Geometry Round

45 minutes

Please put all answers on the provided answer sheet, units are not required.

1. James is stuck inside a Giant Peach. The peach is the shape of a sphere and has a diameter of 12 feet. What is the volume of the peach? Leave your answer in terms of pi. (Hint: V = 4/3(pi)r^3)

Ans: 288
R = 6
V = 4/3pi(6)^3 = 288 pi

2. Chicken Little decides to go on a bike ride that follows a triangular path; two of the paths are equal and the third is 7 miles longer than the other paths. If Chicken Little rides 40 miles total, what is the length of the longest path?
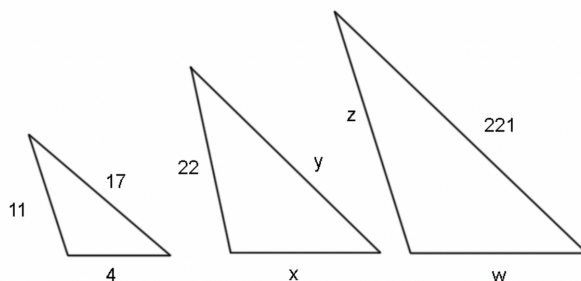
Ans: 18 miles
x+x+x+7=40
3x+7=40
3x=33
x=11
11+7=18

3. Snow White has cut three triangles to decorate a pie. What is the sum of the unknown sides x, y, z, and w if all three triangles are similar?

Ans: 237
x = 8, y = 34, z = 143, w = 52

4. Aurora decided to make a garden with a width of 5 meters and a length of 12 meters. The week after she finished the garden, several animals came and ate all the plants and food, decreasing the size of the garden 25%. What is the area of the garden that is still intact?

Answer: 45 meters squared

5. Princess Belle's book is shown in Figure A. Find the surface area if AD is 3 in, DE is 10 in, and EF is 6 in.

Figure A
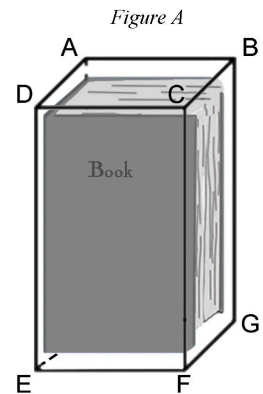
Ans: 216 in²
(18 x 2) + (60 x 2) + (30 x 2)

6. Peter Pan's hat is the shape of a triangle. The 2nd interior angle of the triangle is double the 1st interior angle , and the 3rd interior angle is 40 degrees less than the 1st interior angle. What is the angle of the first interior angle (in degrees)?
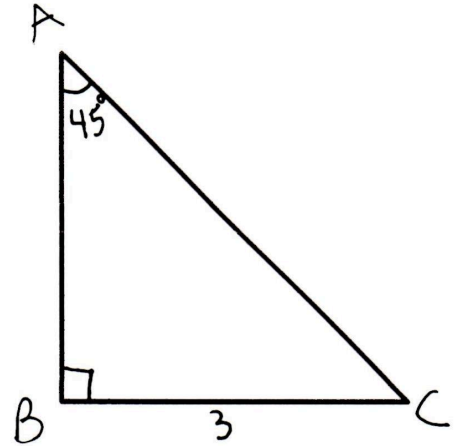
Ans: 55 degrees
X = first interior angle
X + 2x + x – 40 = 180
4x-40 = 180
X = 55

7. Captain Hook is sailing on the Jolly Roger towards a lighthouse. The angle between the lighthouse and the Jolly Roger makes a 45 degree angle, and the ship is 3 miles from the lighthouse. How tall is the Lighthouse?


Answer:
tan(45)=3/X
3/tan45=x
x=3
SHOULD BE IN DEGREES

8. Belle is redecorating the Beast's castle. She has drawn a design on a window (Shown Below), but she doesn't know how much paint she needs for the center circle. The window design is made on a square with a side length of 4 inches and it contains 8 identical semicircles that are tangent to the circle at the center of the square. What is the radius of the circle?
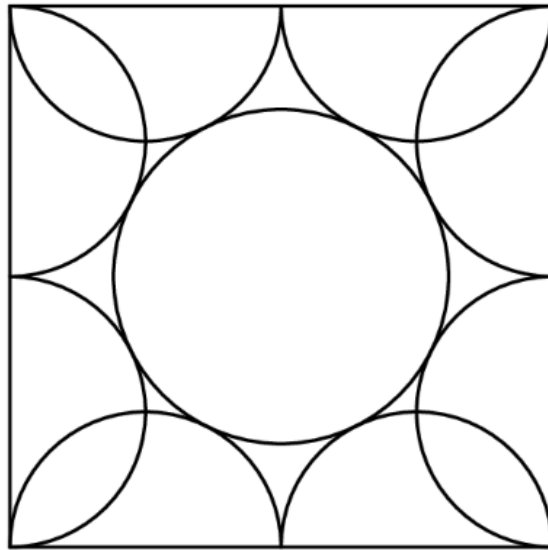
Ans: sqrt 5 – 1

9. Mickey Mouse drank a potion that shrunk his ears! He is looking in a square mirror, which has sides of 8 in. His face is the large circle inscribed in the mirror. The tiny circle ears touch his face and the sides of the square mirror.

       a) What is the radius of his face (large circle)? <u>(Write your answer in question 9)</u>

       b) What is the radius of his ear (small circle)? Express your answer as a + b ($\sqrt{c}$), where a,b,c are integers. <u>(Write your answer in question 10)</u>
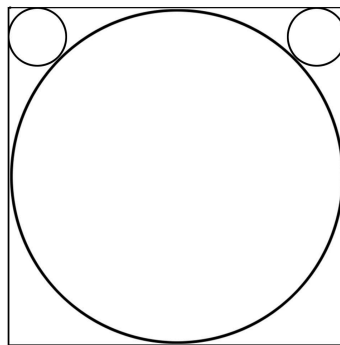
Ans:
a) 4 in (½ * 8)
b) 12 – 8√2

$AB = r\sqrt{2}$

$BC = r$

$CD = 4$

$AD = 4\sqrt{2}$

$AB + BC + CD = AD$

$r\sqrt{2} + r + 4 = 4\sqrt{2}$

$r(\sqrt{2} + 1) = 4\sqrt{2} - 4$

$r = (4\sqrt{2} - 4) / (\sqrt{2} + 1)$

$r = 4(\sqrt{2} - 1) / (\sqrt{2} + 1)$

(rationalize denominator):

$r = 4(\sqrt{2} - 1) * (\sqrt{2} - 1) / [(\sqrt{2} + 1) * (\sqrt{2} - 1)]$

$r = 4(\sqrt{2} - 1)^2$

$= 4(3 - 2\sqrt{2}) = 12 - 8\sqrt{2}$