

1. Find the sum of the solutions for  $2 + \frac{5}{3x-1} = \frac{-2}{(3x-1)^2}$
- A.  $\frac{1}{3}$                       B.  $-\frac{1}{3}$                       C.  $\frac{1}{6}$                       D.  $-\frac{1}{6}$                       E. NOTA
2. Find the speed of the current of a river if a boat travels 12 mph, taking 1 hr 4 min to go 6 miles upstream and return 6 miles downstream.
- A.  $4\sqrt{10}$                       B. 3                      C. 2.5                      D.  $\frac{13}{4}$                       E. NOTA
3. Find the product of the roots of the equation  $16x^2 - 16x = -1$ .
- A.  $\frac{-5}{16}$                       B.  $\frac{1}{4}$                       C.  $\frac{1}{16}$                       D.  $\frac{1}{2}$                       E. NOTA
4. State the smallest value of the range of the function  $f(x) = 3x^2 - 12x + 2$
- A. -3                      B. 3                      C. 2                      D. -10                      E. NOTA
5. Solve for y:  $|4y - 5| + 4 < 7y + 8$ .
- A.  $y > -3$                       B.  $-\frac{1}{11} < y < 3$                       C.  $y > \frac{1}{11}$                       D.  $-3 < y < \frac{1}{11}$                       E. NOTA
6. Give the equation of a line that is  $\perp$  to the graph of  $\frac{3}{4}x - \frac{1}{4}y = -\frac{1}{2}$  and passes through the point (2, -3).
- A.  $x - 3y = 4$                       B.  $x + 3y = -4$                       C.  $3x - 3y = 4$                       D.  $x + 3y = -8$                       E. NOTA
7. The sum of seven consecutive integers is 980. How many of them are prime?
- A. 3                      B. 2                      C. 1                      D. 4                      E. NOTA
8. Six faces of an unusual die are labeled 1, 2, 3, 5, 7, and 9. If two of the die are rolled and the numbers shown on the upper faces are added, what is the probability of rolling a sum of 10?
- A.  $\frac{5}{36}$                       B.  $\frac{1}{12}$                       C.  $\frac{5}{18}$                       D.  $\frac{25}{36}$                       E. NOTA
9. If doughnuts are piled in a pyramid with one doughnut in the top layer, 4 doughnuts in the 2<sup>nd</sup> layer from the top, 9 in the 3<sup>rd</sup> layer from the top and 16 in the 4<sup>th</sup> layer, how many doughnuts will be needed to make a pyramid with 11 layers?
- A. 385                      B. 507                      C. 506                      D. 384                      E. NOTA

10. Find the sum of the roots for  $2a^{\frac{2}{3}} = 11a^{\frac{1}{3}} - 12$ .
- A. 216                      B.  $\frac{539}{8}$                       C.  $\frac{485}{8}$                       D.  $\frac{512}{8}$                       E. NOTA
11. Simplify  $\frac{x(x+2)^{-\frac{1}{2}} + (x+2)^{\frac{1}{2}}}{(x+2)^{\frac{3}{2}}}$  note:  $x \neq -2$
- A.  $\frac{2(x+1)}{(x+2)^2}$                       B.  $\frac{x(x+2)}{(x+2)^2}$                       C.  $\frac{2x+1}{(x+2)^2}$                       D.  $\frac{x}{(x+2)^2}$                       E. NOTA
12. If  $\sqrt{x+\sqrt{2x}} = 2$ , solve for x
- A. 4 & 1                      B. 2 & 8                      C. 0                      D. 2                      E. NOTA
13. You want to fill nine 1-lb tins with a holiday snack mix. You want the mix to contain the three following items: dried apple pieces which cost \$2.45 per lb., pecans which cost \$1.85 per lb, and dried cherry pieces which cost \$.80 per lb. You must spend \$15 and want the mix to contain half as many lbs of cherry pieces as dried apple slices and pecans combined. How many lbs of pecans should you buy?
- A. 3                      B. 5.75                      C. 2.5                      D. 3.6                      E. NOTA
14. What is the product of the solutions of this system of equation?  $\frac{4}{x} + \frac{1}{y} = 1$  ;  $\frac{8}{x} + \frac{4}{y} = 3$
- A.  $\frac{1}{16}$                       B. 18                      C.  $-\frac{13}{18}$                       D. 16                      E. NOTA
15. Solve for x in terms of a.  $6a^2x^2 - 11ax = 10$
- A.  $-\frac{2}{3a}$  &  $\frac{5}{2a}$                       B.  $-\frac{5}{6a}$  &  $-\frac{2}{a}$                       C.  $-\frac{5}{2a}$  &  $\frac{2}{3a}$                       D.  $\frac{2}{a}$  &  $-\frac{5}{6a}$                       E. NOTA
16. Write a quadratic equation with the given solutions.  $x = \frac{-5 \pm \sqrt{13}}{2}$
- A.  $x^2 + 20x - 144 = 0$                       B.  $4x^2 + 25x - 13 = 0$                       C.  $4x^2 - 20x - 12 = 0$                       D.  $x^2 + 5x + 3 = 0$                       E. NOTA
17. Let  $f(x) = 2x - 3$ . Find  $\frac{f(1+h) - f(1)}{h}$ , ( $h \neq 0$ ).
- A. 1                      B. -2                      C.  $\frac{2(h-3)}{h}$                       D. 2                      E. NOTA
18. Let  $f(x) = 1 - \frac{x}{2}$ . Find  $f(f(f(x)))$ .
- A.  $\frac{6-x}{8}$                       B.  $1 - \frac{x}{4}$                       C.  $\frac{2+x}{4}$                       D.  $\frac{6+x}{4}$                       E. NOTA

19.  $\left| \frac{1}{6} - \frac{2}{3}x \right| \leq \frac{3}{4}$ , solve for x.

- A.  $-\frac{11}{8} \leq x \leq \frac{7}{8}$       B.  $-\frac{3}{8} \leq x \leq \frac{15}{8}$       C.  $-\frac{7}{8} \leq x \leq \frac{11}{8}$       D.  $-\frac{7}{18} \leq x \leq \frac{11}{18}$       E. NOTA

20. Simplify completely.  $\frac{a^3b - 2a^2b^2}{c^2b + cbd} \div \frac{2ab - a^2}{c^2d + c^3}$  (Assume all denominators not equal to zero)

- A.  $-a^2c$       B.  $c$       C.  $-ac$       D.  $a^2c^2$       E. NOTA

21. Write an equation of the line in  $ax + by = c$  form given: x-intercept =  $-\frac{2}{3}$  and y-intercept =  $\frac{4}{5}$

- A.  $9x - 10y = -6$       B.  $6x - 5y = -4$       C.  $10x + 15y = 12$       D.  $6x + 5y = 4$       E. NOTA

22. Solve  $\left| \frac{x+1}{3} \right| - |x| = 0$

- A.  $-\frac{1}{2}, \frac{1}{4}$       B.  $-4, 1$       C.  $-\frac{1}{2}, 2$       D.  $-\frac{1}{4}, \frac{1}{2}$       E. NOTA

23. Lucy paints a room in 7 hours. Katie could paint the same room in 5 hours. How long will it take them to paint the room together? Answer in hours and minutes.

- A. 2 hr 55min      B. 2 hr 11min      C. 2 hr 40min      D. 3 hr      E. NOTA

24. Find  $(f - g)(x)$  if  $f(x) = x^2 + 5x - 6$  and  $g(x) = \frac{x+6}{x-1}$ ,  $x \neq 1$ .

- A.  $\frac{x(x^2 + 4x - 12)}{x-1}$       B.  $\frac{x^3 + 4x^2 - 12x + 12}{x-1}$       C.  $\frac{x^2 + 4x - 12}{x-1}$       D.  $\frac{x^2 + 4x}{x-1}$       E. NOTA

25. Solve for x.  $8x^4 - 38x^2 = -45$

- A.  $x = \pm \frac{3}{2}, \pm \frac{\sqrt{10}}{2}$       B.  $x = \pm \frac{3}{2}, \pm \frac{\sqrt{10}}{2}$       C.  $x = \pm \frac{2}{3}, \pm \frac{\sqrt{10}}{5}$       D.  $x = \pm \frac{2}{3}, \pm \frac{\sqrt{10}}{2}$       E. NOTA

TB 1. Solve for x.  $\sqrt{4x+5} + 5 = 2x$

TB 2. Eleven points are all on a circle. How many ways can these points be chosen to be vertices of a pentagon?

TB 3. Find the sum of the series  $2 + 4 + 8 + \dots + 128$