1. If a car runs then it has gasoline. Any car with gasoline needs oil. My car does not need oil. What valid conclusion may be reached using the previous premises?

a. My car runs. b. My car does not run. c. My car needs gas.
d. My car has a full tank of gas e. not given

2. A value of y that satisifies the equation $\log(y+1) + \log(y-5) = 2 \log y$ is

a. $\frac{-5}{4}$ b. $\frac{5}{4}$ c. $\frac{4}{5}$ d. $\frac{-4}{5}$ e. not given

3. If $|5w - 9| = |4 - 3(2 - w)|$ the solution for w is

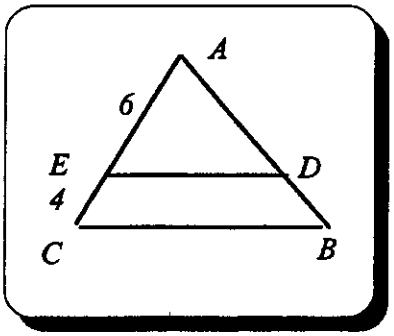
a. $\frac{7}{2}$ b. $\frac{7}{2}$ or $\frac{11}{8}$ c. $\frac{7}{2}$ or $\frac{-11}{8}$ d. $\frac{11}{8}$ e. not given

4. The graphs of $4x - 7y = 13$ and $2x - 7y = 3$ and $5x - By = 17$ all intersect at the same point. Find the value of B.

a. 1 b. 2 c. 4 d. 8 e. not given

5. A 70% mark up on the selling price brought the selling price up to \$1400. To the nearest dollar, what did the storekeeper pay for the item?

a. \$420 b. \$642 c. \$824 d. \$980 e. not given

6. 

Given the diagram above as marked. If the area of $\Delta ADE = 24$, find the area in square units of trapezoid EDBC.

a. 200 b. $66\frac{2}{3}$ c. $42\frac{2}{3}$ d. 24 e. not given

7. If two sides of a triangle are 6 and 10 and the included angle is 120°, the area of the triangle is

a. 15 b. 30 c. $15\sqrt{3}$ d. $30\sqrt{3}$ e. not given

8. How many negative integral values satisfy $-2 \le x^2 + 3x \le 4$.

a. 6 b. 5 c. 4 d. 2 e. not given

9. Analytic geometry was independently discovered by two gifted mathematicians. They were

a. Descartes & Gauss b. Descartes & Pascal c. Newton & Huygens
d. Fermat & Descartes e. not given

10. Find the length of the tangent segment from (3, 7) to the circle with the equation $(x+4)^2+(y-1)^2=25$.

a. $\sqrt{110}$ b. $\sqrt{85}$ c. $2\sqrt{15}$ d. 5 e. not given

11. Barry can mow a football field with a push mower in 7 hours, and Lew can mow the same field in 2.5 hours with a riding lawn mower. Barry starts mowing at 8 a.m., and Lew starts mowing at 8:30 a.m. If a rain storm forces them to stop at 9 a.m., what fractional part of the field still needs to be mowed?

a. $\frac{12}{35}$ b. $\frac{5}{6}$ c. $\frac{23}{35}$ d. $\frac{33}{35}$ e. not given

12. Where defined, $\frac{a^2b^{-1}-b^2a^{-1}}{a^{-2}+a^{-1}b^{-1}+b^{-1}}$ is equivalent to

a. $\frac{ab(a-b)}{b^2+ab+a^2}^3$ b. $ab(a-b)$ c. $\frac{a^2-b^2}{ab(a^2+ab+b^2)}$ d. a- b e. not given

13. A committee of 6 people is to be selected from 8 deomcrats, 5 Republicans, and 2 Independents. What is the probability that the committee selected consists of 2 people from each party?

a. $\frac{1}{10}$ b. $\frac{19}{140}$ c. $\frac{1}{280}$ d. $\frac{8}{143}$ e. not given

14. If the quadratic function in the form $y = ax^2 + bx + c$ has its maximum point at (-1, 17) and passes through the point (7, 1); find a + b + c.

a. $\frac{13}{4}$ b. 16 c. 17 d. 47 e. not given

15. How many negative integers satisfy the inequality $\frac{2x-1}{x^2-9} \geq 0$

a. 0 b. 1 c. 2 d. 3 e. not given

16. How many 2-digit numerals in base 8 are also 2-digit numerals when converted to base 9?

a. 55 b. 56 c. 63 d. 64 e. not given

17. Solve the two equations below over the set of complex numbers. What is the sum of the solutions?

$$2^{x+2} - 2^x = 192 \text{ and } x^{\frac{1}{2}}\left(x^{\frac{1}{2}} + x^{\frac{3}{2}}\right) = x + 16$$

a. 4 b. 6 c. 10 d. 26 e. not given

18. $Tan\left(\frac{x}{2} - \frac{\pi}{2}\right) =$

a. tan x - sec x b. $\frac{1}{2}\cot x$ c. $\tan(2x - \pi)$ d. $\sin\frac{x}{2} - \cos\frac{x}{2}$ e. not given

19. If $\frac{3^{4x+1} \cdot 4^4 \cdot 5^{2x+6}}{81^{x-1} \cdot 2^2 \cdot 25^{x+1}} = 3^a \cdot 6^b \cdot 10^c$. Find the integer value of a + b + c.

a. 9 b. 11 c. 13 d. 15 e. not given

20. There is one real root which satisfies the following equation:
$$\sqrt{x+\sqrt{2x-1}} + \sqrt{x-\sqrt{2x-1}} = 2$$
That root can be found in which interval.

a. $-2 < x < -1$ b. $-1 < x < 0$ c. $0 < x < 1$ d. $1 < x < 2$ e. not given

21. Each angle of a regular polygon measures 120. If the perimeter of this polygon is also 120, then the area of the polygon is

a. $120\sqrt{3}$ b. $240\sqrt{3}$ c. $400\sqrt{3}$ d. $600\sqrt{3}$ e. not given

22. A car travels 40 mph for 200 miles and then returns along the same route in 4 hours. What is the average rate for the trip? (If rounding is necessary, approximate to the neartest tenth mph.)

a. 46.5 b. 46 c. 45 d. 44.4 e. not given

23. If $\left(1-\sqrt{3}\right)^2 + \sqrt[4]{144} - \sqrt{75} + \frac{9^x \cdot 3^3}{81 \cdot 3^{2x-1}} - \left(\frac{1}{25}\right)^{\frac{-1}{2}} = a\sqrt{b}$
then b - a =

a. -8 b. -2 c. 2 d. 8 e. not given

24. The distance from the point (5, -2) to the line $5x - 12y + 16 = 0$ is

a. 13 b. 5 c. $\sqrt{13}$ d. 3 e. not given

25. Find the distance between the vertex of the parabola given by the equation $y^2 - 2y - 2x = 5$ and the center of the circle given by the equation $2x^2 + 2y^2 - 6x + 20y + 42 = 0$

a. $\frac{\sqrt{157}}{2}$ b. $\frac{15}{2}$ c. $\frac{25}{2}$ d. $81\sqrt{2}$ e. not given

26. Calculate the determinant of the matrix below:

$$\begin{bmatrix} 2 & 0 & 1 & 3 \\ -1 & 2 & 0 & 4 \\ 0 & 2 & 5 & 1 \\ -1 & 3 & 0 & 1 \end{bmatrix}$$

a. -88 b. -94 c. -108 d. -114 e. not given

27. A man is three times as old as his son was at the time when the father was twice as old as his son will be two years from now. Find the son's age if the sum of their ages is 55.

a. 17 b. 16 c. 15 d. 13 e. not given

28. If $\tan x = \frac{2ab}{a^2-b^2}$ where $a > b > 0$ and $0° < x < 90°$, then $\sin x$ equals

a. $\frac{a}{b}$ b. $\frac{b}{a}$ c. $\frac{\sqrt{a^2-b^2}}{2a}$ d. $\frac{2ab}{a^2+b^2}$ e. not given

29. Find the sum of the roots for $(\log_3 x) \bullet (\log_3 x) + \log_3 x + \log_3 \frac{x^2}{81} = 0$

a. $\frac{9}{8}$ b. $\frac{17}{8}$ c. $\frac{25}{8}$ d. $\frac{33}{8}$ e. not given

30. If $f_{n+1} = f_{n-1} + 2 \bullet f_n$ for n = 2, 3, 4, ... and $f_1 = 1$ and $f_2 = 1$, then $f_5 =$

a. 7 b. 11 c. 21 d. 41 e. not given