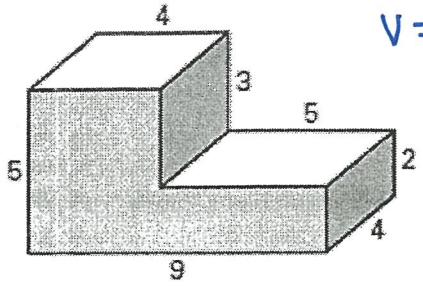
#17 $88y^2 - 12y - 42$

ALL THE SIDES: [PERIMETER OF FRONT] x [DEPTH]

$(\quad)(\quad) = 72y^2 - 32$

#18 Find the volume of the solid.

a.



$V = Bh$

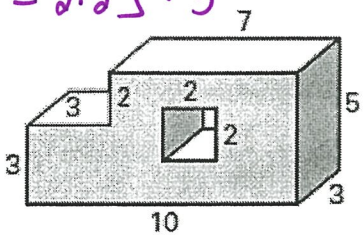
$V = [5 \cdot 9 - 3 \cdot 5][4]$

$= [30][4]$

$= 120$

#18A 120 UNITS^3

b.



$V = B \cdot h$

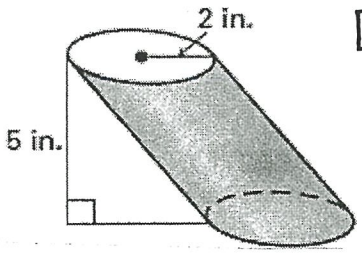
$V = [10 \cdot 5 - 3 \cdot 2 - 2 \cdot 2] \cdot 3$

$= [40]3$

#18B 120 UNITS^3

#19 Find the volume of the oblique prism or cylinder.

a.



[EXACT ANSWER]

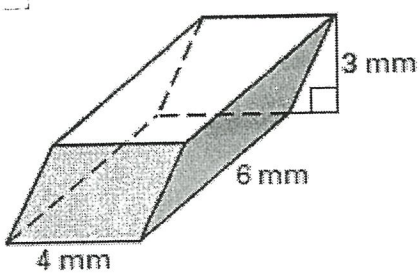
$V = \pi r^2 h$

$= \pi [2]^2 \cdot 5$

$= 20\pi$

#19A 20π IN^3

b.



$V = l \cdot w \cdot h$

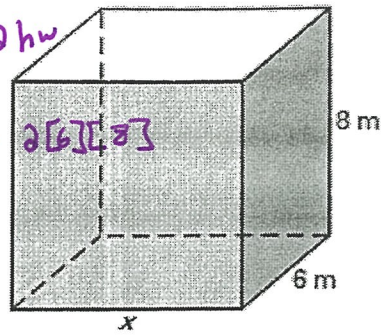
$= 4 \cdot 6 \cdot 3$

$= 72\ mm^3$

#19B 72 mm^3

#20 Solve for x given the surface area of the right prism or cylinder.

a. $S = 320\text{m}^2$



$SA_{Box} = 2lw + 2lh + 2hw$

$320 = 2x[6] + 2[x]8 + 2[6][8]$

$320 = 12x + 16x + 96$

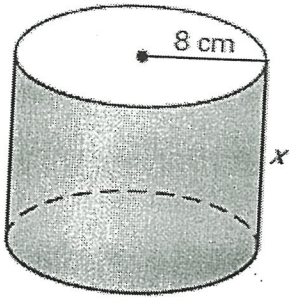
$320 - 96 = 28x$

$224 = 28x$

$8 = x$

#20A $x = 8$ m

b. $S = 1000\text{ cm}^2$ [3 DECIMALS]



$SA_{CYLINDER} = 2\pi r^2 + 2\pi rh$

$1000 = 128\pi + 16\pi x$

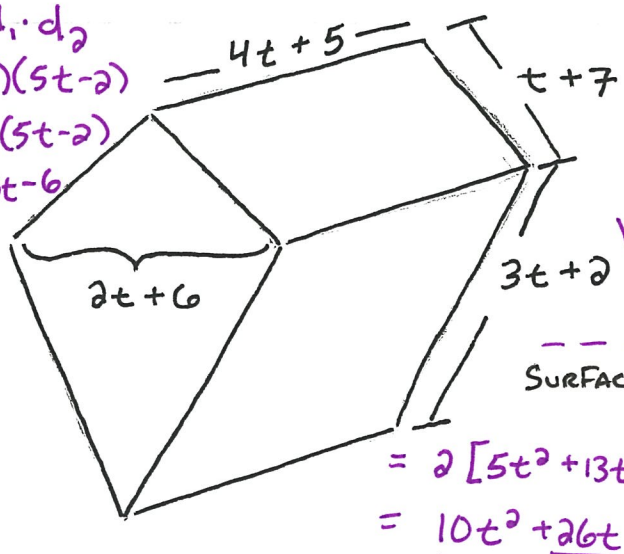
$1000 - 128\pi = 16\pi x$

$\frac{1000 - 128\pi}{16\pi} = x$

$11.894 = x$

#20B $x = 11.894$ cm

#21 FIND THE VOLUME



AREA KITE $= \frac{1}{2} d_1 \cdot d_2$

$= \frac{1}{2}(2t+6)(5t-2)$

$= (t+3)(5t-2)$

$= 5t^2 + 13t - 6$

VOLUME: $(4t+5)(5t^2+13t-6)$

$= 20t^3 + 77t^2 + 41t - 30$

#21 $20t^3 + 77t^2 + 41t - 30$

SURFACE AREA: 2 KITES + BIG RECTANGLE (PERIMETER)(DEPTH)

$= 2[5t^2 + 13t - 6] + (8t + 18)(4t + 5)$

$= 10t^2 + 26t - 12 + 32t^2 + 112t + 90$

$= 42t^2 + 138t + 78$

#22 FIND THE SURFACE AREA

#22 $42t^2 + 138t + 78$