Equations and Inequalities

Name_____

1. The solution of $|2x - 3| < 5$ is

[1] $(-\infty,-1)\cup(4,\infty)$ [2] (-1, 4) [3] $(-1,\infty)$ [4] $(-\infty,4)$

1._____

2. What is the solution set of the equation $\frac{x}{x-4}-\frac{1}{x+3}=\frac{28}{x^2-x-12}$?

[1] { } [2] {4, 6} [3] {-6} [4] {4}

2._____

3. In the equation $x^2 - 7x + 2 = 0$, the sum of the roots exceeds the product of the roots by

[1] 9 [2] [3] -9 [4] -5

3._____

4. The roots of the equation $3x^2 - 4x + 2 = 0$ are

[1] $\frac{1\pm\sqrt{2}}{3}$ [2] $\frac{2\pm\sqrt{10}}{3}$ [3] $\frac{2\pm i\sqrt{2}}{3}$ [4] $4\pm\frac{i\sqrt{2}}{3}$

4._____

5. The roots of the equation $2x^2 + 3x + 2 = 0$ are

[1] real, rational, and equal [3] real, irrational, and unequal

[2] real, rational, and unequal [4] imaginary

5._____

6. When solved by the method of completing the square, the solutions to the equation $-8x = 4x^2 - 1$ are

[1] $\frac{-2\pm\sqrt{5}}{2}$ [2] $\frac{2\pm\sqrt{5}}{2}$ [3] $\frac{2\pm\sqrt{2}}{2}$ [4] $\frac{-2\pm\sqrt{2}}{2}$

6._____

7. What are the solution(s) to the system of equations $y = x^2 - 9$ and $y - 3 = x$?

[1] (-3, 0) and (4, 7) [2] (-3, 0) [3] (4, 7) [4] no solutions

7._____

8. If $\log_5 x = 2$, what is the value of $\sqrt{x}$?

[1] $x^{\frac{2}{5}}$ [2] $\sqrt{5}$ [3] 5 [4] 25

8._____

9. The growth of bacteria in a dish is modeled by the function $f(t) = 2^{\frac{t}{3}}$. For which value of t is $f(t) = 32$?

[1] 8 [2] 2 [3] 15 [4] 16

9._____

10. What is the value of b in the equation $4^{2b-3} = 8^{1-b}$?

[1] 3/7 [2] 7/9 [3] 9/7 [4] 10/7

10._____

11. Which expression is equivalent to $\left(\sqrt{a^2b^{\frac{1}{2}}}\right)^{-1}$?

[1] $a^{-2}b^{-\frac{1}{2}}$ [2] $-ab^{\frac{1}{4}}$ [3] $-ab^2$ [4] $\frac{1}{ab^{\frac{1}{4}}}$

11._____

12. The volume of a soap bubble is represented by the equation $V = 0.094\sqrt{A^3}$, where A represents the surface of the bubble. Which expression is also equivalent to V?

[1] $0.094A^{\frac{3}{2}}$ [2] $0.094A^{\frac{2}{3}}$ [3] $0.094A^6$ [4] $(0.094A^3)^{\frac{1}{2}}$

12._____

13. What is the sum of $5 - 3i$ and the conjugate of $3 + 2i$?

[1] $2 + 5i$ [2] $2 - 5i$ [3] $8 - i$ [4] $8 - 5i$

13._____

14. Which equation is equivalent to $1 - \frac{6}{t^2} = \frac{1}{t}$?

[1] $(t - 3)(t + 2) = 0$
[2] $(t - 2)(t + 3) = 0$
[3] $(2t + 1)(3t - 1) = 0$
[4] $(2t - 1)(3t + 1) = 0$

14._____

15. If $\sqrt{2x-1} + 2 = 5$ then x is equal to

[1] 1 [2] 2 [3] 5 [4] 4

15._____

16. What is the solution set of the inequality $x^2 + 3x - 10 > 8$?

[1] $\{x \mid -6 < x < 3\}$
[2] $\{x \mid x < -6 \text{ or } x > 3\}$
[3] $\{x \mid -3 < x < 6\}$
[4] $\{x \mid x < -3 \text{ or } x > 6\}$

16._____

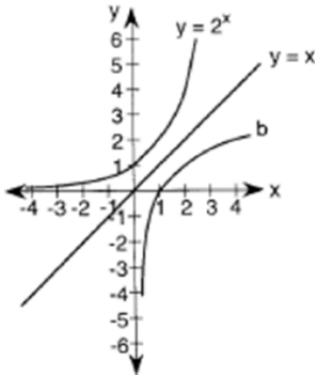
17. The flight paths of two Thunderbird jets are plotted on a Cartesian coordinate plane, and the equations of the jets' flight paths are represented by $y = 2^x + 3$ and $y = 0.5^x$. The best approximation of the intersection of the flight paths is

[1] (-1.50, 2.82) [2] (0,1) [3] (-1.72, 3.3) [4] (-2, -1)

17._____

18. In the diagram, figure b is the reflection of $y = 2^x$ in the line $y = x$. Which is an expression for the equation of figure b?

[1] $y = (-2)^x$
[2] $y = 2^{-x}$
[3] $y = \log_2 x$
[4] $y = \log_x 2$



18._____

19. A certain radioactive material decays according to the law $A = A_0e^{-0.021t}$, where A_0 is the initial amount present and A is the amount present in t years. What is the half-life of this material? Round the answer to two decimal places.

[1] 66.01 years [2] 95.24 years [3] 33.01 years
[4] impossible to determine without knowing the value of A_0

19._____

20. When solved using the quadratic formula, the solutions to the equation $3x^2 - 4x - 6 = 0$, rounded to the nearest hundredth, are

[1] 2.46, -3.79 [2] 2.23, -0.90 [3] 3.79, -2.46 [4] 0.90, -2.23

20._____