Circles, Planes & Volleyballs

Name_____**ANSWER KEY**_____

Cast Away

In the movie *Cast Away*, Federal Express engineer Chuck Nolan (Tom Hanks) struggles to survive on a deserted tropical island after a plane crash in the Pacific. In an effort to comprehend the seriousness of his situation, Chuck computes the size of his search area, centering the region on the point of last radio contact. Chuck laments to his inanimate companion, Wilson (a volleyball), that they may never be found.

1. Are Chuck's calculations correct? In the movie, Chuck is seen performing multiplication times an approximation of π and appears to arrive at his answer very quickly. Check his computations. Find a more accurate computation by using the full calculator listing of π.

Chuck's computations:
He determines that due to the storm, the plane was 400 miles off course from its charted location. This creates a search radius of 400 miles.
The AREA of the search region will be:

$A = \pi r^2 = \pi \cdot 400^2 = (3.14) \cdot 160000$

= 502,400 square miles

Is this computation correct? __**YES**__

Your computations using the calculator π :

$A = \pi r^2 = \pi \cdot 400^2$

$= 502,654.8246$ square miles

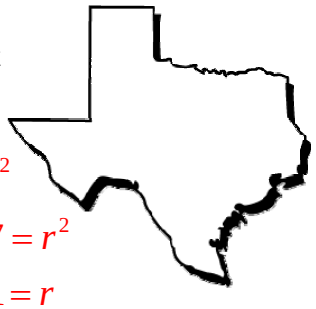
2. Chuck states that the search area is "twice the size of Texas". If the diameter of Texas is 926 miles and we assume Texas to be a circle, what is the number of square miles in its area, to the *nearest square mile*? $d = 926; \quad r = 463$

$A = \pi r^2 = \pi \cdot 463^2$

$= 673,460.0756$

$= 673,460$ square miles

3. Obviously, Texas is not a circle. The exact square mileage of the state of Texas is listed to be 261,797 square miles. What is the radius of the smallest circle that would contain this number of square miles to the *nearest mile*?



$A = \pi r^2$

$261797 = \pi r^2$

$83332.57327 = r^2$

$288.6738181 = r$

$r = 288$ miles

4. a. The airplane's stated speed of 475 mph was to be sustained throughout the entire 11 ½ hour trip. How far would the plane have traveled at this speed in that amount of time?

475 x 11.5 = 5,462.5 miles

b. Due to the storm, the plane reduced speed to 375 mph after traveling for 7 hours at 475 mph. If the reduced speed was maintained for the remainder of the trip, how much longer will this trip take, to the *nearest tenth* of an hour?

475 mph for 7 hours = 3,325 miles.

5462.5 – 3325 = 2137.5 miles left to be covered at 375 mph in 5.7 hours.

Total time: 7 hours + 5.7 hours = 12. 7 hours.

12.7 hours – 11.5 hours = 1.2 hours longer

5. Chuck's friend Wilson, is actually a volleyball. The circumference of a regulation volleyball is 26 inches. What is Wilson's radius, to the *nearest tenth of an inch*?

$C = 2\pi r = 26$

$13 = \pi r$

$4.13802852 = r$

$4.1 = r$

6. If the radius of the search area was 400 miles, what was the circumference of the search area, to the *nearest mile*?

$r = 400$

$C = 2\pi r = 2\pi(400) = 800\pi = 2513.274123$

$C = 2{,}513$ miles