1. Which of the following examples best defines the term “complex fraction”?

A) \( \frac{x+17}{\sqrt{5x}} \)  
B) \( \frac{\frac{2x}{3}}{x+17} \)  
C) \( \frac{x+17i}{4x-3i} \)  
D) \( \frac{x+17}{\frac{3}{2}} \)  
E) none of these

2. Find the area of the triangle with side lengths 7, 13, and 4. Round your answer to the nearest whole unit.

A) 14  B) 22  C) 26  D) 46  E) none of these

3. Find the area of the triangle with the following measurements: \( B = 62° \), \( a = 12 \text{ cm} \), \( c = 19 \text{ cm} \). Round your answer to the nearest whole unit.

A) 54 sq cm  B) 84 sq cm  C) 101 sq cm  D) 114 sq cm  E) none of these

4. Solve for \( x \):

\[
\log(2 + x) - \log(x - 5) = \log 2.
\]

A) no solution, \(-3 \neq 2\)  
B) no solution, \(7 \neq 2\)  
C) \( x = \frac{10}{9} \)  
D) \( x = 12 \)  
E) none of these

5. Find all solutions to the equation in the interval \([0, 2\pi)\).

\[
2\cos x + \sin 2x = 0
\]

A) \( x = \frac{\pi}{4} \)  
B) \( x = \frac{\pi}{2} \)  
C) \( x = \frac{\pi}{4}, \frac{3\pi}{4} \)  
D) \( x = \frac{\pi}{2}, \frac{3\pi}{2} \)  
E) none of these

For questions 6-9, use the graphs at right that represent the positions, \( s \), of a moving alien as functions of time \( t \).

6. Which graph represents the alien speeding up?

A) graph A  
B) graph B  
C) graph C  
D) graph D  
E) none of these

7. Which graph represents the alien speeding up and then slowing down?

A) graph A  
B) graph B  
C) graph C  
D) graph D  
E) none of these

8. Which graph represents the alien slowing down?

A) graph A  
B) graph B  
C) graph C  
D) graph D  
E) none of these

9. Which graph represents the alien slowing down and then speeding up?

A) graph A  
B) graph B  
C) graph C  
D) graph D  
E) none of these
10. Find the area of a regular decagon inscribed in a circle with diameter of 14 inches. Round your answer to the nearest whole unit.

A) 144 sq in  
B) 198 sq in  
C) 576 sq in  
D) 793 sq in  
E) none of these

For questions 11-13, use the graph of function $f$ at right.

11. $f(1) =$

A) 0  
B) 1  
C) 2  
D) does not exist  
E) none of these

12. $\lim_{x \to 1^{-}} f(x) =$

A) 0  
B) 1  
C) 2  
D) does not exist  
E) none of these

13. $\lim_{x \to 1} f(x) =$

A) 0  
B) 1  
C) 2  
D) does not exist  
E) none of these

14. If $\lim_{x \to 3} g(x) = 2$ and $\lim_{x \to 3} h(x) = 9$, then determine $\lim_{x \to 3} \frac{g(x)h(x)}{x}$.

A) 3  
B) 6  
C) 18  
D) 27  
E) none of these

15. A recent study suggests that 61% of the population swallow at least one spider per year in their sleep. Based on this study, what is the probability that exactly 7 of 10 randomly selected people have swallowed at least one spider in their sleep in the past year? Round your answer to the nearest percent.

A) 22%  
B) 43%  
C) 61%  
D) 70%  
E) none of these

16. Find the coefficient of the $x^5y^8$ term in the binomial expansion $(x + y)^{13}$.

A) 40  
B) 56  
C) 520  
D) 1287  
E) none of these

17. A cable news show host asks his viewers to visit his website and respond to an online poll. What type of sampling is this?

A) convenience  
B) random  
C) voluntary response  
D) systematic  
E) none of these

18. A coach wants to select 3 of her 15 basketball players at random to lead warmups before practice each week. The coach assigns each player a number from 01 to 15. Use the line of random numbers to choose the three players.

A) 01, 06, 09  
B) 01, 09, 12  
C) 01, 06, 10  
D) 03, 10, 11  
E) none of these

19. The probability that a dessert sold at a certain café contains chocolate is 86%. The probability that a dessert containing chocolate also contains nuts is 30%. Find the probability that a dessert chosen at random contains nuts given that it contains chocolate. Round your answer to the nearest percent.

A) 29%  
B) 30%  
C) 35%  
D) 86%  
E) none of these
TEAM 11-12 2018 Answer Key

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