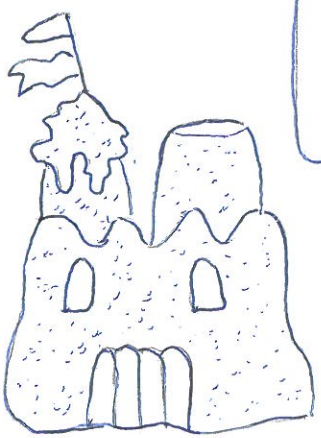
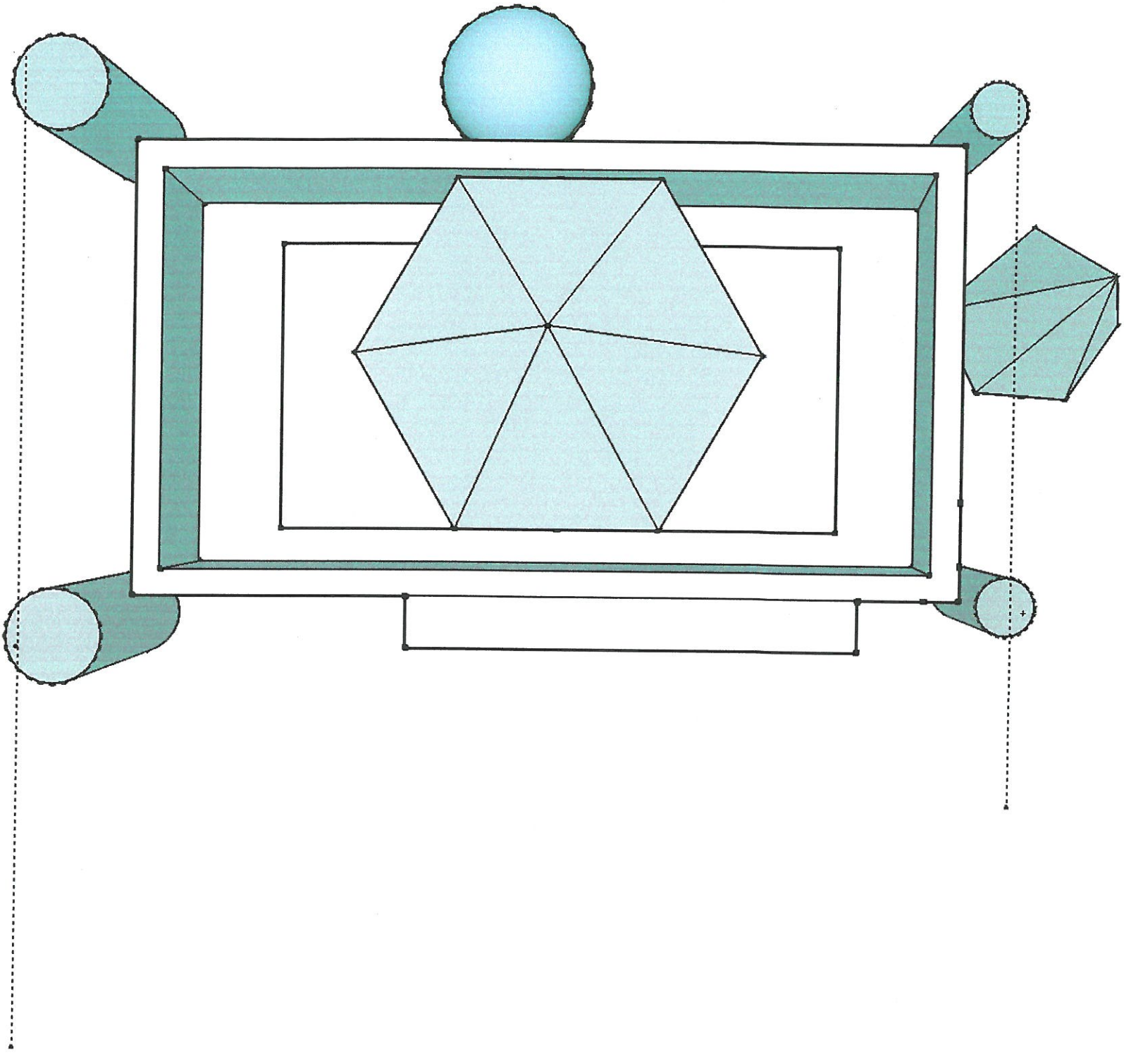
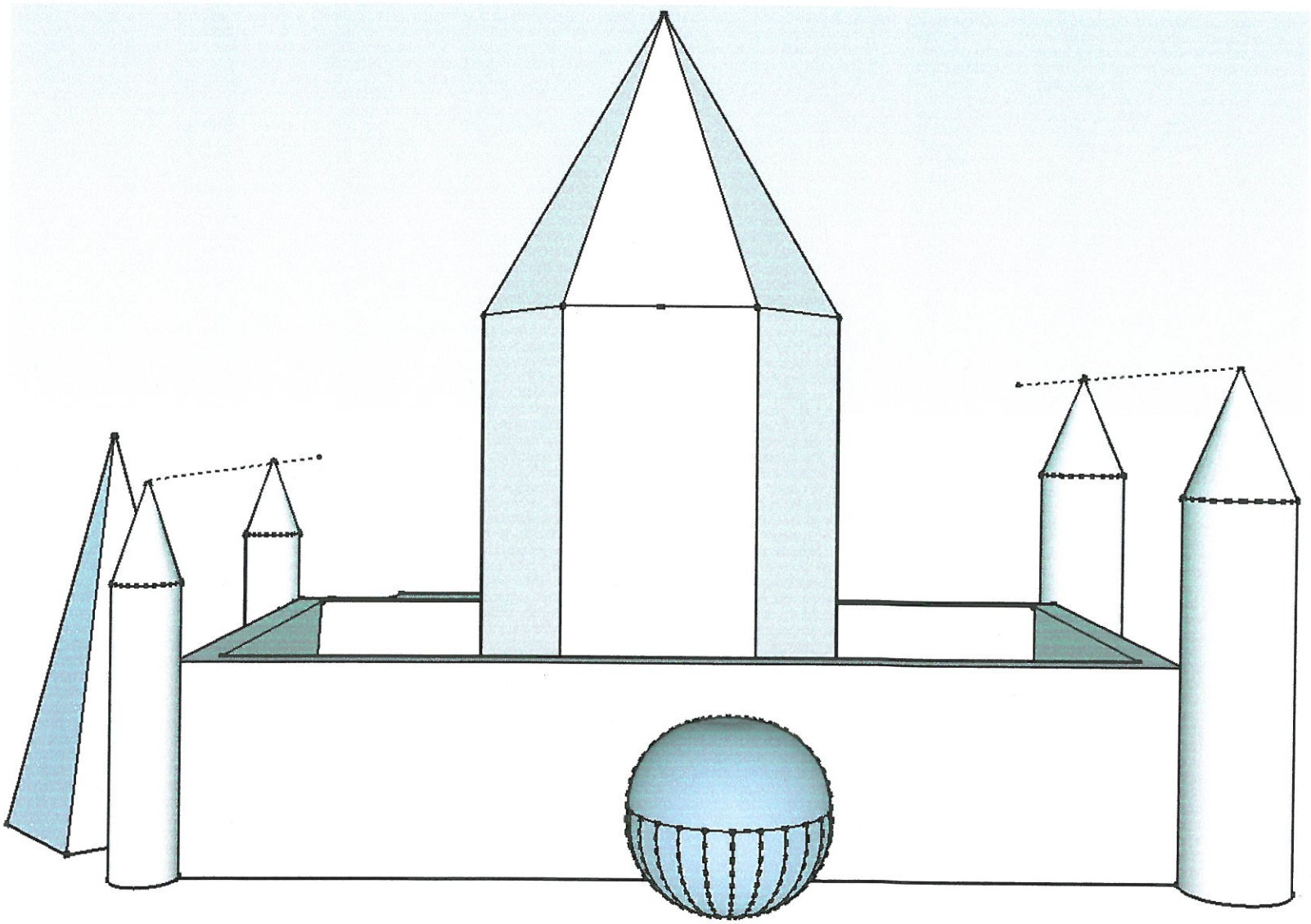
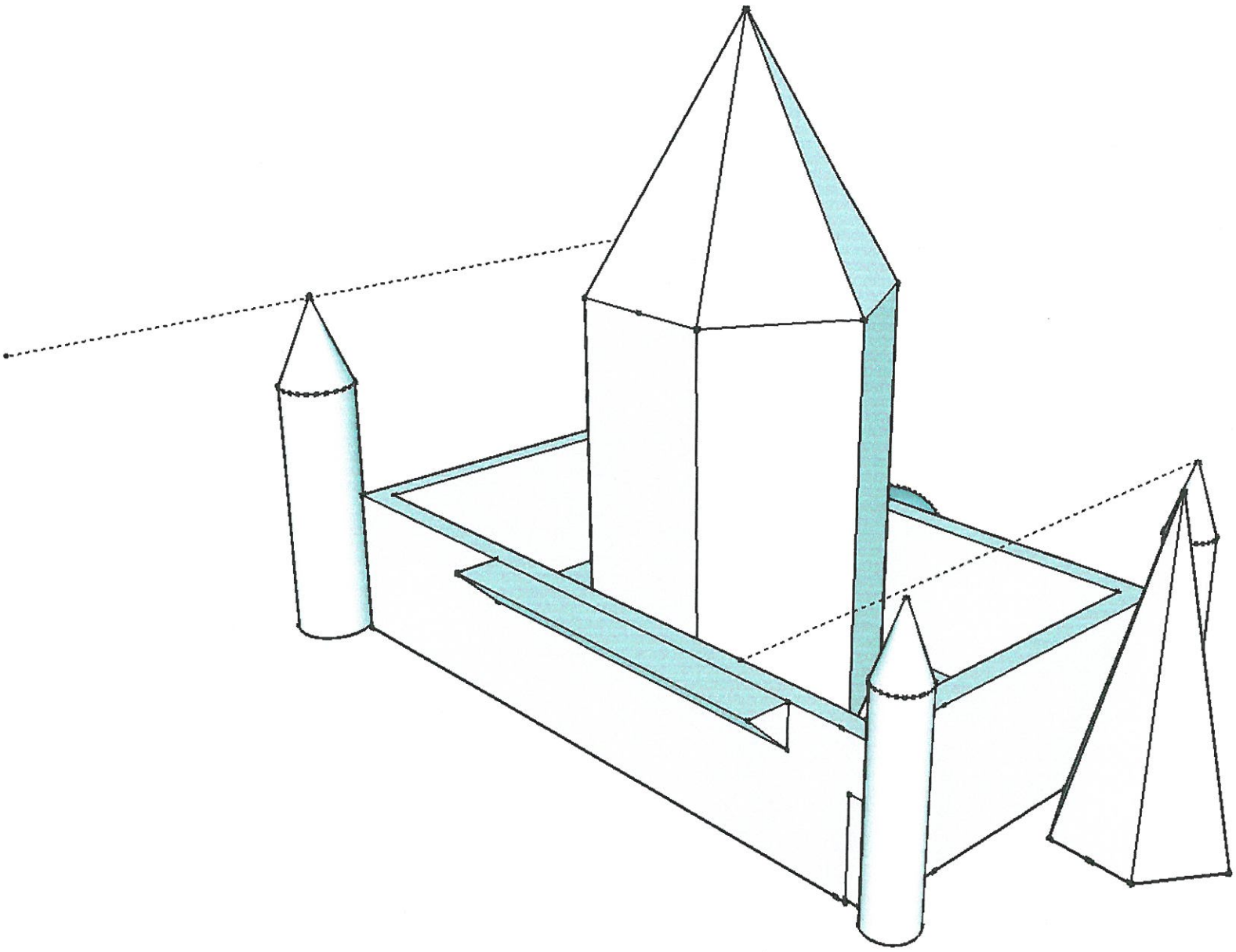
Austin & Emily's Sand Castle Project



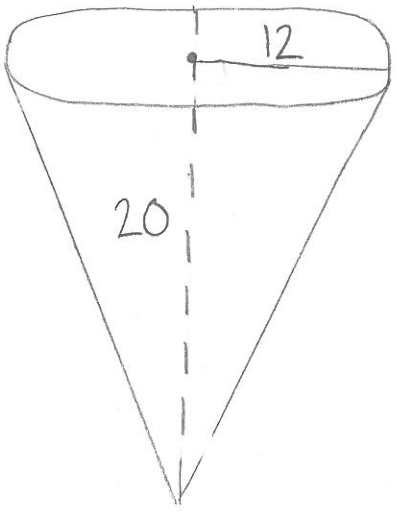
Emily Barrera
Austin Henningfield







Cone #1 (2)



$SA = \frac{1}{2}Cl$
$SA = \frac{1}{2}(24\pi)(23.32)$
$SA = \frac{1}{2}(559.68\pi)$
$SA = 279.84\pi^2$
$SA = 879.14\ in^2$

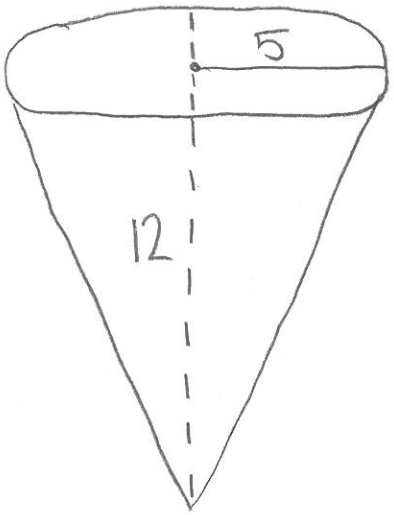
$B = \pi r^2$
$B = \pi 12^2$
$B = 144\pi$

$C = 2\pi r$
$C = 2\pi 12$
$C = 24\pi$

$V = \frac{1}{3}h$
$V = \frac{1}{3}(20)$
$V = 6.6\ in^3$

$20^2 + 12^2 = c^2$
$400 + 144 = c^2$
$\sqrt{544} = \sqrt{c^2}$
$C = 23.32$

Cone #2 (2)



$SA = \frac{1}{2}Cl$
$SA = \frac{1}{2}(10\pi)(13)$
$SA = \frac{1}{2}(130\pi)$
$SA = 65\pi^2$
$SA = 204.2\ in^2$

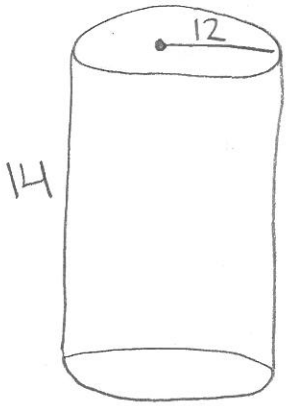
$B = \pi r^2$
$B = \pi 5^2$
$B = 25\pi$

$C = 2\pi r$
$C = 2\pi 5$
$C = 10\pi$

$V = \frac{1}{3}h$
$V = \frac{1}{3}(13)$
$V = 4.3\ in^3$

$12^2 + 5^2 = c^2$
$144 + 25 = c^2$
$\sqrt{169} = \sqrt{c^2}$
$C = 13$

Cylinder #1 (2)



$SA = B + Ch$

$SA = 144\pi + 24\pi(14)$

$SA = 144\pi + 336\pi$

$SA = 480\pi$

$SA = 1507.96 \text{ in}^2$

$B = \pi r^2$

$B = \pi 12^2$

$B = 144\pi$

$C = 2\pi r$

$C = 2\pi 12$

$C = 24\pi$

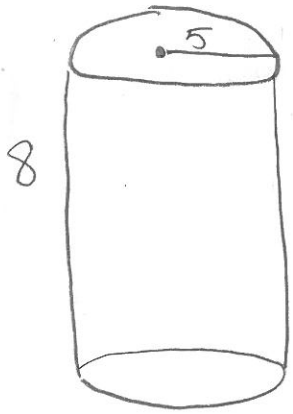
$V = Bh$

$V = 144\pi(14)$

$V = 2016\pi$

$V = 6333.45 \text{ in}^3$

Cylinder #2 (2)



$SA = B + Ch$

$SA = 25\pi + 10\pi(8)$

$SA = 25\pi + 80\pi$

$SA = 105\pi$

$SA = 329.87 \text{ in}^2$

$B = \pi r^2$

$B = \pi 5^2$

$B = 25\pi$

$C = 2\pi r$

$C = 2\pi 5$

$C = 10\pi$

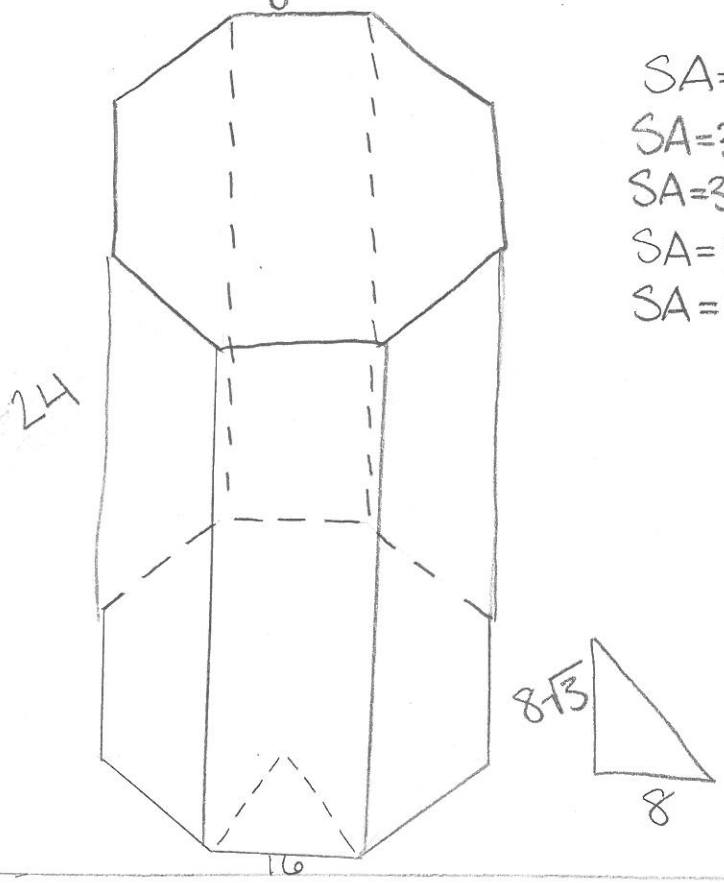
$V = Bh$

$V = 25\pi(8)$

$V = 200\pi$

$V = 628.32 \text{ in}^3$

Hexagonal Prism



$SA = B + nS$

$SA = 384\sqrt{3} + 6(384)$

$SA = 384\sqrt{3} + 2304$

$SA = 2688\sqrt{3}$

$SA = 4655.75\ in^2$

$B = \frac{1}{2}aP$

$B = \frac{1}{2}8\sqrt{3}(96)$

$B = 384\sqrt{3}$

$S = bh$

$S = 16(24)$

$S = 384$

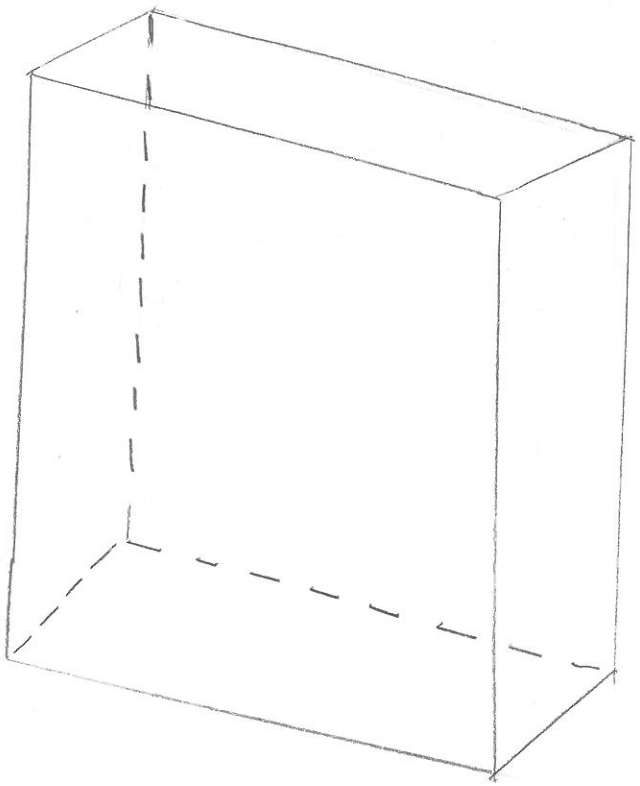
$V = Bh$

$V = 384\sqrt{3}(24)$

$V = 9216\sqrt{3}$

$V = 15962.58\ in^3$

Rectangular Prism #1 (2)



$SA = 2(wh) + (lw) + (lh)$

$SA = 2(20 \cdot 10) + (30 \cdot 20) + (10 \cdot 30)$

$SA = 2(200) + 600 + 300$

$SA = 2(1100)$

$SA = 2200\ in^2$

$V = Bh$

$V = (10)(20)(30)$

$V = 6000\ in^3$

Hexagonal Pyramid

$S = \frac{1}{2}bh$

$S = \frac{1}{2}16(24)$

$S = \frac{1}{2}(384)$

$S = 192$

$SA = nS$

$SA = 6(192)$

$SA = 1152\ in^2$

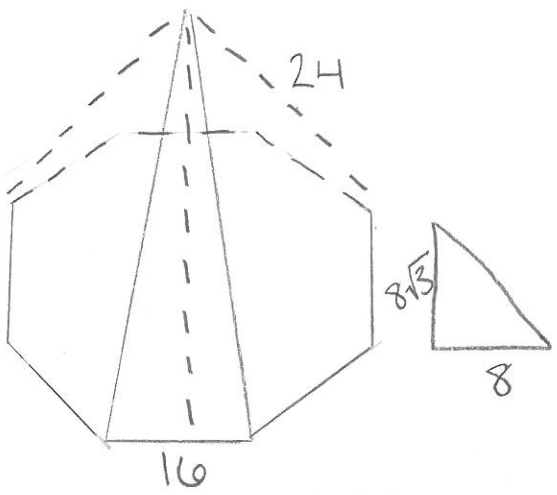
$h^2 + 8\sqrt{3}^2 = 24^2$

$h^2 + 192 = 576$

$-192 \quad -192$

$\sqrt{h^2} = \sqrt{384}$

$h = 19.6$



$V = \frac{1}{3}h$

$V = \frac{1}{3}(19.6)$

$V = 6.53\ in^3$

Pentagonal Pyramid

$S = \frac{1}{2}bh$

$S = \frac{1}{2}10(36)$

$S = \frac{1}{2}(360)$

$S = 180$

$SA = nS$

$SA = 5(180)$

$SA = 900\ in^2$

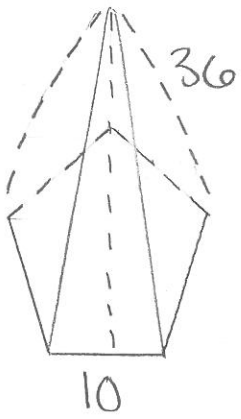
$h^2 + 5\sqrt{3}^2 = 36^2$

$h^2 + 75 = 1296$

$-75 \quad -75$

$\sqrt{h^2} = \sqrt{1221}$

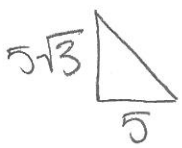
$h = 35.94$



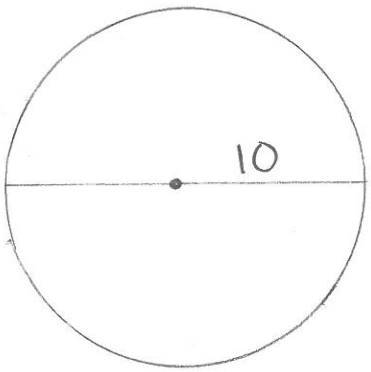
$V = \frac{1}{3}h$

$V = \frac{1}{3}(35.94)$

$V = 10.48\ in^3$



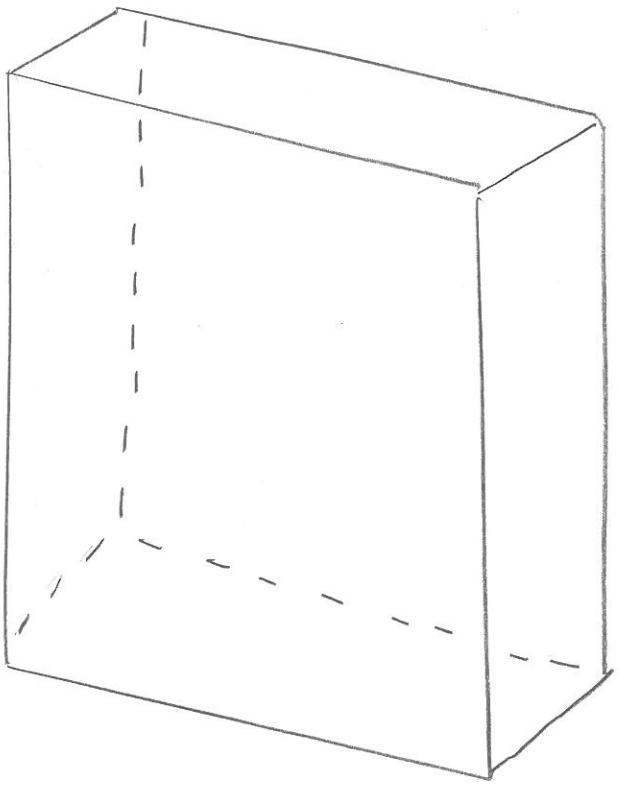
Sphere



$SA = 4\pi r^2$
$SA = 4\pi 10^2$
$SA = 4\pi 100$
$SA = 400\pi$
$SA = 1256.64\ in^2$

$V = \frac{4}{3}\pi r^3$
$V = \frac{4}{3}\pi 10^3$
$V = \frac{4}{3}\pi 1000$
$V = \frac{4000}{3}\pi$
$V = 133.33\pi$
$V = 4188.8\ in^3$

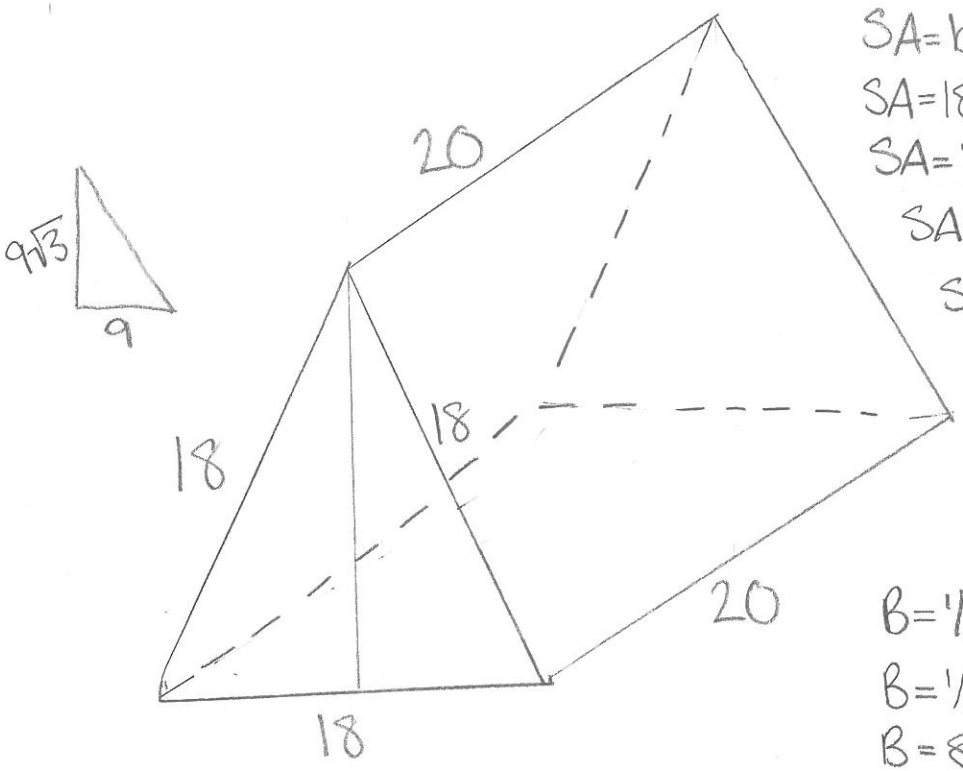
Rectangular Prism #2 (2)



$SA = 2(wh) + (lw) + (lh)$
$SA = 2(10 \cdot 8) + (20 \cdot 10) + (20 \cdot 8)$
$SA = 2(80) + 200 + 160$
$SA = 2(440)$
$SA = 880\ in^2$

$V = Bh$
$V = (20)(8)(10)$
$V = 1600\ in^3$

Triangular Prism



$SA = bh + (S1 + S2 + S3)h$

$SA = 18(9\sqrt{3}) + (18+18+18)20$

$SA = 162\sqrt{3} + (54)(20)$

$SA = 162\sqrt{3} + 1080$

$SA = 1242\sqrt{3}$

$SA = 2151.2\ in^2$

$B = \frac{1}{2}(18)(9\sqrt{3})$

$B = \frac{1}{2}(162\sqrt{3})$

$B = 81\sqrt{3}$

$B = 140.3$

$V = \frac{1}{2}Bhw$

$V = \frac{1}{2}(140.3)(9\sqrt{3})(20)$

$V = \frac{1}{2}(25200\sqrt{3})$

$V = 12600\sqrt{3}$

$V = 21823.84\ in^3$

Surface Area

Cylinder #1: 1507.96(2) = 3015.92
Cylinder #2: 329.87(2) = 659.87
Cone #1: 879.14(2) = 1758.28
Cone #2: 204.2(2) = 408.4
Rec. Prism #1: 2200(2) = 4400
Rec Prism #2: 880(2) = 1760
Sphere = 1256.64
Hex. Prism = 4655.75
Hex. Pyramid = 1152
Pent. Pyramid = 900
Tri. Prism = 2151.2

Total SA = 22118.06 in^2

Volume

Cylinder #1: 6333.45(2) = 12666.9
Cylinder #2: 628.32(2) = 1256.64
Cone #1: 6.6(2) = 13.2
Cone #2: 4.3(2) = 8.6
Rec Prism #1: 6000(2) = 12000
Rec Prism #2: 1600(2) = 3200
Sphere = 4188.8
Hex. Prism = 15962.58
Hex. Pyramid = 6.53
Pent. Pyramid = 10.48
Tri. Prism = 21823.84

Total Volume = 71137.57