1. Given two parallel lines and a transversal, alternate interior angles are always:
A) acute  B) complementary  C) congruent  D) supplementary  E) none of these

For 2-5, use the dartboard diagram at right. The radius of zone A (the bullseye) is 1 inch. Each ring expands the radius by 2 inches. Leave your answer in terms of π as necessary.

2. Find the area of the entire dartboard.
A) 14π sq in  B) 16π sq in  C) 49π sq in  D) 64π sq in  E) none of these

3. Find the circumference of the outside edge of zone B.
A) 3π in  B) 6π in  C) 9π in  D) 12π in  E) none of these

4. The area of the bullseye (zone A) is what percent of the entire dartboard area? Round to the nearest tenth of a percent.
A) 1.6%  B) 2.0%  C) 6.3%  D) 7.1%  E) none of these

5. What is the probability that a dart thrown at random will land in zone C, assuming it hits the dartboard? Round to the nearest tenth of a percent.
A) 28.6%  B) 32.7%  C) 51.0%  D) 55.6%  E) none of these

6. Two competing stores offer your favorite breakfast cereal in differently shaped packages. Geno’s Groceries offers a 4”x5”x10” box. Serena’s SuperSave sells a cube with side measure of 6”. If the cost per package is the same, who is offering the better deal on your cereal?
A) Geno’s  B) Serena’s  C) they are equal

7. X-Sta-Ski Sports is having an end of season clearance sale. For today only, ski boots are on sale for 35% off. How much would you save buying a pair regularly priced at $397.00. Round your amount to the nearest cent.
A) $119.10  B) $138.95  C) $258.05  D) $362.00  E) none of these

8. X-Sta-Ski Sports is passing along a manufacturers’ discount on Burton Snowboards. The manufacturer is giving a 30% discount on all orders, but X-Sta-Ski wants a deposit of 20% to place the order. If the board retails for $519.00, how much of a deposit is needed?
A) $72.66  B) $103.80  C) $108.99  D) $155.70  E) none of these

9. Two fair dice are rolled. What is the probability of rolling a sum of 7?
A) $\frac{1}{12}$  B) $\frac{1}{9}$  C) $\frac{1}{6}$  D) $\frac{7}{12}$  E) none of these

10. Your new laptop requires an 8 character passcode. The first two characters must be letters, the next four characters are digits, and the last two are any of these seven special characters: !,@,#,$,%,?.,. How many passcodes are possible?
A) 1820  B) 29,120  C) 217,326,564  D) 331,240,000  E) none of these
For 11-14, let \( f(x) = 3x^2 + 7x - 9 \), \( g(x) = 7x^2 - 4x + 13 \), and \( h(x) = x^2 - 7 \).

11. Find \( f(x) + h(x) \).
A) \( 3x^2 + 7x - 16 \)  B) \( 3x^4 + 7x - 16 \)  C) \( 4x^2 - 9 \)  D) \( 4x^2 + 7x - 16 \)  E) none of these

12. Find \( g(x) - f(x) \).
A) \( 4x^2 - 11x + 4 \)  B) \( 4x^2 - 11x + 22 \)  C) \( 4x^2 + 3x + 4 \)  D) \( 10x^2 + 3x + 4 \)  E) none of these

13. Find \( g(x) \cdot h(x) \).
A) \( 8x^2 - 4x + 6 \)  B) \( -4x^3 + 6x^2 + 28x - 20 \)  C) \( 7x^4 - 4x^3 - 36x^2 + 28x - 91 \)  D) \( 7x^4 - 4x^3 - 36x^2 - 28x + 91 \)  E) none of these

14. Evaluate \( g(-3) \).
A) -62  B) -38  C) 67  D) 88  E) none of these

For 15-16: A transatlantic flight originates in New York City (approximately 40°N and 74°W) and flies to Glasgow, Scotland (approximately 56°N and 4°W).

15. To combat boredom on a transatlantic flight, a pilot always stretches her legs at the geographic midpoint of the flight. At what latitude and longitude should she plan her stretch?
A) 8°N, 35°W  B) 34°N, 52°W  C) 48°N, 39°W  D) 57°N, 30°W  E) none of these

16. If 1° of latitude is approximately 69 miles, and 1° of longitude in this area of the globe is approximately 46 miles, what is the approximate distance between New York and Glasgow? Round your answer to the nearest mile.
A) 3404 miles  B) 4324 miles  C) 4886 miles  D) 5106 miles  E) none of these

For 17-20, use the diagram at right. Assume \( \overline{AB} \parallel \overline{CD} \).

17. If \( m\angle EHB = 37° \), find \( m\angle CKH \).
A) 37°  B) 53°  C) 143°  D) 153°  E) none of these

18. \( \angle AHE \) and \( \angle BHK \) exemplify which type of angles?
A) alternate interior  B) corresponding  C) supplementary  D) vertical  E) none of these

19. Given \( H \) at \((9, 8)\) and \( K \) at \((7, 3)\). Find the slope of \( \overline{EF} \).
A) \( \frac{1}{4} \)  B) \( \frac{2}{5} \)  C) \( \frac{5}{2} \)  D) 4  E) none of these

20. If the slope of \( \overline{AB} \) is 0, what is the slope of \( \overline{CD} \)?
A) 0  B) 1  C) 5  D) undefined  E) none of these
APPLIED 2018 Answer Key

1. C
2. C
3. B
4. B
5. B
6. B
7. B
8. A
9. C
10. D
11. D
12. B
13. C
14. D
15. C
16. A
17. C
18. D
19. C
20. A