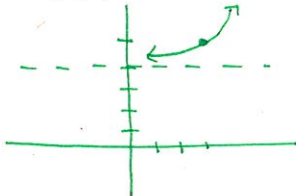


Part 1 - No Calculator

Sketch a graph of each function. Give domain and range.

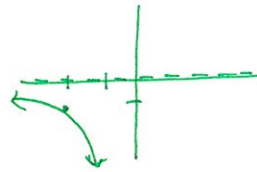
1. $f(x) = 2^{x-3} + 4$



$$D: \mathbb{R}$$

$$R: (4, \infty)$$

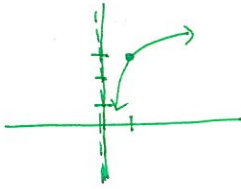
2. $f(x) = -e^{x+2}$



$$D: \mathbb{R}$$

$$R: (-\infty, 0)$$

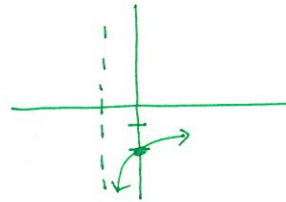
3. $f(x) = \ln x + 3$



$$D: (0, \infty)$$

$$R: \mathbb{R}$$

4. $f(x) = \log(x+1) - 2$



$$D: (-1, \infty)$$

$$R: \mathbb{R}$$

Evaluate:

5. $\log 1000$

3

6. $\ln e^7$

7

7. $\log_5 125^{10}$

$$10 \cdot \log_5 125$$

$$10 \cdot 3$$

$$\boxed{30}$$

8. $\log_{125} 25$

$$\log_{125} 5^2$$

$$2 \cdot \log_{125} 5$$

$$2 \cdot \frac{1}{3}$$

$$\boxed{\frac{2}{3}}$$

9. $\log_3 \frac{1}{27}$

-3

10. $\log_b 15$ given $\log_b 3 = 1.34, \log_b 5 = 2.15$

$$\log_b 3 + \log_b 5$$

$$1.34 + 2.15$$

$$\boxed{3.49}$$

Expand:

11. $\log_5 5x^2$

$$\log_5 5 + 2 \log_5 x$$

$$\boxed{1 + 2 \log_5 x}$$

12. $\log \frac{5\sqrt{y}}{x^2}$

$$\boxed{\log 5 + \frac{1}{2} \log y - 2 \log x}$$

Condense:

13. $\log 5 + \log x$

$$\log 5x$$

Solve:

15. $\ln(3x+5) = 0$

$$3x+5 = e^0$$

$$3x+5 = 1$$

$$3x = -4$$

$$\boxed{x = -\frac{4}{3}}$$

14. $\frac{1}{2} \ln(2x-1) - 2 \ln(x+1) + 3 \ln x$

$$\ln(2x-1)^{\frac{1}{2}} - \ln(x+1)^2 + \ln x^3$$

$$\ln \left[\frac{(2x-1)^{\frac{1}{2}} \cdot x^3}{(x+1)^2} \right]$$

16. $\log_3 x + \log_3(x-2) = 1$

$$\log_3 x(x-2) = 1$$

$$x^2 - 2x = 3$$

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1) = 0$$

$$\boxed{x=3} \quad x \neq -1$$

Part 2 - Calculator Okay

Solve each equation for x . Give the exact answer and the approximate answer rounded to the nearest hundredth.

17. $4^{x+1} + 6 = 12$

$$4^{x+1} = 6$$

$$x+1 = \log_4 6$$

$$x = \log_4 6 - 1$$

$$\boxed{x = .29}$$

19. $5^{2x} = 25^{2x+5}$

$$2x = \log_5 25^{2x+5}$$

$$2x = (2x+5) \log_5 25$$

$$2x = (2x+5) 2$$

$$2x = 4x + 10$$

$$-10 = 2x$$

$$\boxed{x = -5}$$

21. $\ln x + 5 = 1$

$$\ln x = -4$$

$$x = e^{-4}$$

$$\boxed{x = .02}$$

23. $2\log_a 3 + \log_a(x-4) = \log_a(x+8)$

$$\log_a 3^2 + \log_a(x-4) = \log_a(x+8)$$

$$\log_a 9(x-4) = \log_a(x+8)$$

$$9x - 36 = x + 8$$

$$8x = 44$$

$$x = \frac{44}{8} = \boxed{5.5}$$

18. $-2e^{2x} = 25$

$$e^{2x} = -12.5$$

$$2x = \ln(-12.5)$$

$$\boxed{\emptyset}$$

20. $\log x - 10 = 8$

$$\log x = 18$$

$$\boxed{x = 10^{18}}$$

22. $2^{x+1} = 3^x$

$$x+1 = \log_2 3^x$$

$$x+1 = x \cdot \log_2 3$$

$$x+1 = 1.58x$$

$$1 = .58x$$

$$\boxed{1.72 = x}$$

24. How long would it take an investment of \$2500 invested at 9% interest compounded continuously to grow to \$6000?

$$A = Pe^{rt}$$

$$6000 = 2500e^{.09t}$$

$$2.4 = e^{.09t}$$

$$.09t = \ln 2.4$$

$$t = \frac{\ln 2.4}{.09}$$

$$\boxed{t = 9.7 \text{ years}}$$