2] a) $V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}(\pi)(30\text{ mm})^3$

$= \frac{4}{3}\cdot(27000)\cdot\pi\text{ mm}^3$

$= 4(9000)\pi\text{ mm}^3$

$= \boxed{36{,}000\pi\text{ mm}^3}$ of sphere

$V_{\text{hemisphere}} = \frac{1}{2}V_{\text{sphere}}$

$= \boxed{18{,}000\pi\text{ mm}^3}$

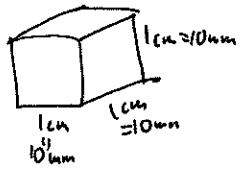
b) $V_{\text{solid}} = 25\%\ V_{\text{total}}$

$= 0.25 \cdot 18{,}000\pi\text{ mm}^3$

$= \frac{9000}{2}\pi\text{ mm}^3$

$= 4500\pi\text{ mm}^3$

Now 10 mm = 1 cm, so a $1\text{ cm}^3$ is $10^3\text{ mm}^3$.




Thus $4500\pi\text{ mm}^3 \cdot \frac{1\text{cm}^3}{1000\text{mm}^3} = \boxed{4.5\pi\text{ cm}^3}$

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6] a) Same as Exam.

b) Hicham runs 1 mile in 3 min 45 s = $3.75 = \frac{15}{4}$ min. So in 2 hours = 120 min he will run

$120\text{ min} \Big/ \left(\frac{15}{4}\text{ min/mile}\right) = \frac{4}{15}\cdot 120 = \boxed{32\text{ miles}}$

c) Svetlana runs 1 mile in 4 min 12 s = 4.2 min. So it takes

$26.2\text{ mi} \cdot \frac{4.2\text{ min}}{1\text{ mi}} = \boxed{110.04\text{ min}}$ to run a marathon

d) $4\text{ L} \approx 4\text{ gallons} = 4\cdot 16\text{ cups} = 8\cdot 8\text{ oz} = \frac{16\cdot 8}{16}\text{ bottles} = 8\text{ bottles}$

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7] a) 

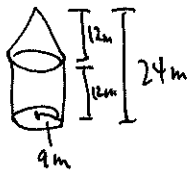

$\rightarrow h^2 + r^2 = l^2 \rightarrow l = \sqrt{h^2 + r^2}$

b) $l = \sqrt{12^2 + 9^2} = \sqrt{225} = 15\text{ m}$. So $A_{\text{lat}} = \pi r l = \pi \cdot 9 \cdot 15 = \boxed{135\pi\text{ m}^2}$

c) $\text{Cost} = (\$7.70/\text{m}^2)\cdot(135\pi\text{ m}^2)$

$= \$1039.50\pi$

$\approx \$3264.03$

d) 


$V = V_{\text{cyl}} + V_{\text{cone}}$

$= \pi\cdot 9^2\cdot 12 + \frac{1}{3}\pi\cdot 9^2\cdot 12$

$= \frac{4}{3}\pi\cdot 9^2\cdot 12$

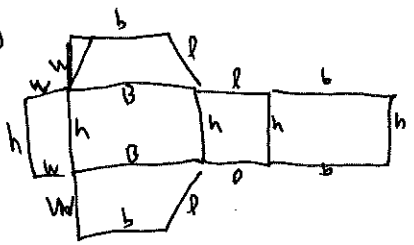
$= 4\pi\cdot 3\cdot 9\cdot 12$

$= \boxed{1296\pi\text{ m}^3}$

135
× 7
945

1039.5
× 3.14
41580
10395 0
31185 0
3264.030

8)

a) 


b) $SA = 2 \cdot \frac{1}{2}(b+B)w + Bh + lh + bh + wh$

$= (6+10)(3) + 15(10+5+6+3)$

$= 3 \cdot 16 + 15(24)$

$= 48 + 360$

$= \boxed{408 \text{ cm}^2}$

$V = \text{Area base} \cdot \text{height}$

$= \frac{1}{2}(b+B)wh$

$= \frac{1}{2}(6+10)(3)(15)$

$= 8 \cdot 3 \cdot 15$

$= \boxed{360 \text{ cm}^3}$

c) Double original height : $H = 30$ cm.

d) No. It will double the area only of the 4 rectangular faces. Need to increase by more to double surface area.

9) a) $\frac{a}{360} = \frac{A}{\pi r^2}$ b) $\frac{45}{360} = \frac{4.5a}{\pi r^2}$ so $\frac{1}{8}r^2 = 4.5\pi$, so $r^2 = 36$, so $\boxed{r = 6 \text{ in.}}$

c) $L = \frac{a}{360} \cdot 2\pi r = \frac{1}{8} \cdot 2\pi \cdot 6 = \frac{6}{4}\pi = \boxed{1.5\pi \text{ in}}$