1. Find the product of the two largest of 3 consecutive even integers where eleven times the smallest exceeds five times the sum of the other two by 42.

a) 5328 b) 5624 c) 5928 d) 6240 e) none of these

2. Find $3*(2*1)$ whenever $x*y=\dfrac{4x-5y}{6xy}$.

a) $\dfrac{43}{18}$ b) $\dfrac{41}{18}$ c) $\dfrac{37}{18}$ d) $\dfrac{35}{18}$ e) none of these

3. Find $29xy$ whenever $4\frac{5}{6}x=8\frac{1}{5}$ and $10y-8=42$.

a) 243 b) 244 c) 245 d) 246 e) none of these

4. Find the number of square units of area for a rectangle whose perimeter is 160 provided that this rectangle becomes a square when the length is decreased by 19 and the width is increased by 19.

a) 1233 b) 1235 c) 1237 d) 1239 e) none of these

5. The base 4 representation of x is 133. Find the representation for $x+1$ in base five.

a) 121 b) 120 c) 113 d) 112 e) none of these

6. Two men have invested money in the same business activity. At the end of one year, they divide their total profit of \$3000 so that the difference of the two amounts is one-third of their average. Find the ratio of the larger share of the profits to the smaller share of the profits.

a) $\dfrac{7}{3}$ b) $\dfrac{7}{4}$ c) $\dfrac{7}{5}$ d) $\dfrac{7}{6}$ e) none of these

7. Find $a+b$ whenever $\frac{x}{a}+\frac{y}{b}=1$ is the equation of the straight line with slope $-\frac{2}{3}$ and which passes through the point (6, 9).

a) 30.5 b) 31.5 c) 32.5 d) 33.5 e) none of these

8. Find $f(g(-10))-g(f(2))$, whenever $f(x)=4x+10$ and $g(x)=8-2x$.

a) 147 b) 148 c) 149 d) 150 e) none of these

9. Find the SUM of the real numbers which belong to set A where set A consists of the solutions of $|2x-5|=6$ or $|x+8|=20$.

a) -11 b) -10 c) -9 d) -8 e) none of these

10. Joe lives 36 miles from a river. His average speed going to the river is twice that of the return trip from the river to his home. Find Joe's average speed for the return trip if his total travel time for both parts of the trip was six hours.

a) 12 mph b) 9 mph c) 8 mph d) 6 mph e) none of these

11. What is the contrapositive of the inverse of the converse of the statement "Not X only if Y?"

a) X implies Y b) Y implies X c) Not X implies Y
d) Not Y implies X e) none of these

12. Two adjacent angles form a linear pair whenever their sum is 180°. Angle EAM and angle EAR form a linear pair. Angle EAM = $(2x^2+17)°$ and angle EAR = $(13-20x)°$. Find the complement of the acute angle of this linear pair.

a) 23° b) 24° c) 25° d) 26° e) none of these

13. A circle is circumscribed about an equilateral triangle whose perimeter is 18. Find the number of square units of area inside the circle and outside the triangle. Round the final answer to the nearest 0.001.

a) 22.111 b) 22.112 c) 22.113 d) 22.114 e) none of these

14. Find the number of cubic units of volume in the smallest right circular cylinder that can contain a sphere whose diameter is 10.

a) 200π b) 225π c) 250π d) 300π e) none of these

15. Find the number of square units of area for the region which lies above the graph of $y = |x|$ and inside the graph of the circle $x^2 + y^2 = 13$. Round your final answer to the nearest 0.001.

a) 10.213 b) 10.212 c) 10.211 d) 10.210 e) none of these

16. Find the length of the shortest line segment which can be drawn from the straight line $y = \frac{-2}{3}x + 2$ to the origin. Round your final answer to the nearest 0.001.

a) 1.663 b) 1.664 c) 1.665 d) 1.666 e) none of these

17. Find a – b – c where $y = ax^2 + bx + c$ is a function whose zeros are –1 and 2 and whose *y*-intercept is –4.

a) 11 b) 10 c) 9 d) 8 e) none of these

18. Which of the following relations are NEITHER even NOR odd?

a) $A(x) = \frac{x^2}{2x^2 + 5}$ b) $B(x) = 3x - 5x^3$ c) $C(x) = \frac{2x}{x^2 + 5}$

d) $D(x) = x^2 + 5$ e) none of these

19. Find the perimeter of the triangle where two sides and the included angle are 2, 3, and 60°, respectively. Round your final answer to the nearest 0.001.

a) 7.646 b) 7.645 c) 7.644 d) 7.643 e) none of these

20. Find the perimeter of the triangle having angles of 55° and 60° where the side opposite the 60° angle has length 10. Round your final answer to the nearest 0.001.

a) 29.925 b) 29.926 c) 29.927 d) 29.928 e) none of these

21. Find the limit of $\frac{f(x)-f(c)}{x-c}$ as x approaches c where $f(x)=6x^{-2}$.

a) $-12c^2$ b) $\frac{-6}{c^2}$ c) $\frac{-12}{c^3}$ d) No limit e) none of these

22. Find the limit of $f(x)$ as x approaches 3 where $f(x)=\begin{cases}\frac{x^2-9}{x-3} \text{ when } x\neq 3\\ 0 \text{ when } x=3\end{cases}$.

a) 6 b) 3 c) 0 d) No limit e) none of these

23. A particle moves along the x-axis according to the position function $X(T)=T^3-6T^2+9T$ where T is the time in seconds. Find the acceleration when the velocity is zero.

a) 0 or 4 b) 1 or 3 c) ±6 d) 1 or –3 e) none of these

24. Find $m-b$ where $y=mx+b$ is the equation of the straight line which is normal to the graph of $y=3x^2-4x+5$ at $x=2$.

a) $\frac{-75}{8}$ b) $\frac{-73}{8}$ c) $\frac{-71}{8}$ d) $\frac{-69}{8}$ e) none of these

Solutions

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