Name Schlansky
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Date _____
Geometry

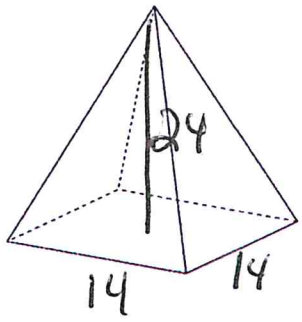
# *Volume and 3 Dimensional Objects Review Sheet*

1. A regular pyramid has a square base with an edge length of 14 and an altitude of 24. Find its volume.

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

$V = \frac{1}{3}(14)(14)(24)$

$V = 1568$

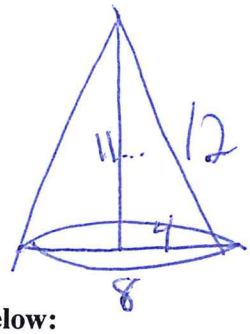



2. Find the volume of a cone with a height of 12 in and a diameter of 8 in rounded to the nearest hundredth.

type π in $V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi(4)^2(12)$

$V = 201.06$




slant

$r = 4$

$a^2 + b^2 = c^2$

$4^2 + b^2 = 12^2$

$16 + b^2 = 144$

$-16 \quad -16$

$\sqrt{b^2} = \sqrt{128}$

$b = 11..$

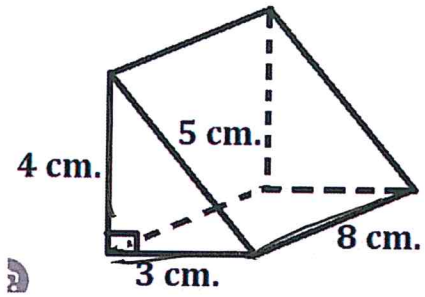
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi(4)^2(11..)$

$V = 189.56$

**Find the volume of the shapes below:**

3.

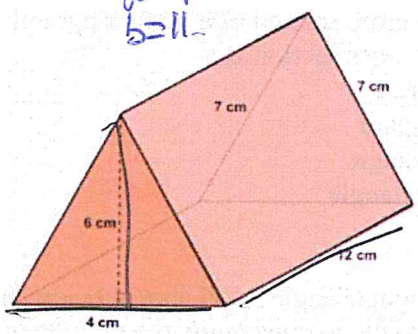



$V = \frac{1}{2}lwh$

$V = \frac{1}{2}(8)(3)(4)$

$V = 48\ cm^3$

4.



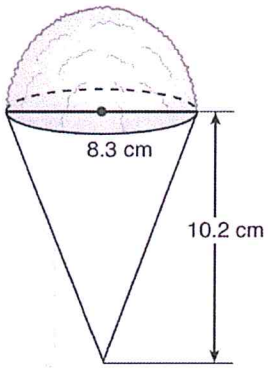

$V = \frac{1}{2}lwh$

$V = \frac{1}{2}(4)(6)(12)$

$V = 144\ cm^3$

Find the volume of the following objects: to the nearest tenth

5.

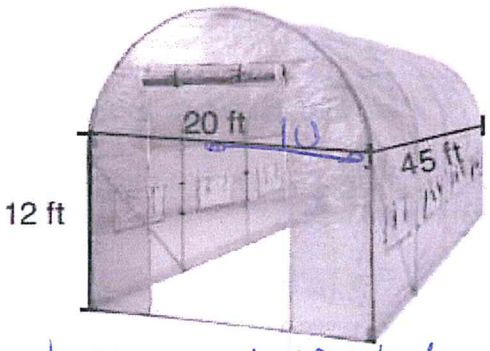



hemisphere
$V=\frac{1}{2}(\frac{4}{3}\pi r^3)$
$V=\frac{1}{2}(\frac{4}{3}\pi(4.15)^3)$
$V=149..$

Cone
$V=\frac{1}{3}\pi r^2h$
$V=\frac{1}{3}\pi(4.15)^2(10.2)$
$V=183..$

$183.. + 149.. = 333.7$

6.




rectangular prism
$V=lwh$
$V=12(20)(45)$
$V=10800$

half cylinder
$V=\frac{1}{2}\pi r^2h$
$V=\frac{1}{2}\pi(10)^2(45)$
$V=7068..$

$17868.5$

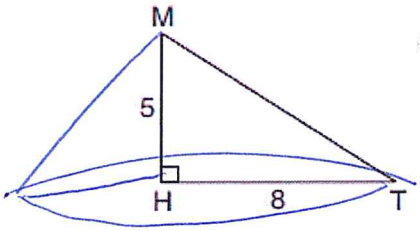
7. A plane intersects a hexagonal prism. The plane is perpendicular (vertical) to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?

1) triangle
2) trapezoid
3) hexagon
4) rectangle

8. The cross section of a regular pyramid contains the altitude (vertical) of the pyramid. The shape of this cross section is a

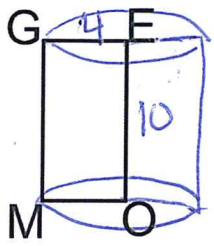
1) circle
2) square
3) triangle
4) rectangle

9. In right triangle $MTH$ shown below, $m\angle H = 90°$, $HT = 8$, and $HM = 5$. Determine and state, to the *nearest tenth*, the volume of the three-dimensional solid formed by rotating $\triangle MTH$ continuously around $\overline{MH}$.




$V=\frac{1}{3}\pi r^2h$
$V=\frac{1}{3}\pi(8)^2(5)$
$V=335.1$

10. In rectangle GEOM, GE = 4 and EO = 10. Find the volume of the three-dimensional object create by continuously rotating rectangle GEOM about EO. in terms of $\pi$




$V = \pi r^2 h$
$V = \pi(4)^2(10)$
$V = 160\pi$

11. The base of a pyramid is a rectangle with a width of 6 cm and a length of 8 cm. Find, in centimeters, the height of the pyramid if the volume is 288 $cm^3$.

1) 6
2) 8
3) 18
4) 24

$V = \frac{1}{3}lwh$ → equation solver, math up
$288 = \frac{1}{3}(8)(6)h$
$\frac{288}{16} = \frac{16h}{16}$
$18 = h$

12. Find the radius of a sphere with a volume of $576\pi$ cubic inches. Find the answer to the nearest tenth of an inch.

1) 4.9
2) 15.1
3) 9.2
4) 7.6

$V = \frac{4}{3}\pi r^3$ → equation solver, math up
$\frac{576\pi}{\frac{4}{3}\pi} = \frac{\frac{4}{3}\pi r^3}{\frac{4}{3}\pi}$
$\sqrt[3]{432} = \sqrt[3]{r^3}$
$7.6 = r$

13. A brick that weighs 1824 grams has dimensions that measure 4 cm by 3 cm by 8 cm. To the nearest tenth, what is the density of the brick?

$d = \frac{m}{V}$
$d = \frac{1824\ g}{96\ cm^3}$
$d = 19\ g/cm^3$

$V = lwh$
$V = 4(3)(8)$
$V = 96\ cm^3$

14. A metal sphere that has a mass of 8024 grams has a diameter of 10 cm. To the nearest tenth, what is the density of the sphere?

$d = \frac{m}{V}$
$d = \frac{8024\ g}{523...\ cm^3}$
$d = 15.3\ g/cm^3$

$V = \frac{4}{3}\pi r^3$
$V = \frac{4}{3}\pi(5)^3$
$V = 523...\ cm^3$

15. Cylindrical bricks are needed to fill a hole in a homeowner's backyard. Each brick is to have a diameter of 4 cm and a height of 2 cm. The weight of the concrete that the brick is going to be made from is 2.1 ounces per cubic centimeter. If the concrete costs $.14 per ounce, how much would it cost to purchase four bricks? Round your answer to the *nearest cent*.

$V = \pi r^2 h$

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

$V = 25.. cm^3$

$25.. cm^3 \cdot \frac{2.1\ oz}{1\ cm^3} \cdot \frac{.14\ \$}{1\ oz} \times 4$

$\$29.56$

16. Walter wants to make candles in the shape of a cone for his new candle business. Each candle will have a height of 8 inches and a diameter of 3 inches.
Walter goes to a hobby store to buy the wax for his candles. The wax costs $0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles?

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

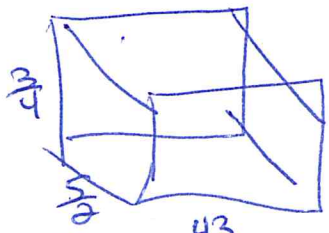
$V = \frac{1}{3}\pi(1.5)^2(8)$

$V = 18... in^3$

$18.. in^3 \cdot \frac{.52\ oz}{1\ in^3} \cdot \frac{.10\ \$}{1\ oz} \times 100$

$\$98.02$

17. A sandbox in the shape of a rectangular prism has a length of 43 inches and a width of 30 inches. Jack uses bags of sand to fill the sandbox to a depth of 9 inches. Each bag of sand has a volume of 0.5 cubic foot. What is the minimum number of bags of sand that must be purchased to fill the sandbox? convert first to $ft^3$




$\frac{43 in}{12} = \frac{43}{12} ft$

$\frac{30 in}{12} = \frac{5}{2} ft$

$\frac{9 in}{12} = \frac{3}{4} ft$

$V = lwh$

$V = (\frac{43}{12})(\frac{5}{2})(\frac{3}{4})$

$V = 6.71875 ft^3$

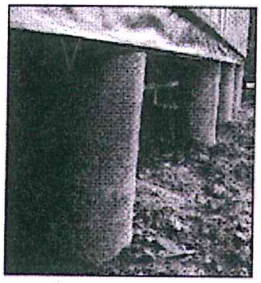
$6.71875 ft^3 \cdot \frac{1\ bag}{0.5 ft^3} = 13.4375$

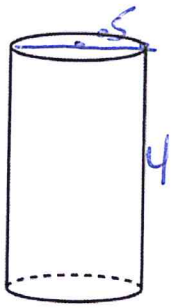
14 bags

convert to ft

18. A concrete footing is a cylinder that is placed in the ground to support a building structure. The cylinder is 4 feet tall and 12 inches in diameter. A contractor is installing 10 footings. If a bag of concrete mix makes $\frac{2}{3}$ of a cubic foot of concrete, determine and state the minimum number of bags of concrete mix needed to make all 10 footings.

$\frac{12 in}{12} \frac{1 ft}{}$






$V = \pi r^2 h$

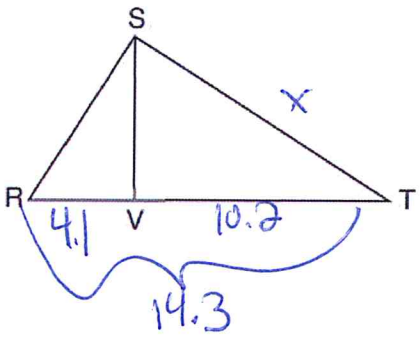
$V = \pi (.5)^2 (4)$

$V = 3... ft^3$

$3... ft^3 \cdot \frac{1 \text{ bag}}{\frac{2}{3} ft^3} \times 10 = 47...$

48

19. In right triangle $RST$ below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$. If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?



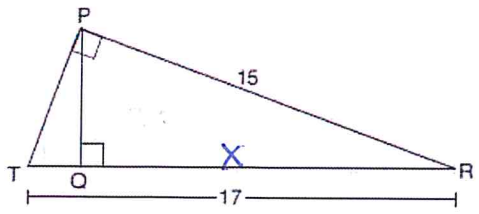

$\frac{H}{L} = \frac{L}{S}$

$\frac{14.3}{x} = \frac{x}{10.2}$

$x^2 = 145.86$

$x = 12.1$

20. In right triangle $PRT$, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$. Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.




$\frac{H}{L} = \frac{L}{S}$

$\frac{17}{15} = \frac{15}{x}$

$\frac{225}{17} = \frac{17x}{17}$

$13.2 = x$

Check orientation!

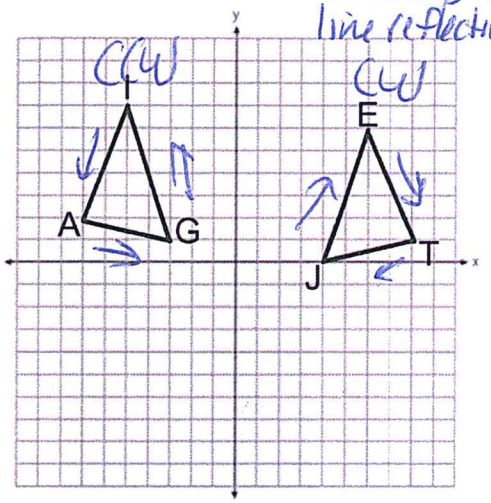
Same: can't be a single line reflection

different: must be a single line reflection

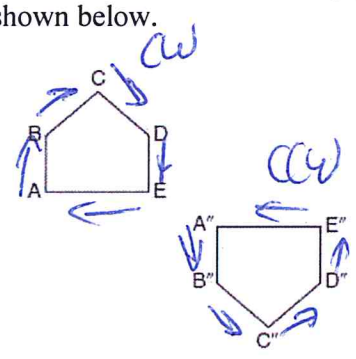
21. Which of the following sequences of rigid motions would map $\Delta GIA$ onto $\Delta JET$?

different must be single line reflection

1) point reflection through (0.5,0.5) followed by a translation 11 right and 1 down
2) reflection over the y-axis followed by a translation right 1 and down 1
3) rotation of 90 degrees clockwise centered at the origin followed by a translation right 1 and up 1
4) reflection over $x=1$ followed by a reflection over the x-axis




22. Identify which sequence of transformations could map pentagon $ABCDE$ onto pentagon $A"B"C"D"E"$, as shown below.



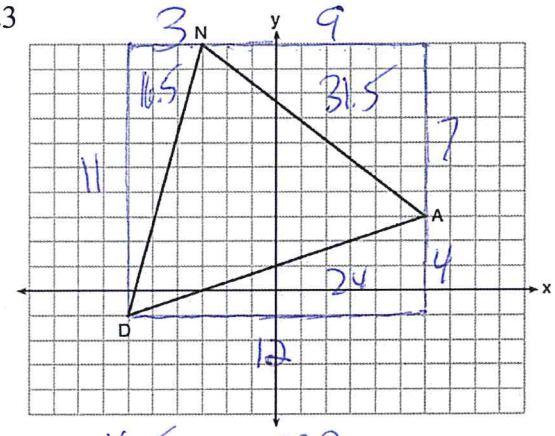

different must be a single line reflection

1) dilation followed by a rotation
2) translation followed by a rotation
3) line reflection followed by a translation
4) line reflection followed by a line reflection

double line reflection

**Find the area of the following triangles:**

23




$A_{\triangle} = 12(11)$

$A_{\triangle} = 132$

$A_{T1} = \frac{1}{2}(11)(3)$

$A_{T1} = 16.5$

$A_{T2} = \frac{1}{2}(9)(7)$

$A_{T2} = 31.5$

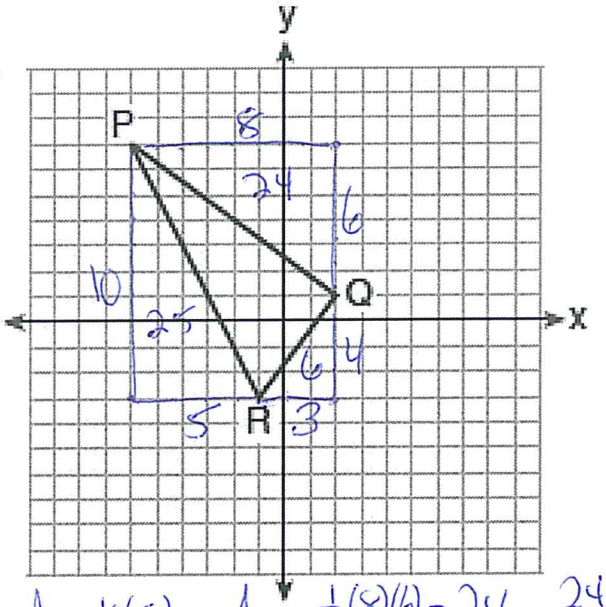
$A_{T3} = \frac{1}{2}(4)(12)$

$A_{T3} = 24$

$16.5 + 31.5 + 24 = 72$

$132 - 72 = 60$

24




$A_{\square} = 10(8)$

$A_{\square} = 80$

$A_{T1} = \frac{1}{2}(8)(6) = 24$

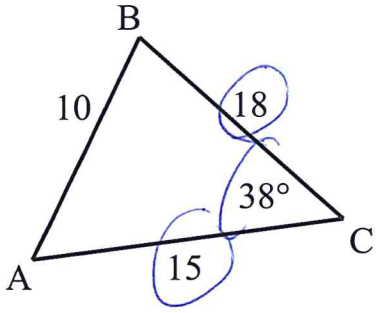
$A_{T2} = \frac{1}{2}(10)(5) = 25$

$A_{T3} = \frac{1}{2}(3)(4) = 6$

$24 + 25 + 6 = 55$

$80 - 55 = 25$

25.

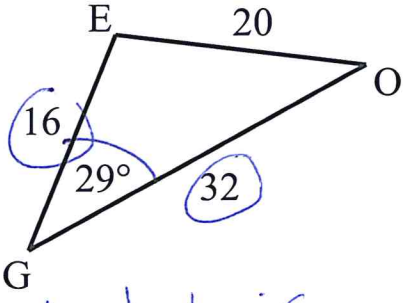



$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(15)(18)\sin 38$

$A = 83.1$

26.




$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(16)(32)\sin 29$

$A = 124.1$