1. The domain of $f(x) = \sqrt{\dfrac{x}{25 - x^2}}$ is

   A) $[0, 5)$ B) $(-5, 5)$ C) $(-\infty, 5)$ D) $[0, \infty)$ E) $(-\infty, -5) \cup [0, 5)$

2. If $f(x) = 3x + 5$, then $f^{-1}(2) =$

   A) $-\dfrac{5}{3}$ B) $-\dfrac{5}{6}$ C) -1 D) 11 E) none of these

3. If $3x + 2y = r$ and $5x - 3y = s$, then $4x + 3y =$

   A) $\dfrac{27r - s}{19}$ B) $18r - 12s$ C) $\dfrac{4r - 3s}{5}$ D) $\dfrac{11r + 2s}{6}$ E) none of these

4. $\displaystyle\sum_{k=1}^{\infty} \left(\frac{2}{7}\right)^{2k-1}$

   A) $\dfrac{4}{49}$ B) $\dfrac{14}{45}$ C) $\dfrac{2}{5}$ D) 7 E) ∞

5. There are 360 ways to arrange the six letters A, A, C, M, T, Y into six-letter "words". (The two A's are indistinguishable.) If these are placed in alphabetical order, in what position would "AMATYC" fall?

   A) 48th B) 52nd C) 54th D) 56th E) none of these

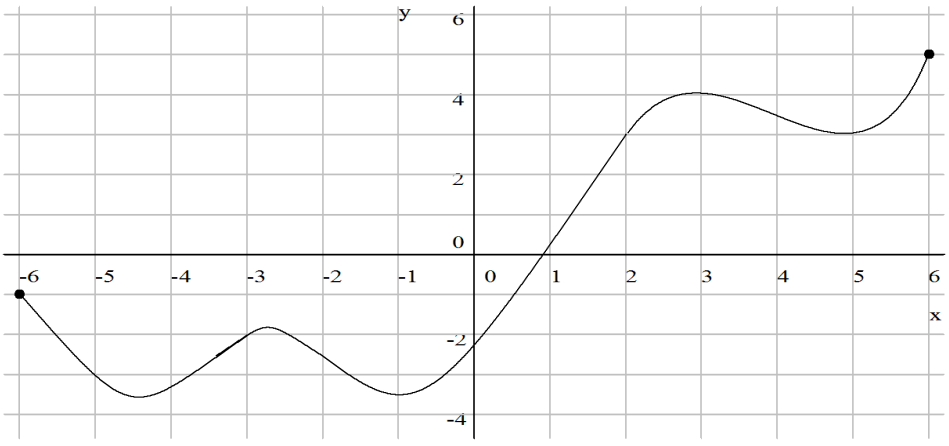
6. The mean of five positive integers is 10 and the (unique) mode is 20. The number of possible values for the median is

   A) 1 B) 2 C) 3 D) 4 E) 5

7. If the points $(1, 1)$, $(4, 5)$, and $(9, y)$ lie on a straight line, then $y =$

   A) 11 B) 12 C) $\dfrac{35}{3}$ D) $\dfrac{37}{3}$ E) none of these

Questions 8-10 refer to a function f, whose graph is shown below and whose domain is $[-6, 6]$.



8. How many solutions does the equation $f(x) + 3 = 0$ have?

   A) 0 B) 1 C) 2 D) 3 E) 4

9. Solve for x: $f(2x + 1) = 5$

   A) 2 B) 2.5 C) 6 D) There is one solution, but it is none of these.

   E) There is more than one solution.

10. Solve for x : $f(x) = x + 2$

A) -5 B) -2 C) 0 D) There is one solution, but it is none of these.

E) There is more than one solution.

11. Isosceles right triangles are cut from the four corners of a square piece of paper s inches by s inches so that a regular octagon is produced. The length of the legs of the isosceles right triangles, in inches, is

A) $\frac{s}{3}$ B) $\frac{5}{\sqrt{2}}$ C) $\frac{s}{1+\sqrt{2}}$ D) $\frac{s}{2+\sqrt{2}}$ E) none of these

12. The probability that a randomly chosen integer from the interval $(-2.5, 7.5)$ satisfies the inequality $x + 2 < x^2$ is

A) 0.5 B) 0.6 C) 0.7 D) 0.8 E) 0.9

13. A right triangle has perimeter k units, area k square units, and one leg of length $\sqrt{k}$ units. $k =$

A) $13 + 8\sqrt{3}$ B) $19\sqrt{2}$ C) 27 D) $14 + 6\sqrt{5}$ E) none of these

14. An asymptote of $2x^3 - (y+3)x^2 + 2(x-1) - y = 0$ is

A) $x = -1$ B) $x = 1$ C) $y = 2$ D) $y = -3$

E) None of these are asymptotes.

15. If the two zeros of a quadratic function P are z_1 and z_2 and $P(0) = k$, then $P(r) =$

A) $k(r - z_1)(r - z_2)$ B) $z_1 r^2 + z_2 r + k$ C) $r^2 + (z_1 + z_2)r + k$

D) $r^2 - (z_1 + z_2)r + k$ E) $\frac{k}{z_1 z_2}(r - z_1)(r - z_2)$

16. Four points, A, B, C, and D are situated in a plane such that $\overline{AB} = 4$, $\overline{BC} = 3$, $\overline{CD} = 2$, and $\overline{DA} = 1$. The greatest possible value for the measure $\measuredangle ABC$ is

A) $\frac{\pi}{3}$ B) $\frac{\pi}{4}$ C) $\tan^{-1}\left(\frac{3}{4}\right)$ D) $\tan^{-1}\left(\frac{4}{3}\right)$ E) $\cos^{-1}\left(\frac{2}{3}\right)$

17. $\sqrt{9 + \sqrt{9 + \sqrt{9 + \sqrt{9 + \ldots}}}} =$

A) π B) $\frac{13}{4}$ C) $\sqrt{10}$ D) $\frac{1+\sqrt{37}}{2}$ E) $\frac{3+\sqrt{10}}{2}$

18. The sum of n consecutive odd whole numbers is 1477, where $n > 1$. What is the least of these n whole numbers?

A) 53 B) 91 C) 137 D) 205 E) There is not enough information given.

19. $\triangle ABC$ has $\measuredangle C = 90°$ and $\overline{AC} = 5$. Point D is located on BC so that $\overline{CD} = 1$ and $\measuredangle DAC = \measuredangle DAB$. Find $\overline{BD}$.

A) 1 B) $\frac{13}{12}$ C) $\frac{11}{10}$ D) $\frac{7}{6}$ E) $\frac{6}{5}$

20. A certain kind of coated candy bits comes in n colors. The probability that a randomly chosen bit has color c_i is p_i, where $\sum_{i=1}^{n} p_i = 1$. If n bits are chosen at random from a very large vat of candy bits, what is the probability that all n colors are represented in the sample?

A) $n! \prod_{i=1}^{n} p_i$ B) $\sum_{i=1}^{n} c_i p_i$ C) $\prod_{i=1}^{n} c_i p_i$ D) $\sum_{i=1}^{n} p_i^n$ E) $\sum_{i=1}^{n} \sum_{j=1}^{n} p_i^{n-1} p_j$