

LOUISIANA MU ALPHA THETA STATE CONVENTION
THETA INDIVIDUAL TEST 2012

1. Simplify: $[1 - 12 - (-3)] - |-15 - 18|$
2. A change purse contains 20 coins consisting of nickels and dimes and having a total value of \$1.40. How many nickels are there?
3. Solve: $\left| \frac{x-1}{2} \right| < 3$
4. Find the equation of the line in standard form containing the points $(-4, 1)$ and $(2, -3)$.
5. Solve: $2x^2 = 7x + 4$
6. Solve: $-\frac{20}{3} \leq -\frac{2}{3} - 2y \leq \frac{10}{3}$
7. Give the coordinate of the point of intersection of the lines $3x + 2y = 8$ and $5x - 3y = 7$
8. Find the greatest common factor: $90xy^2z^3$, $300x^2y^2z^2$, $120z^4$
9. Express in simplest form without negative exponents: $\left(\frac{2x^{-3}}{3y^{-4}} \right)^{-2} \left(\frac{-6x^{-1}y^0}{y^{-6}} \right)$
10. Solve: $\frac{4}{3x+2} = \frac{1}{x-2}$

11. Find the value of k so that the line $(2+k)x + (2-k)y = 15$ has slope $\frac{3}{2}$
12. Solve: $\sqrt{z-2} = z-4$
13. Solve: $x^2 + 5 = 4x$
14. Find the remainder when $2x^3 + 9x^2 - 4x - 24$ is divided by $x + 4$
15. What point is the center of the circle with equation $x^2 + y^2 - 6x + 2y - 6 = 0$?
16. Solve: $\log_6 x + \log_6 (x+1) = 1$
17. Solve for the matrix $X_{2 \times 2}$: $X + 2 \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix} = -\frac{1}{3} \begin{bmatrix} -6 & 0 \\ 9 & -3 \end{bmatrix}$
18. If $f(x) = \sqrt{x+4}$ and $g(x) = x+2$, find $f(g(10)) - g(f(5))$
19. Solve: $4^{2x-1} = 32^{x-3}$
20. A cube is increased to form a new cube so that the surface area of the new cube is 9 times that of the original cube. By what factor is the volume of the cube increased?

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THETA INDIVIDUAL TEST 2012 – SOLUTIONS

1. -41
2. 12
3. $-5 < x < 7$
4. $2x + 3y = -5$
5. $-\frac{1}{2}, 4$
6. $-2 \leq y \leq 3$
7. $(2,1)$
8. $30z^2$
9. $-\frac{27x^5}{2y^2}$
10. 10
11. 10
12. 6
13. $2 \pm i$
14. 8
15. $(3,-1)$
16. 2
17. $\begin{bmatrix} 0 & 0 \\ 3 & -3 \end{bmatrix}$
18. -1
19. 13
20. 27