**SOLUTIONS**

1. To find the area of the base, we can use the formula for hexagons. You get However, there are two bases, so . Then you add the lateral surface area, which is .

D.

2. The volume of a pyramid is . The area of the hexagonal base can be found using the formula . We find the area of the base to be The height is 40, so .

B.

3. This can be solved by creating a triangle and setting up proportions.

. Solving for x you get 16 (keep in mind x will be in feet)

We can now set up proportions to get the height of the rocket.

Solving for x, we get the maximum height of the rocket to be 559 ft.

D. 559

4. D. Alternate interior angles

5. The final answer must have π in it, so the correct choice is E.

6. You get the contrapositive by switching the hypothesis and conclusion and then negating both.

B. If Joanna does not have friends, then she is not cool.

7. The converse of the inverse of the contrapositive will just result in the conditional, so all that’s left is the converse (switch).

B. If you tell me this, then the game is boring.

8. Mars is 4 units from the sun and Neptune is 8 units from the sun in the opposite direction, so 8+4=12.

E. NOTA

9. A right triangle can be formed by drawing a line from the center to the tangent point on Mercury’s orbit and another line from the center to the starting point on Venus’s orbit. Then using Pythagorean theorem, This is, however, only half the distance traveled.

C.

10. The shape of the parallelogram is maintained and Jennifer is farther away only at the point

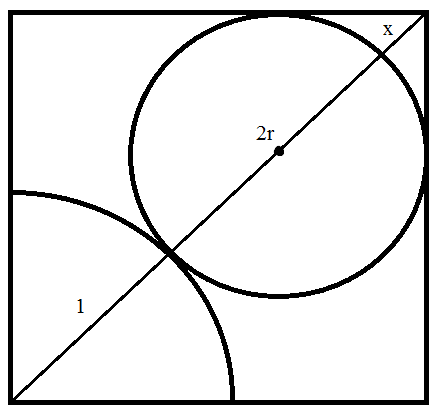
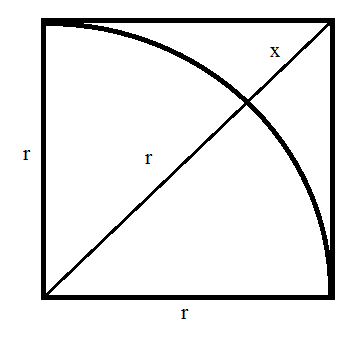
B.

11. When the vertex of the angle is outside the circle (Mercury’s orbit), then the measure of the angle is equal to half the difference of the measures of its intercepted arcs.

The degree measure of the intersected arc is 60°. The distance between the two ships is not the arc length between them, but a straight line that is equal to the radii of the inner circle because an equilateral triangle can be formed with a 60° angle.

A. 1

12. The diagonal of the square picture is So we know that , where x is the extra little bit. x can also be written as Now we have . Solving for r you get



B.

13. This is an infinite geometric series with a ratio of and the first term is 1. Using this information, you can find the sum using the formula for infinite geometric series , where is the first term and is the common ratio.

A. 2

14. The probability of rolling a prime sum is 5/12. So, the probability Jennifer wins after the first round is the probability Joanna does not roll a prime sum multiplied by the probability that Jennifer does roll a prime sum. If neither wins, then they must play another round, and the probability of Jennifer winning begins to look like another infinite geometric series.

The first term is and the common ratio is , so

B.

15. An icosahedron has twenty faces that are equilateral triangles. Each face has three edges; however, each edge is shared by two faces. The total number of edges is therefore To find vertices, you can use Euler’s formula: ..

E. NOTA

16.

The question gives the mass, so we must find the volume in order to solve for the density of the asteroid. The formula for the volume of a tetrahedron is . Convert the side length from feet to inches, because the answers are all in g/in3 . . A. 32 g/in3

17. Use distance formula.

B.

18. The five platonic solids are: tetrahedron (4), hexahedron (cube,6), octahedron (8), dodecahedron (12), and icosahedron (20).

D. 46080

19. C. I, and IV

20. First we find the volume of the entire planet. The volume of a sphere is and the radius is 70,000 km.

The volume of the middle section is

The percentage is

A. 36%

21. E (none of the answer choices were correct, the question required a calculator to complete)

22. The distance from the outer circle to a point tangent to the inner circle is equal to Since the distance is 10, we find that . To find the area between the circles, you would use

B. 100π cm2

23. To solve this you need to set up an equation.

R=6 and r =4, so

B. 100°

24.

The distance between Earth and Brandon and DZ’s ship is 146,000,000 miles.

A. $2190

25. Because no three moons are collinear, the number of triangles that can form is equivalent to

C. 39,711

26. A. triskaidecagon

27. In a right triangle with legs 3 and 4, the third side would have a length of 5. Since 98° is greater than 90°, the length of the side the angle opens up to will be greater than 5, which is only answer choice D.

D. 5.3235

28. The radius of a circle is proportional to the circumference so the ratios of the circumferences will be equal to the ratio of the radii.

A. 1:30

29.

The area of the window is 6 and the area covered by Pluto is

A.

30. B. 8