1. Given: $\frac{a+b}{a}=3$ and $\frac{c+b}{c}=5$. Find $\frac{c}{a}$

a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{3}{5}$ d) $\frac{5}{3}$ e) None of these

2. One-third of the faculty at SHHS are women. Twelve of the men faculty are single and ¾ of the men faculty are married. Find the total number of faculty members.

a) 96 b) 84 c) 75 d) 72 e) None of these

3. When you reduce 80 by *x*%, you get 26. Find *x*.

a) 67.5 b) 65 c) 62.5 d) 60 e) None of these

4. Find *x* in terms of *a* and *b*, when $\frac{10}{x}=\frac{\frac{10}{a}}{b}$.

a) $a-b$ b) $\frac{1}{ab}$ c) $\frac{b}{a}$ d) $\frac{a}{b}$ e) None of these

5. If the integer *x* divided by 6 leaves a remainder of 2, then $(x+5)$ divided by 6 has what remainder?

a) 5 b) 4 c) 3 d) 1 e) None of these

6. At 10:30 am, a 6-foot tall man casts a shadow 30 inches long and another man nearby casts a shadow 28 inches long. Find the height of this other man.

a) 67 in. b) 67.2 in. c) 67.4 in. d) 67.6 in. e) None of these

7. A car starts at point A and goes 26 miles east, then 24 miles north, then 8 miles west stopping at point P. Find the distance from A to P.

a) 28 miles b) 30 miles c) 32 miles d) 34 miles e) None of these

8. Find the sum of the number of diagonals and the number of sides of a regular polygon whose interior angles are each 120°.

a) 14 b) 15 c) 16 d) 17 e) None of these

9. Which of the following numbers is equal to 42_7 ?

a) 34_9 b) 51_6 c) 132_4 d) 29_{10} e) None of these

10. Find the distance between the points (-13, 20) and (-40, 12).

a) $\sqrt{793}$ b) $\sqrt{795}$ c) $\sqrt{797}$ d) $\sqrt{799}$ e) None of these

11. The sum of the diagonals of a square is 20. Find the perimeter of this square.

a) 25 b) $\sqrt{50}$ c) $\sqrt{200}$ d) $\sqrt{400}$ e) None of these

12. If the sum and product of the roots of $2x^2 = 5x - 13$ are denoted by S and P, find $(S + P)^2$.

a) 16 b) 64 c) 81 d) 324 e) None of these

13. Find the sum of the first 71 positive multiples of five.

a) 12,650 b) 12,700 c) 12,750 d) 12,800 e) None of these

14. How many ways can 6 boys and 5 girls sit in a row if the boys all sit together and the girls all together?

a) 168,400 b) 172,800 c) 174,200 d) 176,500 e) None of these

15. If the inverse of $y = 13 - 5x$ is written in the form $y = mx + b$, find $m + b$.

a) 2.2 b) 2.3 c) 2.4 d) 2.5 e) None of these

16. Bo makes 60% of his free throws. Find the probability that he will make exactly two out of five.

a) $\frac{136}{625}$ b) $\frac{138}{625}$ c) $\frac{142}{625}$ d) $\frac{144}{625}$ e) None of these

17. Given $\log_x y = 15$ and $\log_y w = 4$, find $\log_x w$.

a) $\frac{1}{4}$ b) 4 c) 9 d) 15 e) None of these

18. If $f(x) = y$ contains the point (a, b), then the new equation $f\left(\frac{x-6}{2}\right) = 5y$ will send (a, b) to the new location (h, k). Find $h - a + 20k$.

a) $a + 5b - 6$ b) $a + 4b + 6$ c) $2a - 4b + 6$ d) $2a + 4b - 6$ e) None of these

19. An airplane is headed (aimed) 40° north of west. Airspeed is 300 mph. The wind is 30 mph from the southwest. Find the groundspeed in mph. Round your answer to 0.001 mph.

a) 298.879 mph b) 298.881 mph c) 298.883 mph d) 298.885 mph e) None of these

20. Find the distance from the straight line $3x + 4y = 6$ to the point (2, 3).

a) 2.1 b) 2.2 c) 2.3 d) 2.4 e) None of these

21. The solution of $\log(7x - 3) = 2 + \log(3x - 6)$ is the number $\frac{p}{q}$ where p and q are relatively prime positive integers. Find $p + q$.

a) 890 b) 891 c) 892 d) 893 e) None of these

22. Evaluate $\lim_{x \to -\infty} \frac{\sqrt{8x^2 + 9}}{3x + 5}$

a) $\frac{-2\sqrt{3}}{3}$ b) $\frac{-2\sqrt{2}}{3}$ c) $\frac{-2\sqrt{3}}{4}$ d) $\frac{-3\sqrt{2}}{2}$ e) None of these

23. Given $\frac{x^2}{16} + \frac{y^2}{9} = 1$, find $\frac{dy}{dx}$ where $x = -\sqrt{3}$ in the second quadrant.

a) $\frac{\sqrt{39}}{13}$ b) $\frac{\sqrt{39}}{26}$ c) $\frac{3\sqrt{39}}{52}$ d) $\frac{5\sqrt{39}}{52}$ e) None of these

24. Evaluate $\lim_{x \to \infty} \left[\sqrt{25x^2 + 6x} - 5x \right]$.

a) .6 b) .625 c) $.6\overline{3}$ d) $.6\overline{6}$ e) None of these

Solutions:

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