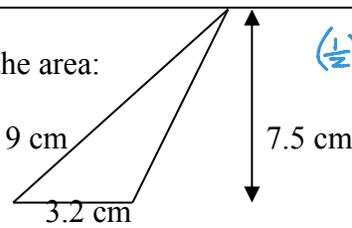
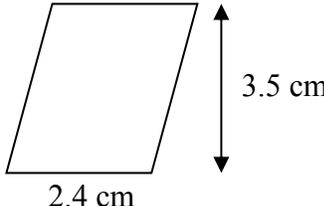
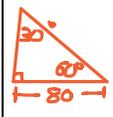
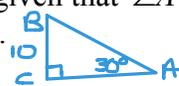
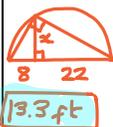
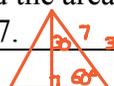


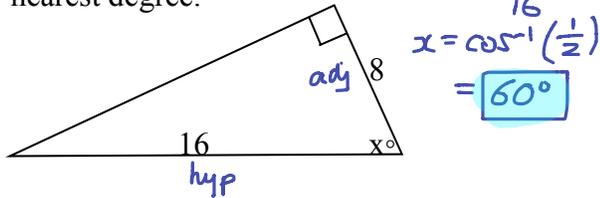
**Challenge Test Review 2**  
Algebra 2 Honors Answers

NAME ANSWERS

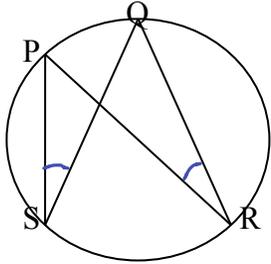
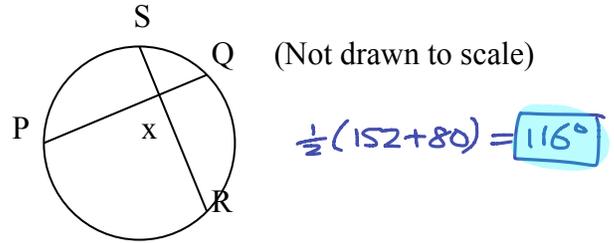
PERIOD \_\_\_\_\_

<p>1. Find the area:</p>  <p><math>(\frac{1}{2})(3.2)(7.5) = 12\text{cm}^2</math></p>	<p>14. (a) Lines <math>l</math> and <math>m</math> intersect at point <math>O</math> and the Angle between <math>l</math> and <math>m</math> is <math>23^\circ</math>. A figure is reflected in line <math>l</math> followed by a reflection in line <math>m</math>. The overall effect is: <u>Rotation, center <math>O</math>, angle <math>46^\circ</math></u></p> <p>(b) If the parallel lines <math>p</math> and <math>q</math> are 6cm apart and a figure is reflected in line <math>p</math> and then in line <math>q</math>, the overall effect is: <u>Translation <math>12\text{cm}</math> <math>\perp</math> to lines <math>p</math> &amp; <math>q</math></u></p>
<p>2. Find the area:</p>  <p><math>(2.4)(3.5) = 8.4\text{cm}^2</math></p>	<p>15. The shorter leg of a <math>30^\circ-60^\circ-90^\circ</math> triangle is 5.1 feet long. Find the perimeter.</p> <p><math>1:\sqrt{3}:2</math> <math>P=5.1+10.2+5.1\sqrt{3}</math>  <math>5.1:5.1\sqrt{3}:10.2 = 15.3+5.1\sqrt{3}</math></p> <p>16. An expression for the circumference of a circle with radius <math>r</math> is: <u><math>C=2\pi r</math></u></p>
<p>3. If <math>A = (3, 1)</math> and <math>B = (2, -4)</math>. Find vector <math>\overrightarrow{AB}</math></p> <p><math>\overrightarrow{AB} = \langle 2-3, -4-1 \rangle = \langle -1, -5 \rangle</math></p>	<p>17. If two solids have the same height and the same cross-sectional area at every level, then they have the same? <u>Volume</u></p>
<p>4. Two legs of a right triangle have lengths 10 and 7. The measure of the smaller acute angle is:</p> <p><math>\tan A = \frac{7}{10}; A = \tan^{-1}(0.7) = 35^\circ</math></p> <p>5. A rectangle has length <math>a</math> and width <math>b</math>. An expression for its area is... <u><math>A=ab</math></u></p>	<p>18. Which of the following is not enough information to solve a right triangle?</p> <p>(A) One side length and one acute angle          (B) One side length and one trig. ratio          (C) Two sides <u>(D) Two angles</u></p>
<p>6. <math>A(2, -3)</math> is translated onto <math>A'</math> by the vector <math>\vec{u} = \langle -4, 2 \rangle</math> Find the coordinates of <math>A'</math>.</p> <p><math>A' = (-2, -1)</math></p>	<p>19. The sides of a right triangle are <math>x+3</math>, <math>x+4</math>, and <math>x+5</math> units long. Find the side lengths of the triangle by solving for <math>x</math>.</p> <p><math>(x+3)^2 + (x+4)^2 = (x+5)^2</math>  <math>x^2+6x+9+x^2+8x+16=x^2+10x+25</math>  <math>x^2+14x+25=10x+25</math>  <math>x^2+4x=0</math>  <math>x(x+4)=0</math>  <math>x=0</math> or <math>-4</math>          extraneous</p>
<p>7. What is a Pythagorean triple?</p> <p><math>a, b, c</math> where <math>a^2+b^2=c^2</math>          all integers</p>	<p>20. Find the surface area of a sphere that has a diameter of 12 cm. Express your answer in terms of <math>\pi</math>.</p> <p><math>SA=4\pi r^2 = 4\pi 6^2 = 144\pi \text{cm}^2</math></p>
<p>8. Triangle <math>ABC</math> is transformed by the motion rule <math>(x, y) \rightarrow (x+2, y-3)</math> where <math>A(3,2)</math>, <math>B(2,4)</math> and <math>C(0,1)</math>. Find the coordinates of <math>A'</math>, <math>B'</math>, <math>C'</math>.</p> <p><u><math>A'(5, -1), B'(4, 1), C'(2, -2)</math></u></p>	<p>21. A forester, 80 feet from the base of a tree, observes that the angle between the ground and the top of the tree is <math>60^\circ</math>. Find the height of the tree.</p> <p><math>1:\sqrt{3}:2</math>  <math>80\text{ft}</math> <u><math>80\sqrt{3}\text{ft}</math></u></p> 
<p>9. For a circle of radius 8 feet, find the arc length <math>s</math> subtended by a central angle of <math>31^\circ</math>.</p> <p><u><math>4.33\pi</math></u></p>	<p>22. Write the ratio of vowels to consonants in the word MATHEMATICS. <u><math>4:7</math></u></p>
<p>10. The area of a trapezoid is <math>140 \text{ in}^2</math>. If the height is 8 inches and the longer base 24 inches, what is the length of the shorter base? Round your answer to the nearest tenth.</p> <p><math>\frac{1}{2}(x+24)(8) = 140</math>  <math>x+24 = 35</math>  <math>x = 11</math></p>	<p>23. If a circle has a radius of 8 inches, what is the circumference rounded to the nearest whole number? (Use <math>\pi = 3.14</math>)</p> <p><math>C = 2\pi(8) = 16\pi = 16(3.14) = 50.24 \text{ in}</math></p>
<p>11. A line which intersects a circle at exactly two points is called... <u>secant line</u></p>	<p>24. Use your calculator to determine <math>\tan 53^\circ</math>.</p> <p><u><math>1.3270</math></u></p>
<p>12. Find the missing angle and side measures of <math>\triangle ABC</math>, given that <math>\angle A = 30^\circ</math>, <math>\angle C = 90^\circ</math> and <math>CB = 10</math>.</p>  <p><math>1:\sqrt{3}:2</math> <math>m\angle B = 60^\circ</math>  <math>10:10\sqrt{3}:20</math> <math>AB = 20</math>  <math>AC = 10\sqrt{3}</math></p>	<p>25. Inside a semicircular tunnel of diameter 30 feet, a vertical support beam is placed 8 feet from the side of the tunnel. How tall is the beam? (Round to one decimal place)</p> <p><math>\frac{8}{x} = \frac{x}{22} \Rightarrow x^2 = 176</math> <u><math>x = 4\sqrt{11} \approx 13.3\text{ft}</math></u></p> 
<p>13. Define a prism.</p> <p><u>Polyhedron with 2 ll, <math>\cong</math> faces called bases. Other lateral faces are parallelograms.</u></p>	<p>26. Find the area of an equilateral triangle with a side of 7.</p> <p><math>1:\sqrt{3}:2</math> <math>7:7\sqrt{3}:14</math>  <math>A = \frac{1}{2}(7)(\frac{7\sqrt{3}}{2}) = \frac{49\sqrt{3}}{4}</math></p> 

27. Solve for  $x$  to the nearest degree.

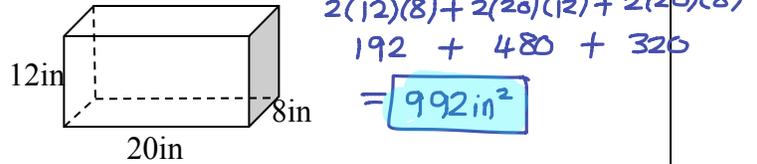


36. Given: measure of arc  $SQ = 80^\circ$ , measure of arc  $PR = 152^\circ$ , then  $m\angle x = ?$

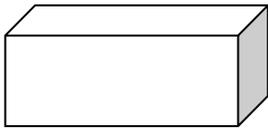


28. Find  $m\angle PSQ$   
 if  $m\angle PSQ = 3y + 4$   
 and  $m\angle PRQ = 2y + 16$   
 $3y + 4 = 2y + 16$   
 $y = 12$   
 $m\angle PSQ = 3y + 4 = 3(12) + 4 = 40^\circ$

37. If all the angles in the faces of the polyhedron below are right angles, then its surface area is...

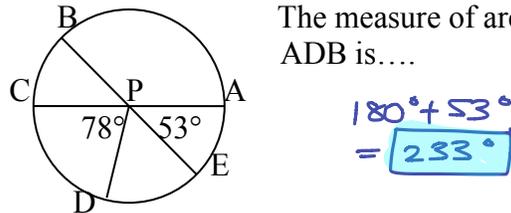


29. Find the number of faces, edges and vertices of:



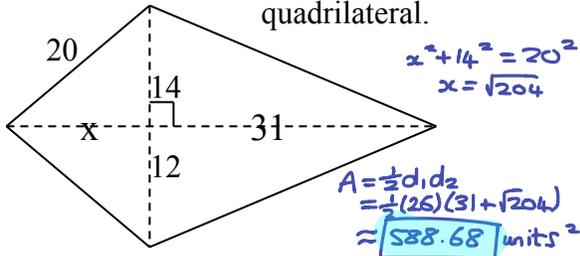
faces = 6  
 edges = 12  
 vertices = 8

38. The measure of arc  $ADB$  is....

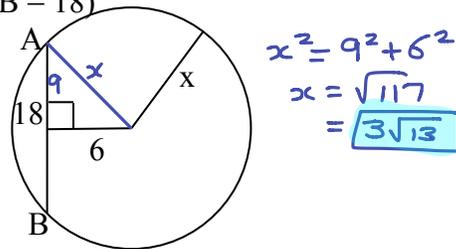


30. A segment whose endpoints are on the circle is?  
**chord**

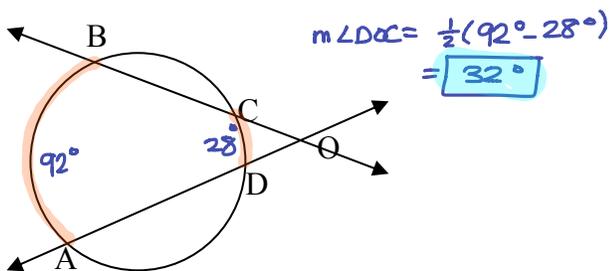
31. Find the area of the quadrilateral.



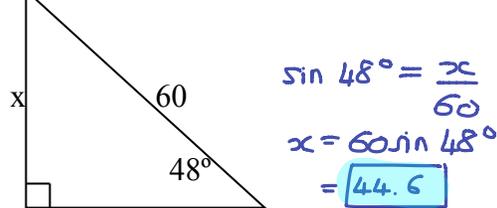
39. Find the value of  $x$  to the nearest tenth. ( $AB = 18$ )



32. Given: measure of arc  $AB = 92^\circ$ , measure of arc  $CD = 28^\circ$ , then  $m\angle DOC$  is?

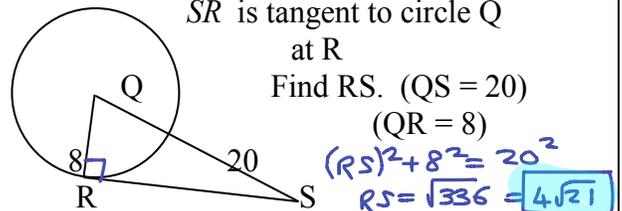


40. What is  $x$  to the nearest hundredth?



33. What is the segment that goes through center of circle and touches circle circumference twice?  
**diameter**

41.  $\overline{SR}$  is tangent to circle Q at R. Find RS. ( $QS = 20$ ) ( $QR = 8$ )



34. Solve for  $x$ :  $\frac{5}{x+2} = \frac{2}{x}$

$5x = 2x + 4$   
 $3x = 4$   
 $x = \frac{4}{3}$

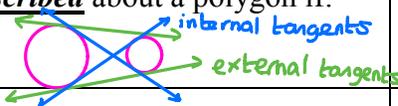
35. (a) Find the exact total surface area of a cone that has a slant height of 25 in and radius of 6 in.  
 (b) Find the height of the cone. **see end**  
 (c) Find the volume of the cone.

42. What's the ratios of the lengths of sides of  
 (a)  $30^\circ-60^\circ-90^\circ\Delta$   **$1:\sqrt{3}:2$**   
 (b)  $45^\circ-45^\circ-90^\circ\Delta$   **$1:1:\sqrt{2}$**

all vertices of the polygon are on circle

43(A) A circle is circumscribed about a polygon if:

(B) Common internal/external tangents:



44. Draw:

- (A) a regular polyhedron cube
- (B) a non-convex polyhedron
- (C) a polygon

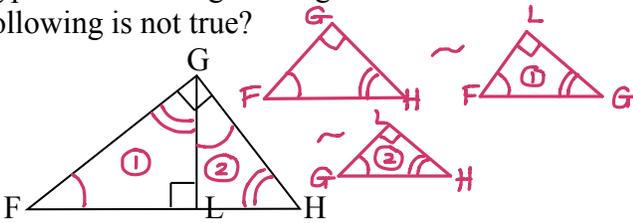
45. Give two angles co-terminal with  $250^\circ$  <sup>others possible</sup>  
 $250^\circ + 360^\circ = 610^\circ$       $250^\circ - 360^\circ = -110^\circ$

46. Convert  $145^\circ$  to radians and leave answer in terms of  $\pi$ .  $\frac{145\pi}{180} = \frac{29\pi}{36}$

47. A student is trying to work out the height of the music teacher. He is 15 feet away from the teacher and the angle of elevation from his feet to the top of teacher's head is  $22^\circ$ . How tall is the teacher in feet and inches?  
 $\tan 22^\circ = \frac{x}{15}$       $x = 15 \tan 22^\circ = 6.06 \approx 6 \text{ ft } 1 \text{ in}$



48. In the figure below, an altitude is drawn to the hypotenuse of a right triangle. Which of the following is not true?

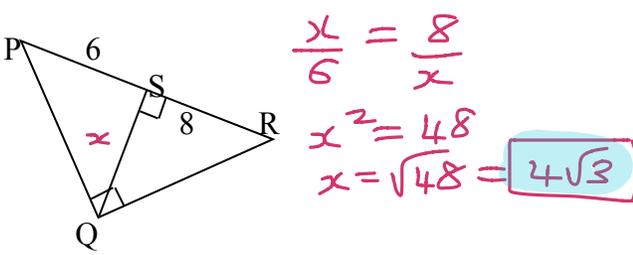


- (A)  $\triangle FLG \sim \triangle GHL$  X
- (B)  $\triangle GLH \sim \triangle FGH$
- (C)  $\triangle FGH \sim \triangle FLG$
- (D)  $\triangle GLH \sim \triangle FLG$

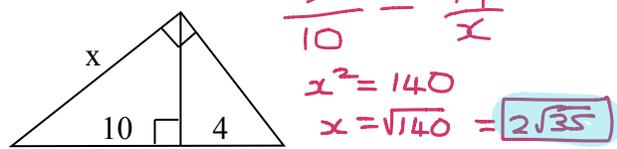
49. Find the equation of the circle with center  $(-3, 5)$  and  $(2, -4)$  is a point on the circle.

$(x+3)^2 + (y-5)^2 = r^2$       $r^2 = 106$   
 $(2+3)^2 + (-4-5)^2 = 25 + 81 = 106$       $(x+3)^2 + (y-5)^2 = 106$

50. Given:  $PS = 6$ ,  $SR = 8$ , then the value of  $QS$  is....



51. Find the value of  $x$ .

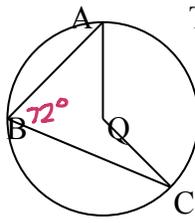


52. If  $a = 3, c = 4, \beta = 40^\circ$ , then find side  $b$ . see end

53. An automobile has 15-inch diameter wheels. If the wheels revolved four times after the brakes were applied, the stopping distance was approximately...  $C = \pi d = \pi(15) = 15\pi$   
 $4 \text{ times} = 4(15\pi) = 60\pi \text{ in}$

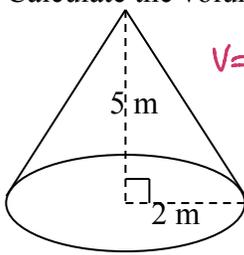
54. Write down all the ways that 2 triangles can be similar. **AA, SAS, SSS**

55. Given circle center  $Q$  and  $m\angle B = 72^\circ$ . Then the measure of arc  $AC$  is...



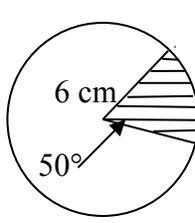
$2(72^\circ) = 144^\circ$

56. Calculate the volume of the cone. Use  $\pi = 3.14$



$V = \frac{1}{3}\pi r^2 h$   
 $= \frac{1}{3}\pi(2^2)(5)$   
 $= \frac{20\pi}{3} \approx 20.93 \text{ m}^3$

57. Find the area of the shaded region.

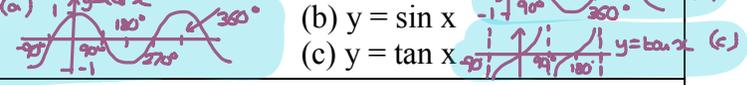


(Radius = 6 cm and central angle =  $50^\circ$ )  
 $\frac{50}{360} \cdot \pi 6^2 = 5\pi \approx 15.708 \text{ cm}^2$

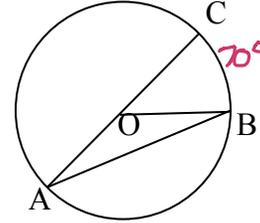
58. A field is 150 m by 450 m. A barn 30 m by 41 m is built in the field. How much area is left over?

$(150)(450) - (30)(41) = 66270 \text{ m}^2$

59. Draw the graphs of (a)  $y = \cos x$



60. Given: In circle  $O$ , measure of arc  $BAC = 290^\circ$ . Find  $m\angle A$



$m\angle A = 35^\circ$

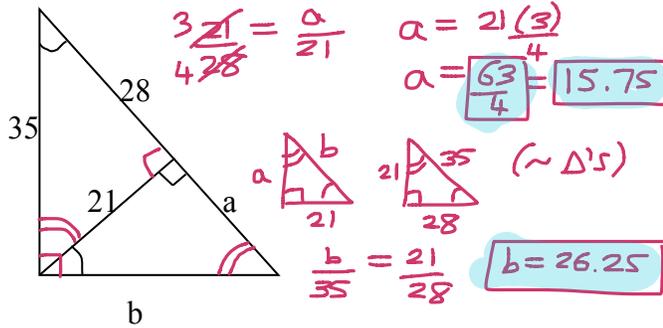
61. An aquarium in a restaurant is a rectangular prism and measures 2.5 feet by 5 feet by 3 feet. What is the volume of the aquarium?

$(2.5)(5)(3) = 37.5 \text{ ft}^3$

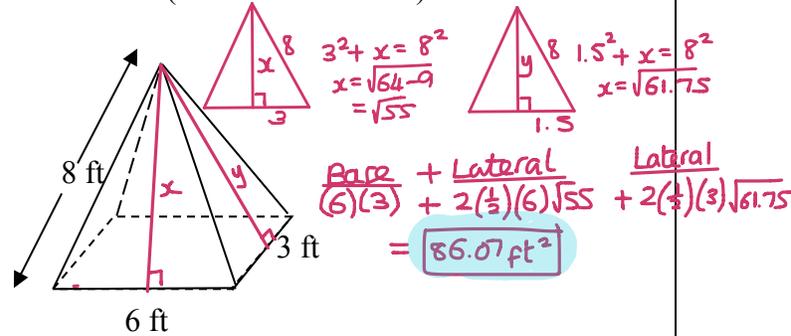
62. Assume that  $\angle A$  is an acute angle and  $\sin A = 0.13$ . The  $m\angle A = ?$  **7.5°**

63. Find the surface area, in square centimeters, of a right circular cylinder if the radius is 4 cm and the height is 10 cm.  $S.A. = 2\pi(4)^2 + 2\pi(4)(10) = 112\pi \text{ cm}^2$   
 (bases) (lateral)  
 $V = \pi(4^2)(10) = 160\pi \text{ cm}^3$

64. Solve for a and b.



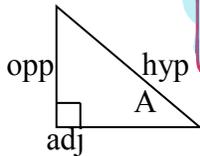
74. The pyramid shown has a rectangular base and faces that are isosceles triangles. Find the total surface area. (Not drawn to scale)



65. Write down the definition of similar polygons.

All corresponding angles are congruent and sides proportional

66. The sine of  $\angle A$  is the ratio:



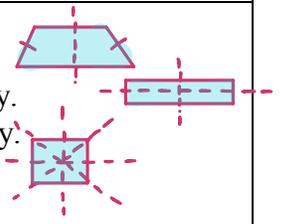
$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

75. Draw a quadrilateral with:

(a) Exactly one line of symmetry.

(b) Exactly two lines of symmetry.

(c) Exactly four lines of symmetry.



67. Convert 1.45 radians to degrees.

$$1.45 \times \frac{180}{\pi} \approx 83.08^\circ$$

76. Find the exact value of  $\cos 150^\circ$ .

$$\cos 150^\circ = -\frac{\sqrt{3}}{2}$$

68. Find the volume of a sphere 6 ft in diameter.

$$\frac{4}{3}\pi 3^3 = 36\pi \approx 113.1 \text{ ft}^3$$

77. Solve the following system:

$$x = 2y + 5$$

$$3x - 4y = -20$$

$$\begin{aligned} 3(2y+5) - 4y &= -20 \\ 6y + 15 - 4y &= -20 \\ 2y &= -35 \end{aligned}$$

$$y = -\frac{35}{2}$$

$$x = 2y + 5 = 2(-\frac{35}{2}) + 5 = -30$$

69. Solve the triangle if  $a = 5, b = 6, C = 39^\circ$

see end

70. Define concentric circles.

have same center

78. Find area of a sector with a radius of 4 and  $\theta = 50^\circ$ . Leave the answer in terms of  $\pi$ .

$$\frac{50}{360} \cdot \pi 4^2 = \frac{20\pi}{9}$$

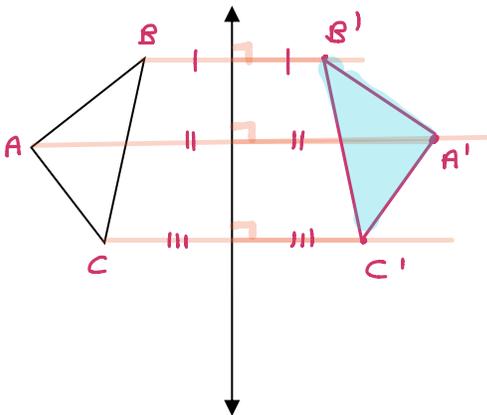
71.  $(-3, 4)$  is a point on the terminal side of  $\theta$ . Find the exact value of  $\cos \theta$ .

$$\cos \theta = -\frac{3}{5}$$

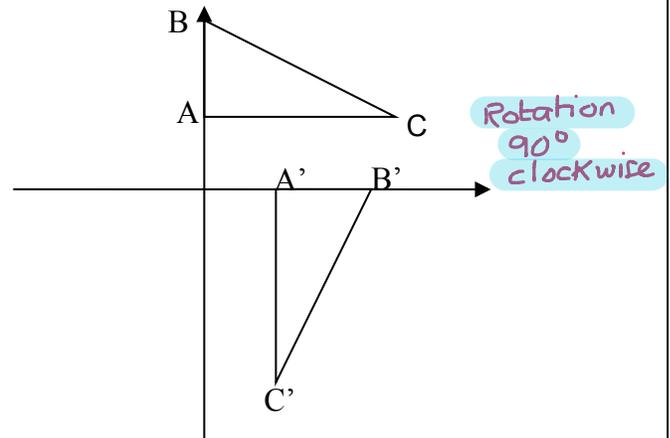
79. Solve the triangle if  $a = 5, B = 42^\circ, C = 39^\circ$

see end

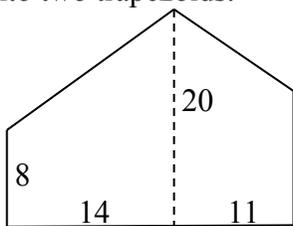
72. Reflect the triangle in the line



80. State the transformation of ABC.



73. Find the area of the region shown by dividing it into two trapezoids.



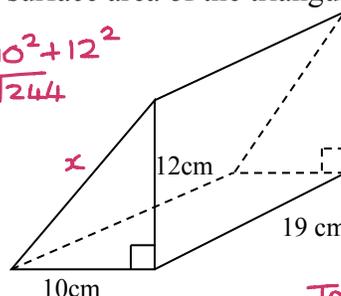
$$\frac{1}{2}(8+20)(14) = 7(28) = 196$$

$$\frac{1}{2}(20+15)(11) = (35)(5.5) = 192.5$$

$$\text{Tot} = 388.5 \text{ u}^2$$

81. Find (a) the volume and (b) the surface area of the triangular prism.

$$\begin{aligned} x^2 &= 10^2 + 12^2 \\ x &= \sqrt{244} \end{aligned}$$



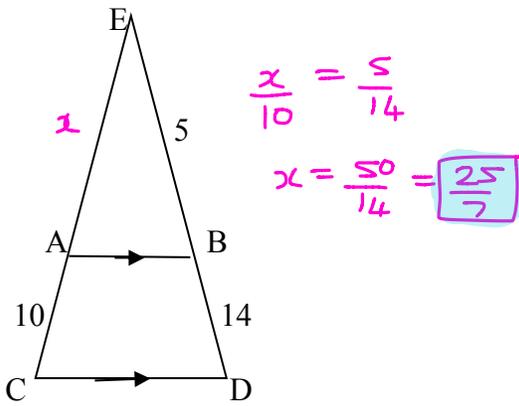
$$(a) V = \frac{1}{2}(10)(12)(19) = 1140 \text{ cm}^3$$

$$(b) \text{Base} = \frac{1}{2}(10)(12) = 120$$

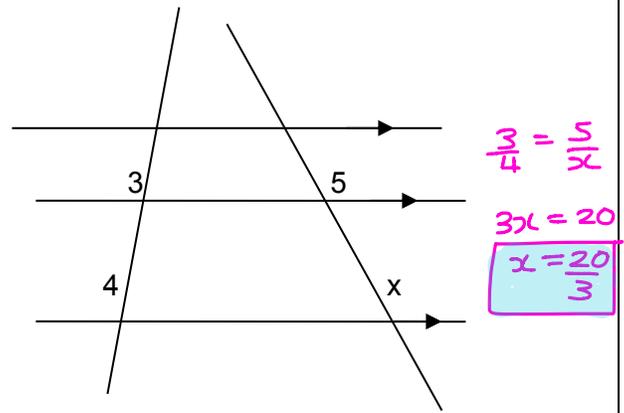
$$\text{Lateral} = (10)(19) + (12)(19) + (\sqrt{244})(19) = 228 + 228 + 19\sqrt{244}$$

$$\text{Total} = 834.79 \text{ cm}^2$$

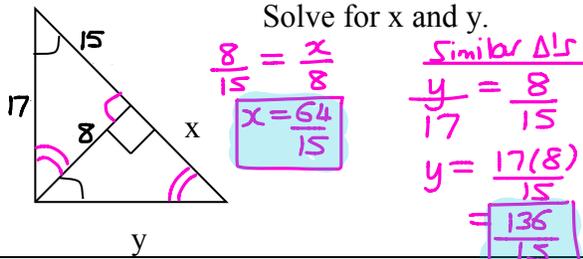
82. Find AE given that  $\overline{AB}$  is parallel to  $\overline{CD}$



91. Find x.



83.



92. Plot the points A = (2, -1), B = (6, -1), C = (6, -3) and D = (2, -3).

At end

- (a) Reflect ABCD in the line y = 1.
- (b) Rotate A'B'C'D' 90° counterclockwise about the origin.
- (c) Translate A''B''C''D'' along the vector <-5,2>

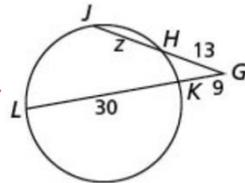
84. Find the geometric mean of 7 and 15.

$\frac{7}{x} = \frac{x}{15}$ ;  $x^2 = 105 \Rightarrow x = \sqrt{105}$

85. Find the value of z and the length of JG.

all. outside = all. outside  
 $(z+13)(13) = (39)(9)$   
 $z+13 = 27$   
 $z = 14$

$JG = z+13 = 27$

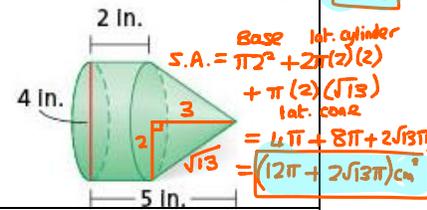


93. Find the other leg of a right triangle, given one leg is 18 cm and the hypotenuse is 34 cm.

$x^2 + 18^2 = 34^2$   
 $x = \sqrt{832} = 8\sqrt{13}$  cm

94. Find:

- (a) the volume
  - (b) the surface area of the composite figure.
- (a)  $V = \pi r^2 h + \frac{1}{3} \pi r^2 (3)$   
 $= 8\pi + 4\pi = 12\pi$  in<sup>3</sup>



86. The point A(5, -2) is translated onto A' by the Vector  $\vec{u} = \langle -6, 7 \rangle$ . The coordinates of A' are:

$A' = (-1, 5)$

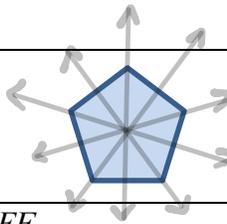
95. (a) Find the area of a regular octagon with side length 6 m. Round to the nearest tenth.

At end

(b) Find the area of a regular hexagon with side length 10 cm. Round to the nearest tenth.

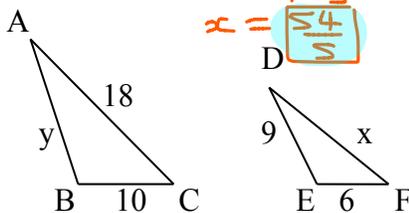
87. What are the angle of rotation and the order of rotational symmetry for the regular polygon?

$\frac{360^\circ}{5} = 72^\circ$  order 5



96. According to a recent survey, 30 out of 40 geometry students like math. What's the ratio of those students that like math to total number of students? like math : total = 30 : 40 = 3 : 4

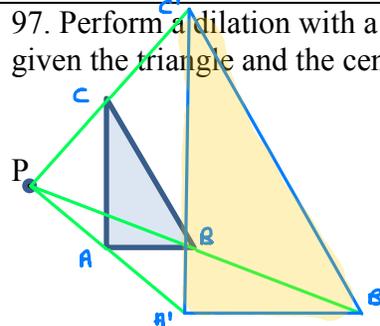
88. Given:  $\triangle ABC$  is similar to  $\triangle DEF$ . Solve for x and y.



$\frac{x}{18} = \frac{6}{10}$   
 $x = \frac{54}{5}$

$\frac{y}{9} = \frac{10}{6}$   
 $y = 15$

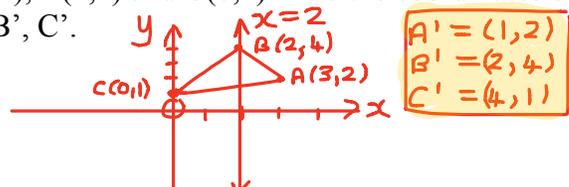
97. Perform a dilation with a scale factor of 2 given the triangle and the center of dilation P.



89. Find the volume of a regular square based pyramid with base side length of 8 cm and slant height of 5 cm.

At end

98. Triangle ABC is reflected in line x = 2 where A(3,2), B(2,4) and C(0,1). Find the coordinates of A', B', C'.



90. What is the effect on (a) the volume and (b) the surface area of a sphere if the radius is multiplied by 4?

(a)  $x 4^3 = x 64$   
 (b)  $x 4^2 = x 16$

#35 Cone: slant height  $25\text{ in}$ ; radius  $= 6\text{ in}$

(a) Surface Area  $= \pi r^2 + \pi r l$   
 $= \pi(6^2) + \pi(6)(25)$   
 $= 36\pi + 150\pi$   
 $= 186\pi \text{ in}^2$



(b)  $h^2 + 6^2 = 25^2$   
 $h = \sqrt{589}$

(c)  $V = \frac{1}{3}\pi(6^2)\sqrt{589}$   
 $= 12\sqrt{589}\pi \text{ in}^3$   
 $\approx 914.9 \text{ in}^3$

#52  $a=3, c=4, B=40^\circ$

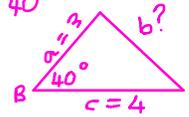
Cosine Rule

$b^2 = a^2 + c^2 - 2ac \cos B$

$b^2 = 3^2 + 4^2 - 2(3)(4) \cos 40^\circ$

$b^2 \approx 6.6$

$b \approx 2.57$



#69  $a=5, b=6, C=39^\circ$

Cosine rule  
 $c^2 = a^2 + b^2 - 2ab \cos C$   
 $c^2 = 5^2 + 6^2 - 2(5)(6) \cos 39^\circ$   
 $= 14.37$   
 $c = 3.79$

Sine rule  
 $\frac{\sin A}{5} = \frac{\sin 39^\circ}{3.79}$

$A = \sin^{-1}\left(\frac{5 \sin 39^\circ}{3.79}\right)$

$A \approx 56.1^\circ$

$B = 180^\circ - 56.1^\circ - 39^\circ$

$= 84.9^\circ$

#79  $a=5, B=42^\circ, C=39^\circ$



$A = 180^\circ - 39^\circ - 42^\circ$   
 $= 99^\circ$

Sine rule:  
 $\frac{b}{\sin 42^\circ} = \frac{5}{\sin 99^\circ}$

$b = \frac{5 \sin 42^\circ}{\sin 99^\circ}$

$\approx 3.39$

$\frac{c}{\sin 39^\circ} = \frac{5}{\sin 99^\circ}$

$= \frac{5 \sin 39^\circ}{\sin 99^\circ}$

$\approx 3.19$

#89  $h^2 + 4^2 = 5^2$   
 $h = \sqrt{25 - 16}$   
 $h = 3$   
 $V = \frac{1}{3} 8^2 (3)$   
 $= 64 \text{ cm}^3$

(a)  $\frac{360^\circ}{8} = 45^\circ$   
 $\tan 22.5^\circ = \frac{3}{a}$   
 $a = \frac{3}{\tan 22.5^\circ}$   
 $A = \frac{1}{2} a p$   
 $= \frac{1}{2} \left[ \frac{3}{\tan 22.5^\circ} \right] (48)$   
 $= \frac{72}{\tan 22.5^\circ} \approx 70.75 \text{ m}^2$

(b)  $\frac{360^\circ}{6} = 60^\circ$   
 $A = \frac{1}{2} a p$   
 $= \frac{1}{2} (5\sqrt{3}) (60)$   
 $= 150\sqrt{3} \text{ cm}^2$

#92

