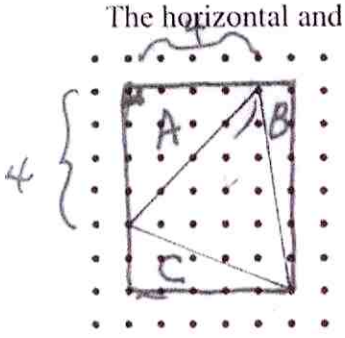
MATH 304 Review for EXAM 2 NAME SOLUTION KEY Seat # _____ +02

1. Find the area and perimeter of this triangle.
The horizontal and vertical distance between adjacent dots is 1 unit.



Area Triangle A = $\frac{1}{2} \cdot 4 \cdot 4 = 8$ sq units
Area Triangle B = $\frac{1}{2} \cdot 6 \cdot 1 = 3$ sq. units
Area Triangle C = $\frac{1}{2} \cdot 5 \cdot 2 = 5$ sq. units

Area Rectangle = $5 \times 6 = 30$ sq. units.
AREA ORIGINAL TRIANGLE = $30 - (8 + 3 + 5) = 30 - 16 = 14$ sq. units

$(\text{Side A})^2 = 4^2 + 4^2$ so $(\text{Side A})^2 = 32$ and side A $= \sqrt{32}$
$(\text{Side B})^2 = 6^2 + 1^2$ so $(\text{Side B})^2 = 37$ and side B $= \sqrt{37}$
$(\text{Side C})^2 = 2^2 + 5^2$ so $(\text{Side C})^2 = 29$ and side C $= \sqrt{29}$

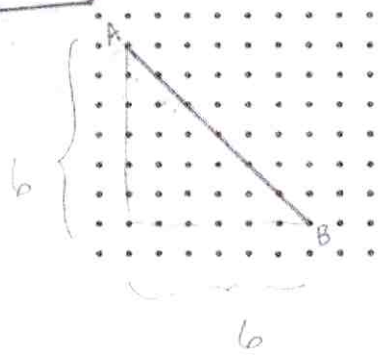
Area = 14 sq. units

PERIMETER $= \sqrt{32} + \sqrt{37} + \sqrt{29} \approx 5.66 + 6.08 + 5.39 \approx$ 17.13 units

2. What is the length of this segment? The horizontal and vertical distance between adjacent dots is 1 unit.

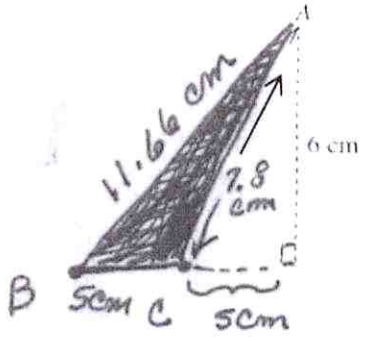
Length = $\sqrt{72}$ units $\approx$ 8.49 units

$6^2 + 6^2 = h^2$
$36 + 36 = h^2$
$72 = h^2$
$\sqrt{72} = h$



3. Find the perimeter of triangle ABC.
Perimeter = 24.46 cm

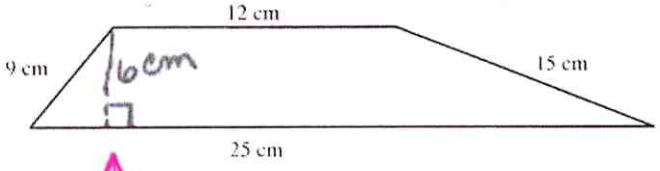
$11.66 + 7.8 + 5 = 24.46$



4. Find the area of triangle ABC above.
Area = 15 cm^2

$A_{\text{Triangle}} = \frac{1}{2}bh = \frac{1}{2} \cdot 5 \cdot 6 = \frac{1}{2}(30) = 15 \text{ cm}^2$

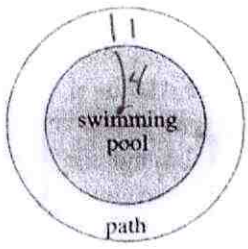
5. Find the area of this polygon.
Area = 111 cm^2



maybe 5 on your copy

$A_{\text{TRAPEZOID}} = \frac{1}{2}(B + b)h$
$= \frac{1}{2}(25 + 12) \cdot 6$
$= \frac{1}{2}(37) \cdot 6$
$=$ 111 cm^2

6. A circular swimming pool of radius 4 m is surrounded by a path 1 m wide.



(a) Find the circumference of the circle forming the outer edge of the path.

$C = 2\pi r = 2\pi \cdot 5 = \boxed{10\pi \approx 31.4 \text{ m}}$

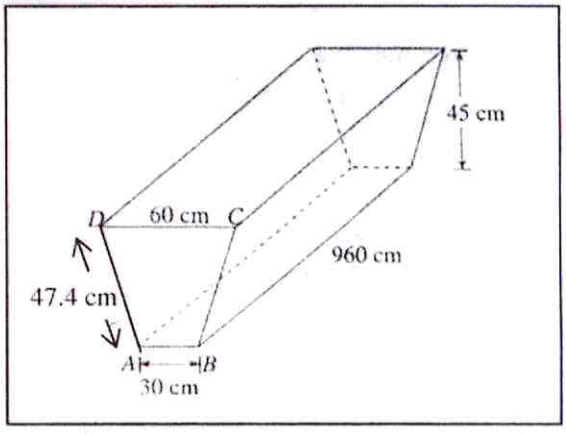
(b) Find the area of the path.

AREA BIG CIRCLE − AREA INSIDE CIRCLE

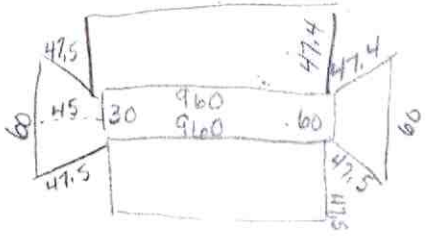
$\pi \cdot 5^2 - \pi \cdot 4^2$

$25\pi - 16\pi = \boxed{9\pi \approx 28.26 \text{ m}^2}$

7. The picture at the right is of a horse trough.
It is open on the top so the horses can get to the water. It is made of galvanized steel.



(a) Sketch a net that could be enlarged and used to create this trough.



No top horses because have to get to the water.

(b) Find the surface area of the outside of the trough.

2 rectangles + Bottom + 2 trapezoids

$2(960 \times 47.4) + (30 \times 960) + 2\left(\frac{1}{2}(60+30) \cdot 45\right)$

$91008 + 28{,}800 + 4050$

$= \boxed{123{,}858 \text{ cm}^2}$

(c) For what ***real-life*** question is the surface area the answer?

how much veneer or paint to cover outside of trough

(d) Find the volume of the trough.

AREA TRAPEZOIDAL BASE × LENGTH (Height) OF PRISM

$\frac{1}{2}(60+30) \cdot 45 \times 960$

2025×960

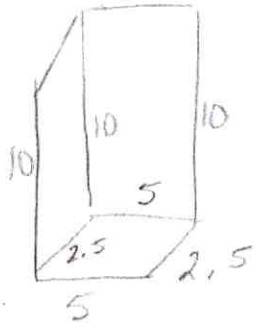
$\boxed{1{,}944{,}000 \text{ cm}^3}$ OK

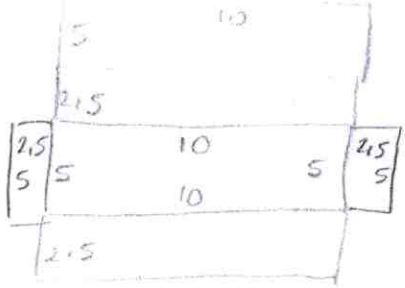
(e) For what ***real-life*** question is the volume the answer?

how much water the trough can hold

For each 3-D shape below (a) draw the net
(b) list the polygons and their areas (like we did on the box worksheet)
(c) compute the total surface area.

8. A rectangular prism has length 5 cm, width 2.5 cm, and height 10 cm.



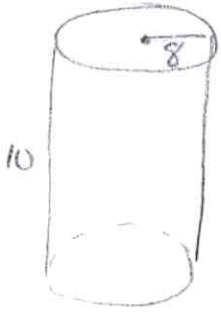


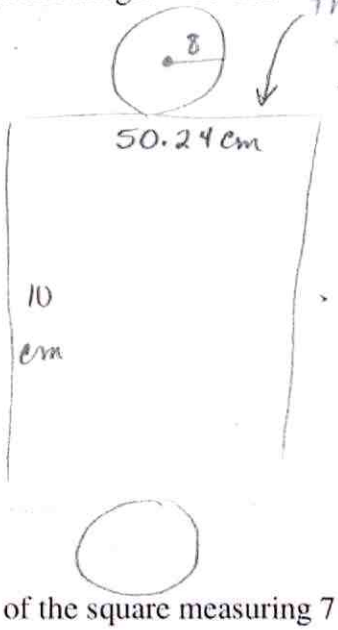
Net

2 (5×10) Rectangles = 100
2 (2.5×10) Rectangles = 50
2 (2.5×5) Rectangles = 25

Total Surface Area = 175 Sq. cm.

9. A cylinder with radius = 8 cm and height = 10 cm.





NET

the length of this side must fit around the circular end so it must have length = circumference of the circular end.

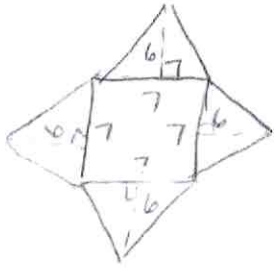
Circumference = $2\pi \cdot 8 = 16\pi \approx 50.24$

Area of Circle = $\pi \cdot 8^2 = 64\pi \approx 200.96$

2 circles @ 200.96 = 401.92
1 rectangle 50.24×10 = 502.40

Total Surface Area = 904.32 cm²

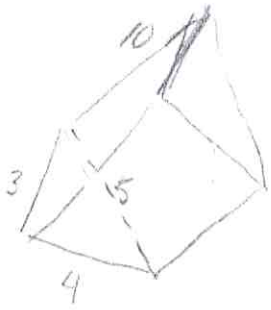
10. A square pyramid with sides of the square measuring 7 inches and the slant-height (height of the triangular faces) measuring 6 inches.

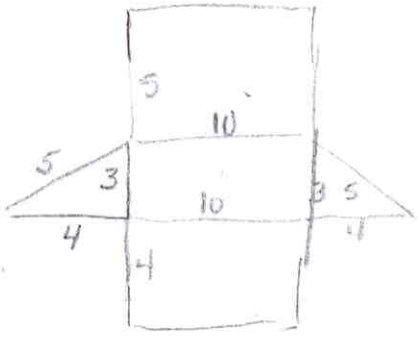


4 triangles @ $(\frac{1}{2} \cdot 7 \cdot 6)$ = 84 in²
1 square @ (7×7) = 49 in²

Total Surface Area = 133 in²

11. A triangular prism with has right triangles with sides of 3 inches, 4 inches, and 5 inches and length of the prism 10 inches.





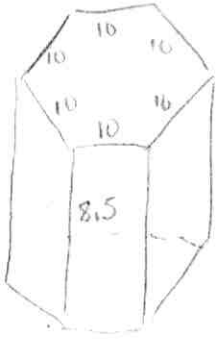
1 (5×10) rectangle = 50
1 (4×10) rectangle = 40
1 (3×10) rectangle = 30
2 ($\frac{1}{2}$×4×3) triangles = 12

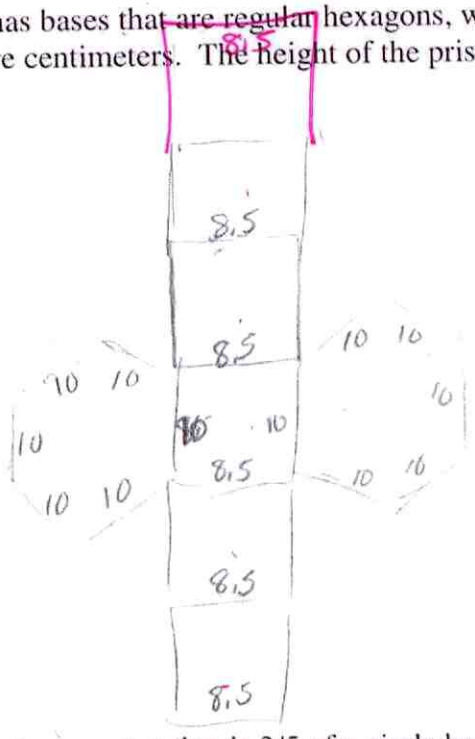
132

TOTAL SURFACE AREA = 132 sq. in

(132 NO decimal point,

12. A hexagonal prism has bases that ~~are regular~~ hexagons, with each side length 10 cm. The area of one of the hexagons is 260 square centimeters. The height of the prism is 8.5 centimeters.

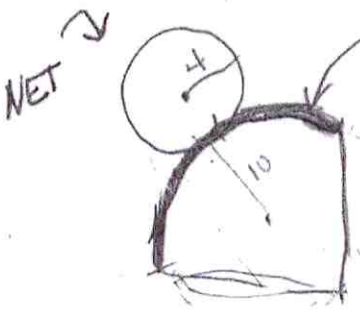




6 (8.5×10) rectangles = 510
2 hexagons @ 260 cm^2 = 520

Total surface Area = 1030 cm^2

13. A cone is formed using a sector that is 2/5 of a circle having radius 10. (Note that the base circle must have circumference that is equal to the curved edge of the sector).



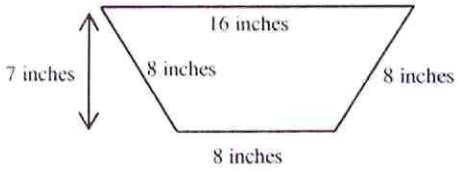
2/5 of circumference of circle have radius = 10 unit

$\frac{2}{5}$ of $2\pi \cdot 10 = 8\pi \approx 25.12$ units

then $2\pi r$ for smaller circle ≈ 25.12 units
$6.28r \approx 25.12$ so $r \approx \frac{25.12}{6.28} \approx 4$ units

Total surface area = area of small circle + $\frac{2}{5}$ area of cu with r = 1
$= \pi 4^2 + \frac{2}{5}(\pi 10^2)$
$= 16\pi + 40\pi = 56\pi \approx$ 175.84 sq. units

14 -17. Find the area and the perimeter of each of the following figures.



$\text{Area}_{Trap} = \frac{1}{2}(B+b)h$

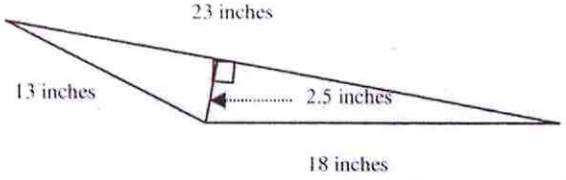
$= \frac{1}{2}(16+8)\,7$

$= 84\ in^2$

Perimeter $= 8+8+8+16 = 40$ in

Area = 84 in^2

Perimeter = 40 in



$\text{Area}_{triangle} = \frac{1}{2}bh = \frac{1}{2}(23)(2.5)$

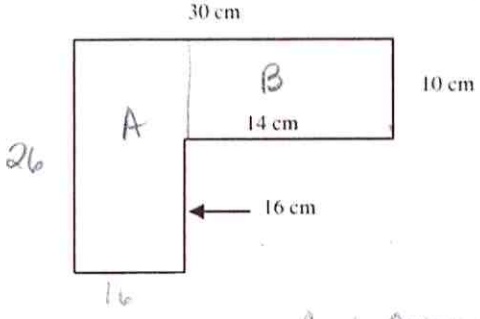
$= 28.75$ inches

Perimeter $= B + 23 + 18$

28.75 in^2

Area = 28.75 inches^2

Perimeter = 54 in



Area = Region A + Region B

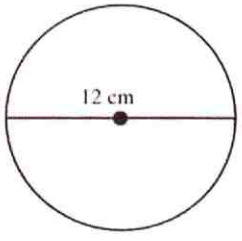
$= (16 \times 26) + (14 \times 10)$

$= 416 + 140 = 556\ cm^2$

Perimeter $= 30 + 10 + 14 + 16 + 16 + 26 = 112$ cm

Area = 556 cm^2

Perimeter = 112 cm



So radius = 6

$\text{Area}_{circle} = \pi r^2$

$= \pi(6^2)$

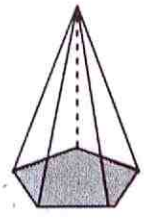
$= 36\pi \approx 113.04\ cm^2$

Circumf $= \pi d = \pi \cdot 12 \approx 37.68$ cm

Area = 113.04 cm^2

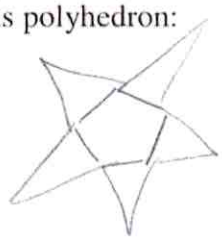
Circumference = 37.68 cm

18.

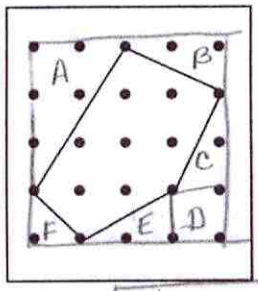


The specific name for this polyhedron is Pentagonal pyramid.

Draw a net for this polyhedron:



19. Find the area for each of the following polygons.



$A = \frac{1}{2}(3\times2) = 3$

$B = \frac{1}{2}(2\times1) = 1$

$C = \frac{1}{2}(2\times1) = 1$

$D = 1$

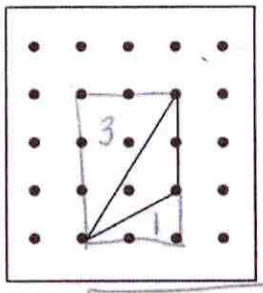
$E = 1$

$F = \frac{1}{2}$

Area = 8½ square units

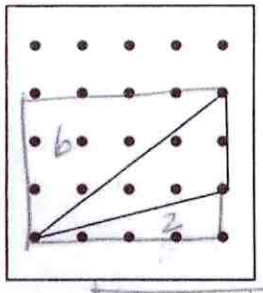
$16 - (A+B+C+D+E+F)$

$= 16 - (3+1+1+1+1+\frac{1}{2})$



Area = 2 sq. units

$6 - (3+1) = 6 - 4 = 2$



Area = 4 sq. units

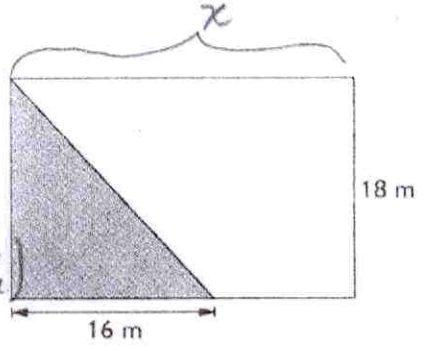
$(3\times4) - (6+2)$

$12 - 8$

4

20. $16 - 7\frac{1}{2} = 8\frac{1}{2}$

The area of the shaded part is $\frac{1}{3}$ of the area of the rectangle. Find the area of the rectangle.



area of shaded region $= \frac{1}{2}(16)(18)$

$= 144\ m^2$

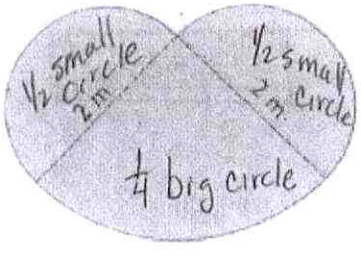
area of rectangle is 3 times as much (so shaded area can be ⅓ of rectangle)

$= 3(144) =$ **$432\ m^2$**

21. This figure is made up of two semicircles and a quarter circle. Find the area and perimeter. Leave your answers in terms of π

Area of small circle $= \pi(1)^2 = \pi \approx 3.14\ m^2$

Area of large circle $= \pi(2)^2 = 4\pi \approx 12.56\ m^2$



$=$ ¼ Big Circle + 1 whole small circle

$\approx \frac{1}{4}(12.56) + 3.14$

$\approx 3.14 + 3.14$

$\approx$ **$6.28\ m^2$**

$P =$ 1 whole small circle circumference (small diameter) + ¼ Big Circle circumference (Big radius)

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

$= 2\pi + \pi =$ **$3\pi\ m$**