Practice test 4

Note: Show all work. Unless a problem is marked with an asterisk (*), use a calculator only to check or do arithmetic. All complex solutions should be of the form a + bi.

Solve the following equations algebraically.

1. $18x^2 - 12x = 0$
2. $x^2 - 6x + 12 = 0$
3. $49x^2 - 9 = 0$
4. $2x^2 - x - 6 = 0$
5. $5z^2 + z = 9$
6. $x^2 = 7$
7. $x^{\frac{2}{5}} - 11x^{\frac{1}{5}} + 28 = 0$
8. $4x^4 - 101x^2 + 25 = 0$
9. $x^4 + x^2 = 20$

10. The height of a thrown math book is given by the formula $h(t) = -16t^2 + 35t + 6$

a. When does the book reach its maximum height?
*b. What is the maximum height of the book?
*c. How long does it take for the book hit the ground?

11. Assume $7000 is deposited in an account that earns 4% interest compounded annually. How long does it take for the amount of money to grow to $10,000.

12. a. Write the equation $2^5 = 32$ in logarithmic form.
b. Write the equation $\log_r(s) = t$ in exponential form.

13. Some values of a function f are supplied in the table below.

x	f(x)
0	3
1	12
2	48
3	192
4	768

a. Assuming that f is an exponential function, find an equation for f.
*b. Find f(6)
c. What is $f^{-1}(48)$

14. Evaluate the following.

*a. $\log 33$
*b. $\ln(9)$
c. $\log_3(9)$
d. $10^{\log(3)}$
e. $\log_7\left(\sqrt[5]{7}\right)$
f. $\log_b 1$
g. $\ln\left(e^4\right)$
h. $\log_3 3^4$
*i. $\log_5 8$
j. $\log_b \sqrt{b}$

15. Below is a function $f(x)$.

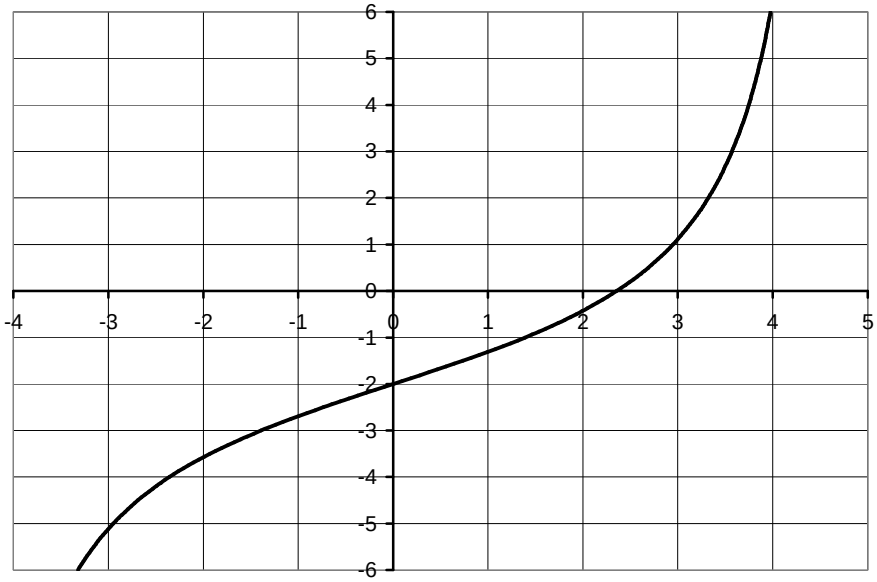
x	f(x)
0	2
1	4
2	3
3	1
4	5

a. What is $f(2)$
b. What is $f^{-1}(2)$
c. What is the domain of f?
d. What is the domain of f^{-1}?

16. Find the inverse of the following functions.

a. $y = 4x - 9$ b. $y = \ln(x)$ c. $y = 5^x$

17. The graph below is the graph of a function h. Estimate $h^{-1}(2)$



18. What is the domain and range of the following.

a. $f(x) = \log(17 - 3x)$ b. $g(x) = 5e^x + 1$

19. Simplify $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

a. If $a = 9, b = -12, \text{and } c = 20$ b. If $a = 3, b = 4, \text{and } c = 2$

20. Solve the following symbolically. Also give approximate answers using a calculator.

a. $5(2)^x = 10240$ b. $7(6^x) = 2516$

21. Solve $3x^2 + 10x = 8$ by completing the square. No credit for any other method.

22. Sketch $f(x) = 3x^2 - 5x - 2$. Label the vertex and all intercepts with their coordinates. Use exact values of the coordinates.