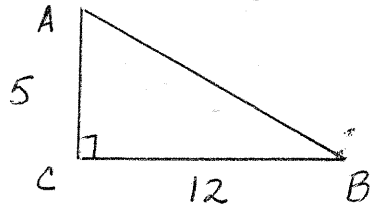
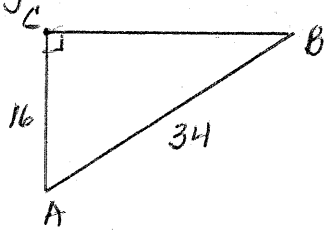
Geometry Practice Exam Name _____

1. Solve the Right Triangle – Use Trig ratios.

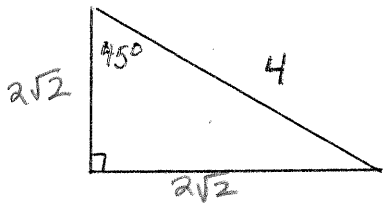


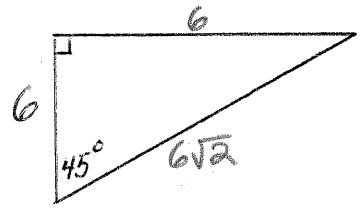
$\angle A = 67^\circ$
$\angle B = 23^\circ$
$AB = 13$

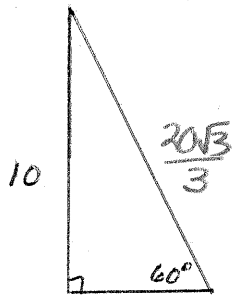


$\angle A = 62^\circ$
$\angle B = 28^\circ$
$BC = 30$

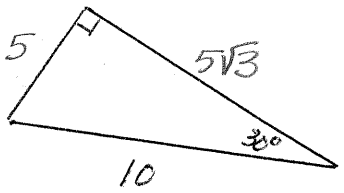
2. Find the lengths of all sides and give exact values. (may not be drawn to scale.)



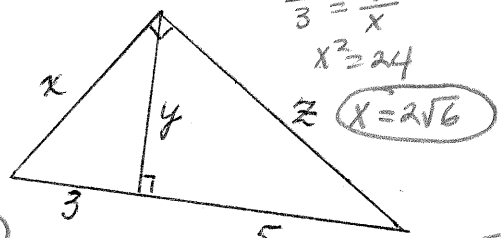




$\frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{3}$



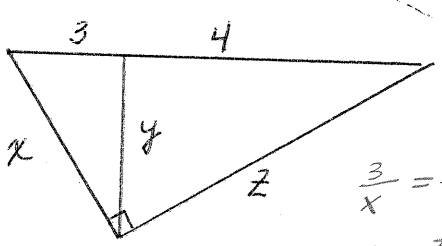
3. Find the lengths of x, y, and z giving exact answers in simplest form



$\frac{x}{3} = \frac{8}{x}$ $x^2 = 24$ $x = 2\sqrt{6}$

$\frac{3}{y} = \frac{y}{5}$ $y^2 = 15$ $y = \sqrt{15}$

$\frac{z}{5} = \frac{8}{z}$ $40 = z^2$ $z = 2\sqrt{10}$

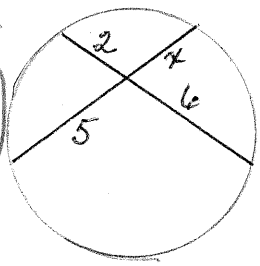


$\frac{3}{y} = \frac{y}{4}$ $y^2 = 12$ $y = 2\sqrt{3}$

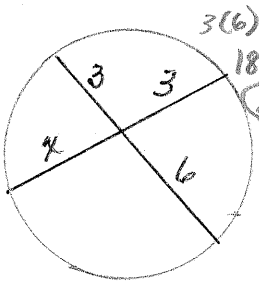
$\frac{3}{x} = \frac{x}{7}$ $21 = x^2$ $x = \sqrt{21}$

$\frac{4}{z} = \frac{z}{7}$ $28 = z^2$ $z = 2\sqrt{7}$

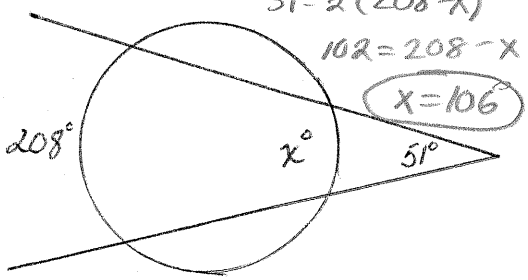
Solve for x



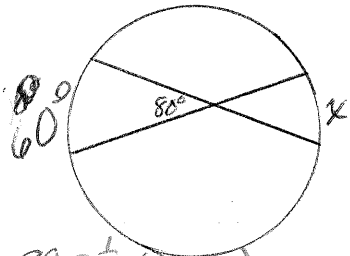
$2(6) = 5x$ $x = \frac{12}{5} = 2.4$



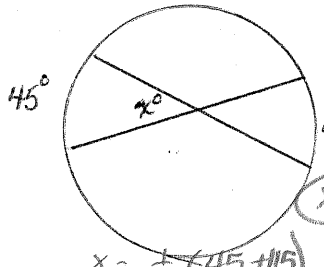
$3(6) = 3x$ $18 = 3x$ $x = 6$



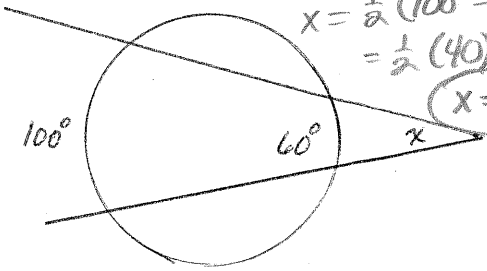
$51 = \frac{1}{2}(208 - x)$ $102 = 208 - x$ $x = 106^\circ$



$80 = \frac{1}{2}(60 + x)$ $160 = 60 + x$ $x = 100^\circ$

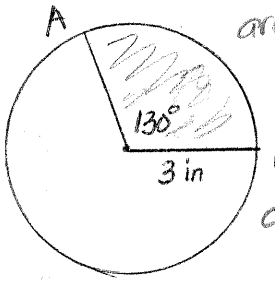


$x = \frac{1}{2}(45 + 115)$ $x = \frac{1}{2}(160)$ $x = 80^\circ$



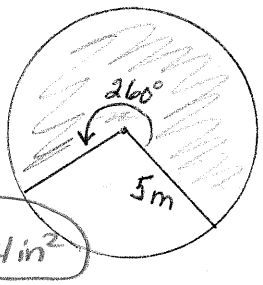
$x = \frac{1}{2}(100 - 60)$ $= \frac{1}{2}(40)$ $x = 20^\circ$

5. What is the arc length and area of the sector



arc length
$\frac{130}{360}(2\cdot\pi\cdot 3) = \frac{13\pi}{6} \approx 6.81$ in

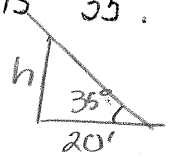
area
$\frac{130}{360}(\pi\cdot 3^2) = \frac{13\pi}{4} \approx 10.21\ in^2$



arc length
$\frac{260}{360}(2\pi\cdot 5) = \frac{65\pi}{9} \approx 22.689$ m

area
$\frac{260}{360}(\pi\cdot 5^2) = \frac{325\pi}{18} \approx 56.72\ m^2$

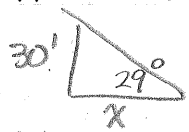
A tree casts a shadow 20 ft long. The angle of elevation to the sun is 35°. What is the height of the tree?



$\tan 35° = \frac{h}{20}$

$h = 20\tan 35° \approx 14$ ft

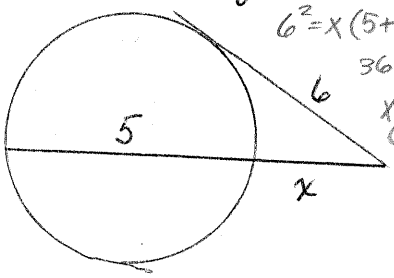
A 30 ft tree casts a shadow. The angle of elevation to the sun is 29°. What is the length of the tree's shadow?



$\tan 29° = \frac{30}{x}$

$x = \frac{30}{\tan 29°} \approx 51.96$ ft

Write an equation and solve for x.



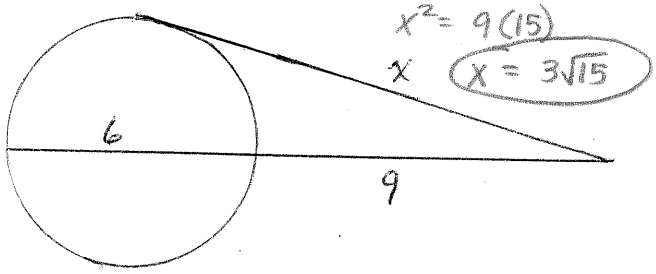
$6^2 = x(5+x)$

$36 = 5x + x^2$

$x^2 + 5x - 36 = 0$

$(x+9)(x-4) = 0$

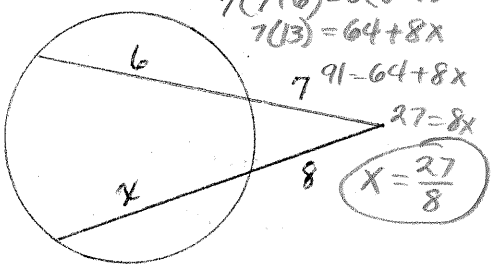
$x \neq -9$ $\quad x = 4$



$x^2 = 9(9+6)$

$x^2 = 9(15)$

$x = 3\sqrt{15}$



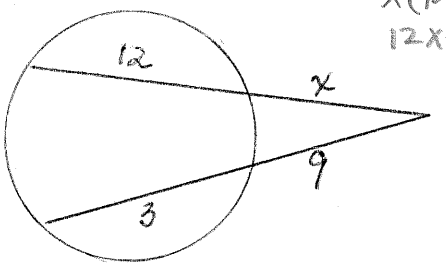
$7(7+6) = 8(8+x)$

$7(13) = 64 + 8x$

$91 = 64 + 8x$

$27 = 8x$

$x = \frac{27}{8}$



$x(12+x) = 9(3+9)$

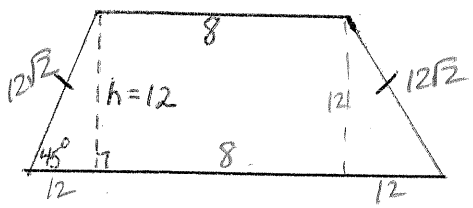
$12x + x^2 = 9(12)$

$x^2 + 12x - 108 = 0$

$(x+18)(x-6) = 0$

$x \neq -18$ $\quad x = 6$

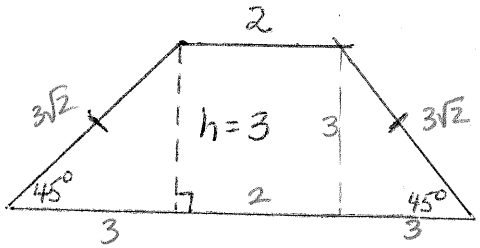
Find the area of



$A = \frac{1}{2}(12)(8+32)$

$= 6(40)$

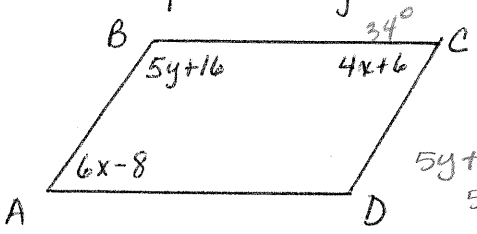
$= 240$



$A = \frac{1}{2}(3)(3+8)$

$= \frac{33}{2}$

7. ABCD is a parallelogram. Find values for x and y



$6x-8=4x+6$

$2x=14$

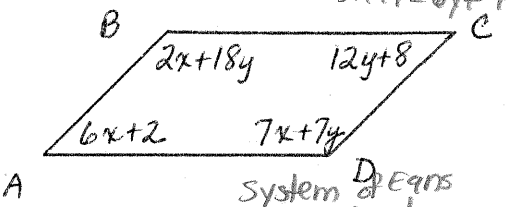
$x=7$

$5y+16+34=180$

$5y+50=180$

$5y=130$

$y=26$



System of eqns may vary!

$11y=5x$

$6x+2=12y+8$

$3x+1=6y+4 \rightarrow 3x=6y+3$

$5(x=2y+1)$

$5x=11y$

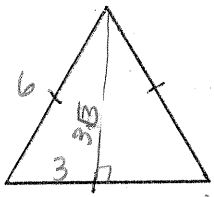
$11y=5(2y+1)$

$11y=10y+5$

$y=5$

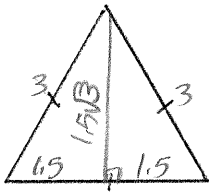
$x=11$

1. Find area.



$s=6$ $A=\frac{1}{2}(6)(3\sqrt{3})$

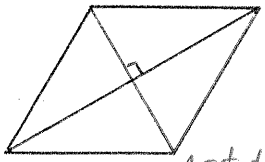
$=9\sqrt{3}$



$s=3$

$A=\frac{1}{2}(3)(1.5\sqrt{3})$

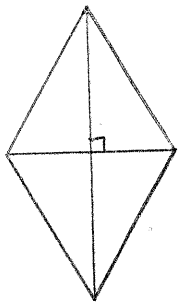
$2.25\sqrt{3}$



$d_1=5$

$d_2=3$ $A=\frac{1}{2}d_1d_2$

$=\frac{15}{2}$



$d_1=7$

$d_2=6$

$A=\frac{42}{2}$

$=21$

2. Algebraically find the intersection of circle and line

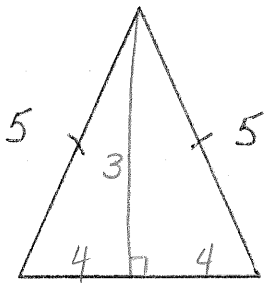
$(x-6)^2+(y+2)^2=9$ $\qquad x^2+y^2-2x-3=0$

$y=-x+1$ $\qquad 3x+y-5=0$

separate sheet

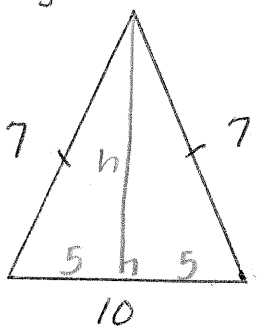
3. Find area ... (Hint - you need to find height)

a)



$A=\frac{1}{2}(8)(3)=12$

b)



$h^2=7^2-5^2$

$=49-25$

$=24$

$h=2\sqrt{6}$

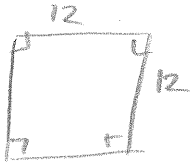
$A=\frac{1}{2}(10)(2\sqrt{6})$

$=10\sqrt{6}$

c) Of a square with perimeter 36 ft.

$A=81\ ft^2$

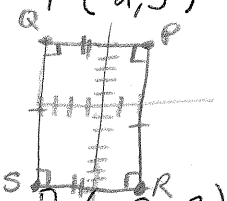
d) Of a square with perimeter 48 in



$A=144\ in^2$

4. Determine if the given points represent vertices of a rectangle, a rhombus, a square, a trapezoid or a kite

a) P(2,5) Q(-4,5) R(2,-7) S(-4,-7)



Rectangle (opp sides ≅ ∥; adj sides ⊥)

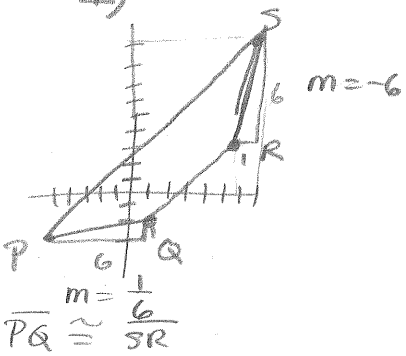
b) P(-5,-3) Q(1,-2) R(6,3) S(7,9)

$m_{PS} = \frac{12}{12} = 1$

$m_{QR} = \frac{5}{5} = 1$

$\overline{PS} \parallel \overline{QR}$

Isos Trapezoid



$\overline{PQ} \cong \overline{SR}$

5. Identify center + radius

a) $x^2+y^2+4x-20-2y=0$

$x^2+4x+4 = y^2-2y+1 = 20+4+1$

$(x+2)^2 + (y-1)^2 = 25$

C: (-2,1) r=5

b) $16+x^2+y^2-8x-6y=0$

$x^2-8x+16+y^2-6y+9 = -16+16+9$

$(x-4)^2 + (y-3)^2 = 9$

C: (4,3) r=3

6. Find center + radius + graph using 4 easy points + 4 other points

a) $(x-4)^2+(y+3)^2=169$

(use x=9)

attached

b) $(x-8)^2+(y-4)^2=64$

(use x=12)

attached

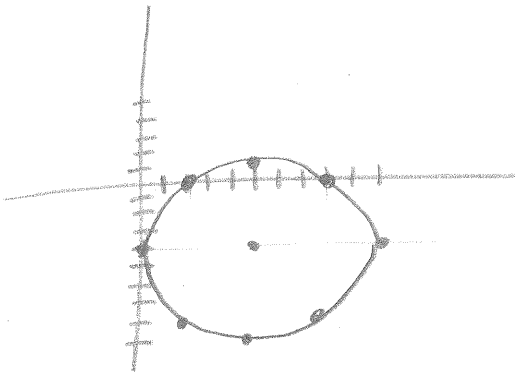
c) $(x-5)^2+(y+4)^2=25$

C: (5,-4) r=5

(use x=2)

4 easy points

(0,-4) (10,-4) (5,1) (5,-9)



x=2:

$(2-5)^2+(y+4)^2=25$

$9+y^2+8y+16=25$

$y^2+8y=0$

$y(y+8)=0$

$y=0 \quad y=-8$

(2,0) (2,-8)

(8,0) (8,-8)

12. $(x-6)^2+(y+2)^2=9$

$y=-x+1$ $\quad x+3$

$(x-6)^2+((-x+1)+2)^2=9$

$x^2-12x+36+x^2-6x+9=9$

$2x^2-18x+36=0$

$x^2-9x+18=0$

$(x-6)(x-3)=0$

$x=6 \qquad x=3$

$y=-x+1$

$-6+1=-5 \qquad -3+1=-2$

$(6,-5) \qquad (3,-2)$

$x^2+y^2-2x-3=0$

$3x+y-5=0 \rightarrow y=5-3x$

$x^2+(5-3x)^2-2x-3=0$

$x^2+25-30x+9x^2-2x-3=0$

$10x^2-32x+22=0$

$5x^2-16x+11=0$

$(5x-5)(x-11)=0$

$x=1 \qquad x=11$

$5-3(1)=2 \qquad 5-3(11)=-28$

$(1,2) \qquad (11,-28)$

16 a) $(x-4)^2+(y+3)^2=169$

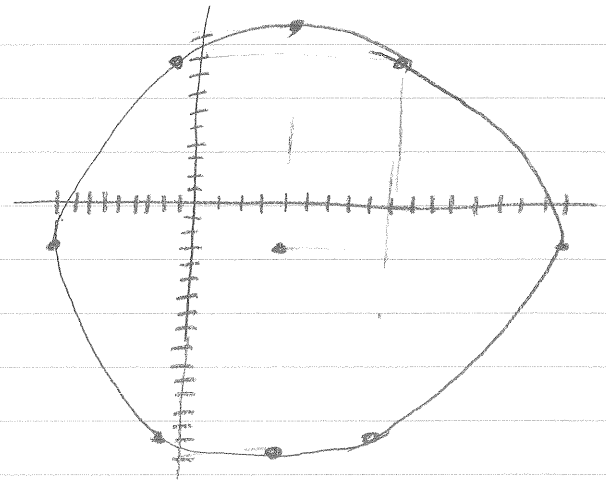
C: $(4,-3)$

$r=13$

4 easy pts

$(17,-3) \quad (-9,-3)$

$(4,10) \quad (4,-16)$



$x=9$:

$(9-4)^2+(y+3)^2=169$

$25+y^2+6y+9=169$

$y^2+6y-135=0$

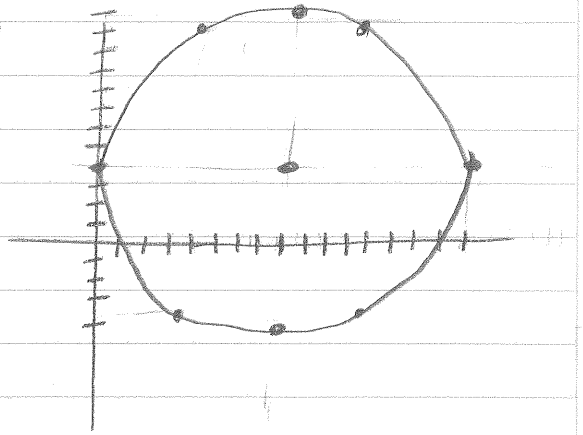
$(y+15)(y-9)=0$

$y=-15 \qquad y=9$

$(9,-15) \quad (9,9)$

$(-1,-15) \quad (-1,9)$

16b) $(x-8)^2+(y-4)^2=64$ | C: (8, 4), r = 8



4 easy points
(0, 4) (16, 4)
(8, 12) (8, −4)

$x=12$:

$(12-8)^2+(y-4)^2=64$

$16+y^2-8y+16=64$

$y^2-8y-32=0$

$y=\frac{8\pm\sqrt{64-4(-32)}}{2}$

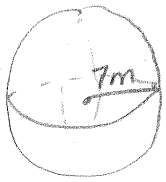
$=\frac{8\pm\sqrt{192}}{2}$

$=\frac{8\pm8\sqrt{3}}{2}=4\pm4\sqrt{3}$

$(12, 4+4\sqrt{3})$ $(12, 4-4\sqrt{3})$
$(4, 4+4\sqrt{3})$ $(4, 4-4\sqrt{3})$

Find the volume and surface area of the shapes indicated by the following descriptions. Provide a simple sketch and label any vital dimensions.

1) Sphere with radius of 7 meters.



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

$V = \frac{4}{3}\pi(7^3)$

$= \frac{1372\pi}{3} \approx 1436.755 m^3$

$SA = 4\pi r^2$

$= 4\pi(49)$

$= 196\pi \approx 615.752 m^2$

2) Sphere with diameter of 18.25 inches.

$r = 9.125$ in.

$V = \frac{4}{3}\pi(9.125)^3$

$\approx 3182.638 in^3$

$SA = 4\pi(9.125)^2$

$\approx 1046.347 in^2$

3) Cone (right) with a base radius of 2 feet and height of 4 feet.

$\ell = \sqrt{20} = 2\sqrt{5}$

$V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi(2^2)(4)$

$= \frac{16\pi}{3} \approx 16.755 ft^3$

$SA = \pi r^2 + \pi r \ell$

$\pi(2^2) + \pi(2)(2\sqrt{5})$

$= 4\pi(1+\sqrt{5}) \approx 40.666 ft^2$

4) Cone (right) with a base diameter of 3 yards and height of 10 feet.

9ft

$\ell \approx 10.966$

$V = \frac{1}{3}\pi(4.5)^2(10) \approx 212.058 ft^3$

$SA = \pi(4.5)^2 + \pi(4.5)(10.966)$

$\approx 218.645 ft^2$

5) Cone (right) with a base diameter of 5 centimeters and a slant height of 12 centimeters.

$h \approx 11.737$

$V = \frac{1}{3}\pi(2.5)^2(11.737)$

$\approx 76.816 cm^3$

$SA = \pi(2.5)^2 + \pi(2.5)(12)$

$\approx 113.883 cm^2$

6) Cylinder with a height of 14 centimeters and a base radius of 12 centimeters.

$V = \pi r^2 h$

$= \pi(12^2)(14)$

$= 2016\pi \approx 6333.451 cm^3$

$SA = 2\pi r^2 + 2\pi rh$

$= 2\pi(12^2) + 2\pi(12)(14)$

$= 624\pi \approx 1960.354$

Find volume and surface area with sketch (continued)

7. Cylinder with radius of 22 feet and height of 10 feet

$V = \pi(22^2)(10)$

$= 4840\pi \approx 15205.308 \text{ ft}^3$

$SA = 2\pi(22^2) + 2\pi(22)(10)$

$= 1408\pi \approx 4423.362 \text{ ft}^2$

8. Cube with sides 82 mm

$V = (82)^3$

$= 551,368 \text{ mm}^3$

$SA = 6(82^2)$

$= 40344 \text{ mm}^2$

9. Cylinder with base radius of 2 ft and height of 4 feet.

$V = \pi(2^2)(4)$

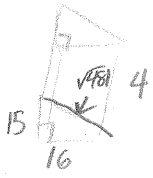
$= 16\pi \approx 50.265 \text{ ft}^3$

$SA = 2\pi(2^2) + 2\pi(2)(4)$

$8\pi + 16\pi$

$= 24\pi \approx 75.398 \text{ ft}^2$

10. Triangular prism with a right triangle base. The legs of the right triangle are 15 m and 16 m. The prism has a height of 4 m.



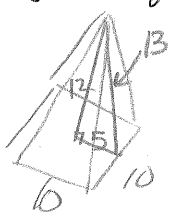
$V = \frac{1}{2}(15)(16)(4) = 480 \text{ m}^3$

$SA = 2\left(\frac{1}{2}(15)(16)\right) + 15(4) + 16(4) + 4(\sqrt{481})$

$240 + 60 + 64$

$364 + 4\sqrt{481} \text{ m}^2$

1. Pyramid with a square base with 10 inch sides and a height of 12 inches



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

$= \frac{1}{3}(100)(12)$

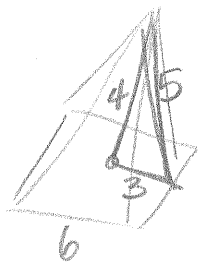
$= 400 \text{ in}^3$

$SA = 10^2 + 4\left(\frac{1}{2}(10)(13)\right)$

$100 + 260$

$= 360 \text{ in}^2$

2. Pyramid with a square base having a perimeter of 24 yds. The pyramid has a slant height of 5 yds.



$V = \frac{1}{3}(6^2)(4)$

$= 48 \text{ yd}^3$

$SA = 36 + 4\left[\frac{1}{2}(6)(5)\right]$

$= 36 + 60$

$= 96 \text{ yd}^2$