Section: 4.2

Determine which of the following graphs belongs to each function:

1. \( y = \log_2 x \)  
2. \( y = \log_{1/2} x \)  
3. \( y = 2^x \)  
4. \( y = (1/2)^x \)

Find the domain of the functions:

5. \( f(x) = \log_3 (3x + 8) \)  
6. \( g(x) = \frac{\sqrt{1 + \ln x}}{x + 3} \)  
7. \( f(x) = \sqrt{7 - 2x} + \ln(3x + 5) \)

Evaluate the following expressions:

1. \( \log_4 2 + \log_4 8 = \)  
2. \( \log_2 40 - \log_2 5 = \)  
3. \( \log_2 \sqrt[3]{16} = \)  
4. \( \log_{10} 7 = \)  
5. \( \log_6 (36\sqrt{6}) = \)  
6. \( \log 1500 + \log 2 - \log 3 = \)
Solve the following equations:

10. \( \log_3 (7x + 8) = 2 \)
11. \( \log_y \left( \frac{19}{y} - y - 7 \right) = -1 \)
12. \( 2e^{4-5x} - 7 = 1 \)
13. \( x^2 \log_4 x - 4 \log_4 x = 0 \)
14. \( \log_x (\sqrt{x} - 2) + \log_x (\sqrt{x} + 2) = 2 \)

15. If \( \ln a = 5 \) and \( \ln b = 9 \), then \( \ln \frac{a^2}{\sqrt{b}} = \)
16. Solve for \( x \) if \( \log x - 3 \log a = \log b + 4 \log c \)

17. If \( u = 6^{2w-3} \), then find \( w \)
18. If \( f(x) = 8^x \) and \( g(x) = \log_8 x \), then \( (fog)(x) = \)

Rewrite as a single logarithm:
19. \( 2 \log_8 x + 5 \log_8 y = \)
20. \( \ln 2 + 7 \ln a - 4 \ln (a + b) = \)

Distribute the logarithm on the indicated functions:
21. \( \log \frac{2x^3}{3y^7z} = \)
22. \( \ln \sqrt[5]{\frac{5a^2}{b^4c^5}} = \)

If \( \log 2 = 0.301 \) and \( \log 3 = 0.477 \), then:
23. \( \log 0.03 = \)
24. \( \log 1/6 = \)
25. Find the \( x \) and \( y \) – intercepts of the following equation
   \( 2 + \log_2 (3y + 1) = \log_3 (1 - 2x) \)
26. If \( f(x) = \log_4 (x^3 + 1) \) and \( g(x) = \log_4 (x + 1) \), then \( (f - g)(x) = \)

Section: 4.4

Solve the following equations:
1. \( 2 \ln x = \ln (3x + 10) \)
2. \( \ln (4 - 3x) - 2 = \ln (x - 1) \)
3. \( 2 \log_5 (3/t) = -3 + 2 \log_5 t \)
4. \( \ln y - 2 \ln 10 = 9 \)
5. \( 8^{3x-1} = 32^x + 4 \)
6. \( 9^{5-2x} = \sqrt{27} \)
7. \( \log_2 (2 - x) - \log_2 (x^2 - 3x - 1) = 0 \)

Solve the following inequalities:
8. \( |7 - 2 \ln x| < 1 \)
9. \( |5 + 2 \ln x| \geq 5 \)
10. \( |(\ln x^2) - 2| \leq 4 \)