1. exponential

2. When solving exponential equations, the exponents can be set equal once a common base is found. If the bases are not the same, try solving the equation by taking a logarithm of each side. When solving logarithmic functions, each side of the equation can be exponentiated to obtain an equation with no logarithms.

3. The domain of a logarithmic function is positive numbers only, so any quantity that results in taking the log of a non-positive number will be an extraneous solution.

4. $x = y$

5. $x = -1$

6. $x = 1$

7. $x = 7$

8. $x = 1$

9. $x \approx 1.771$

10. $x \approx 2.173$

11. $x = -\frac{5}{3}$

12. $x = \frac{1}{2}$

13. $x \approx 0.255$

14. $x \approx 0.253$

15. $x \approx 0.173$

16. $x \approx 0.896$

17. about 17.6 years old

18. about 6967 years

19. about 50 min

20. about 20 min