

VOLUME OF CONES and PYRAMIDS

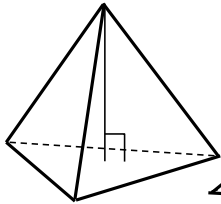
ANSWERS

PAGE 1 - INTRODUCTION

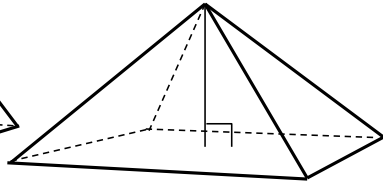


IN THIS WORKSHEET WE WILL TALK ABOUT FINDING THE VOLUME OF **CONES** AND **PYRAMIDS**. THE PROCESS IS ALMOST EXACTLY THE SAME AS PRISMS AND CYLINDERS (VOLUME = AREA of BASE x HEIGHT), EXCEPT FOR ONE SMALL DIFFERENCE.

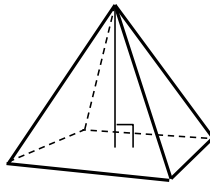
BELOW ARE SOME EXAMPLES OF CONES AND PYRAMIDS. AS YOU CAN SEE ALL OF THEM HAVE SIDES THAT MEET TO CREATE A POINT AT THE TOP.



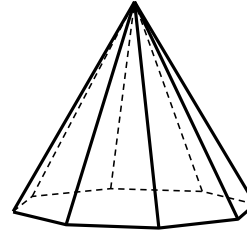
TRIANGULAR PYRAMID



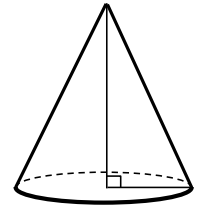
RECTANGULAR PYRAMID



SQUARE PYRAMID



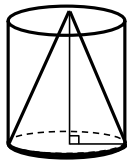
OCTAGONAL PYRAMID



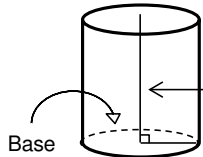
CONE



LET'S DO AN EXAMPLE TO BETTER EXPLAIN HOW TO FIND THE VOLUME OF A CONE. HERE IS A CYLINDER WITH A CONE INSIDE OF IT. THEY BOTH HAVE THE SAME BASE AND HEIGHT. THE ONLY DIFFERENCE BETWEEN THEM IS THAT THE CONE HAS A POINTED TOP WHILE THE CYLINDER'S TOP IS THE SAME AS THE BASE.

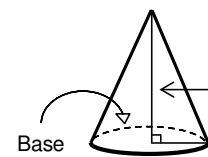


CYLINDER



$$\text{VOLUME} = \text{Area of Base} \times \text{Height}$$

CONE



$$\text{VOLUME} = (\text{Area of Base} \times \text{Height}) \div 3$$

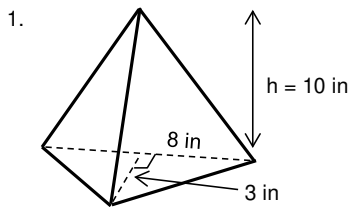
VOLUME IS THE AMOUNT OF SPACE INSIDE A THREE DIMENSIONAL SHAPE. IT IS ALSO KNOWN AS THE **CAPACITY** OF A CONTAINER.

SO THE EQUATIONS FOR FINDING THE VOLUME ARE ALMOST THE SAME, BUT SINCE PYRAMIDS AND CONES HAVE POINTED TOPS WE NEED TO DIVIDE BY 3.



$$\text{VOLUME of PYRAMID and VOLUME of CONE} = (\text{AREA of BASE} \times \text{HEIGHT}) \div 3$$

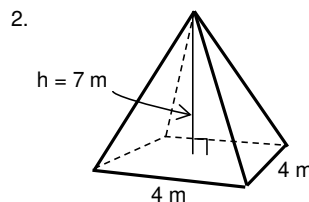
Now your turn. Find the volume of each shape. Round all answers to the nearest whole number.



$$\text{AREA of TRIANGLE} = \left(\text{Base of Triangle} \times \text{Height of Triangle} \right) \div 2$$

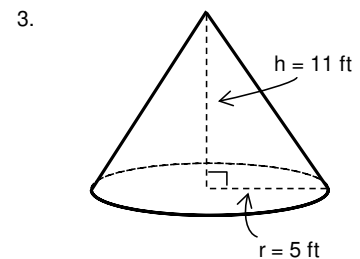
40 cubic inches

$$\text{VOLUME of PYRAMID} = \left(\text{Area of Base} \times \text{Height of Pyramid} \right) \div 3$$



$$\text{AREA of SQUARE} = \text{Length} \times \text{Width}$$

37 cubic meters



$$\text{AREA of CIRCLE} = \pi \times r^2$$

$$(A = \pi r^2)$$

$$\pi = 3.14$$


$$\text{VOLUME of CONE} = \left(\text{Area of Base} \times \text{Height of Cone} \right) \div 3$$

288 cubic feet


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ANSWERS

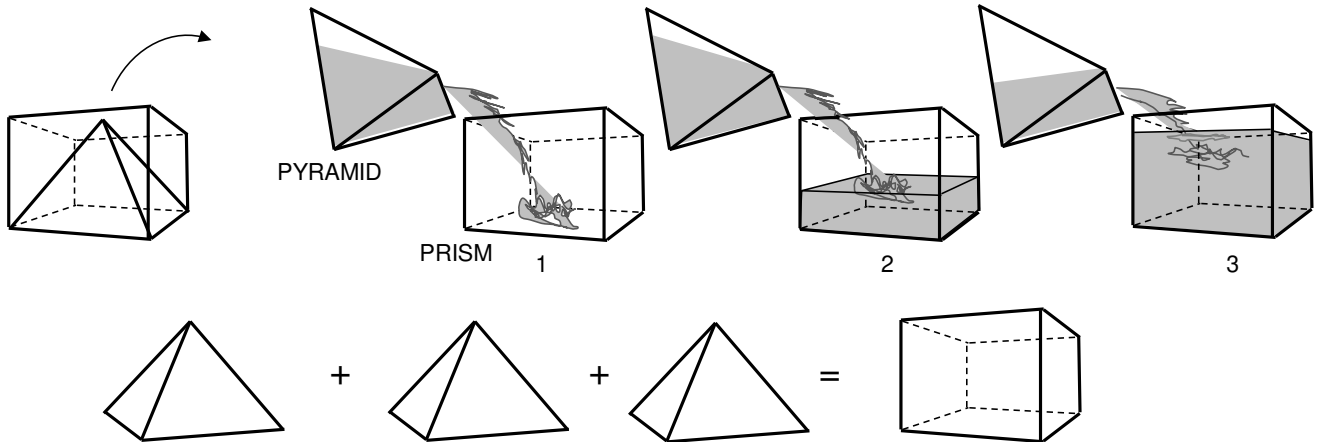
PAGE 2 - PROBLEMS



I SEE THAT CONES AND PYRAMIDS ARE SMALLER THAN CYLINDERS AND PRISMS, BUT WHY DO WE DIVIDE BY THREE, WHY NOT TWO OR FOUR OR FIVE OR SIX?

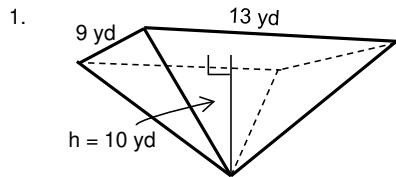


THE REASON WHY WE USE THE EQUATION, (AREA of BASE x HEIGHT) ÷ 3, IS BEST EXPLAINED BY USING THE SHAPES BELOW. WE HAVE A PRISM WITH A PYRAMID INSIDE. BOTH HAVE THE SAME BASE AND HEIGHT, BUT THE TOPS ARE DIFFERENT. IF WE TAKE THE PYRAMID OUT AND USE IT TO FILL THE PRISM WITH WATER, IT WILL TAKE EXACTLY THREE OF THEM TO COMPLETELY FILL THE PRISM.

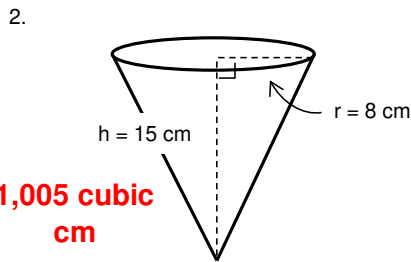


SO THE PRISM CAN HOLD THREE TIMES MORE THAN THE PYRAMID

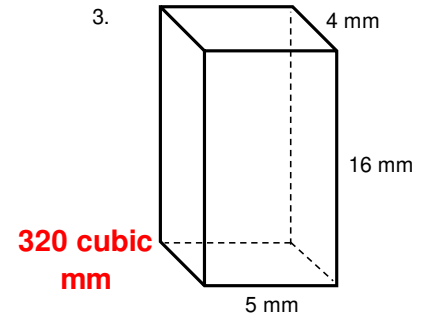
Find the volume of each shape. Use $\pi = 3.14$ for cylinders and cones. Round all answers to the nearest whole number.



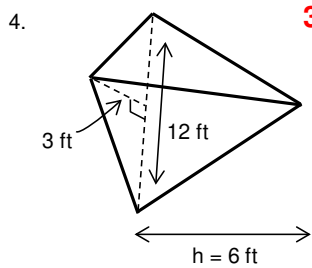
390 cubic yards



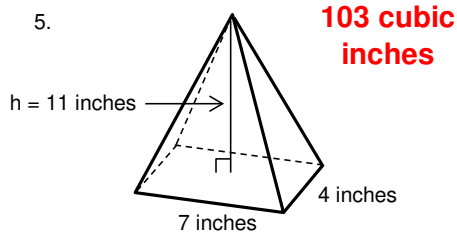
1,005 cubic cm



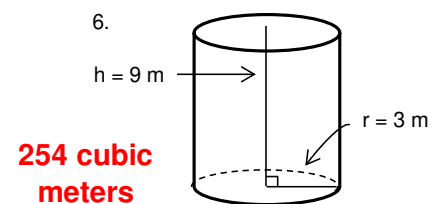
320 cubic mm



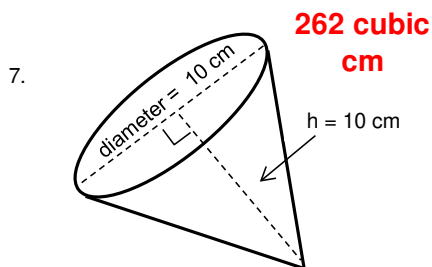
36 cubic feet



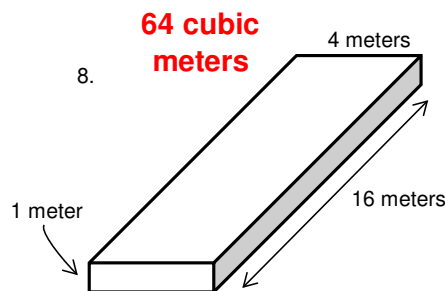
103 cubic inches



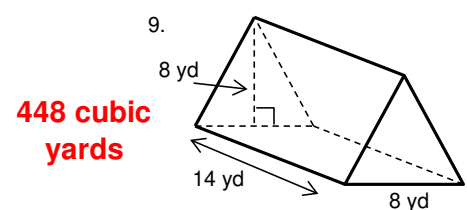
254 cubic meters



262 cubic cm



64 cubic meters



448 cubic yards