1) Find \( f(-1) \) when \( f(x) = 4x^3 - 2x^2 - 8x + 3 \)

2) Given \( f(x) = \frac{x + 2}{x - 3} \) and \( g(x) = \frac{x - 1}{x + 4} \), find the sum, \( (f + g)(x) \).

3) Given \( f(x) = -6x^3 + 9x^2 + 4 \) and \( g(x) = -5x^3 + 2x - 5 \), find the difference, \( (f - g)(x) \)

4) Given \( f(x) = x - 4 \) and \( g(x) = 3x + 4 \), find the product, \( (f \cdot g)(x) \)

5) Given \( f(x) = \frac{4x^2 - 9}{x^2 - 9} \) and \( g(x) = \frac{2x - 3}{x - 3} \), find the quotient, \( \left(\frac{f}{g}\right)(x) \)

6) Which of the functions is graphed below?

   \[
   f(x) = \frac{1}{2}x - 3 \\
   f(x) = -\frac{1}{2}x + 3 \\
   f(x) = \frac{1}{2}x + 3 \\
   f(x) = -2x + 3
   \]

7) Find the range.

8) Find the domain of the function: \( f(x) = \frac{x - 5}{x^2 - 6x + 9} \). Write your answer using set-builder notation
9) Find the domain of the difference of f and g, \((f - g)(x)\): \(f(x) = \frac{2}{x - 8}\), \(g(x) = -6x - 5\)

10) Find the domain of the quotient of f and g, \((f / g)(x)\): \(f(x) = \frac{2}{x - 12}\), \(g(x) = 4x - 5\)

11) The weight \(W\) of an object on the Moon varies directly as the weight \(E\) on earth. A person who weighs 145 lb on earth weighs 29 lb on the Moon. How much would a 140-lb person weigh on the Moon? Round to one decimal place, if necessary

12) The volume \(V\) of a gas varies inversely as the pressure \(P\) on it. The volume of a gas is \(230 \text{ cm}^3\) under a pressure of \(21 \text{ kg/cm}^2\). What will be its volume under a pressure of \(35 \text{ kg/cm}^2\)?

13) Solve:
\[
\begin{align*}
4x + y &= 10 \\
3x + 2y &= -5
\end{align*}
\]

The value of the \(y\) coordinate is...

14) Solve:
\[
\begin{align*}
6x - 5y &= -3 \\
-24x + 20y &= 12
\end{align*}
\]

15) A sum of money amounting to $4.25 consists of dimes and quarters. If there are 23 coins in all, how many are quarters?

16) Walt made an extra $5000 last year from a part-time job. He invested part of the money at 6% and the rest at 10%. He made a total of $420 in interest. How much was invested at 10%?

17) Find the total-profit function for the total-cost and total-revenue functions.
\[
\begin{align*}
C(x) &= 45x + 40,000 \\
R(x) &= 100x
\end{align*}
\]

18) Find the break even point (\(x\)-coordinate only) for the given total-cost and total-revenue functions. Round to the nearest whole unit.
\[
\begin{align*}
C(x) &= 20x + 34,000 \\
R(x) &= 150x
\end{align*}
\]

19) Find the equilibrium point for the pair of demand and supply functions.
\[
\begin{align*}
D(p) &= 3000 - 14p \\
S(p) &= 2440 + 2p
\end{align*}
\]

20) Graph the solution: \(x < 3\) or \(x \geq 6\)

21) Solve: \(-3x \geq 6\) and \(x + 4 > 5\) Write your answer using interval notation

22) Solve: \(|b - 2| = 5\)
23) Solve: \[ |2x + 3| < 15 \] 
Write your answer using interval notation

24) Graph the solution: \[ |2n - 4| > 2 \]

25) Match the graph below with the corresponding linear inequality
(Note: the boundary line is drawn as a dashed line)

\[
\begin{align*}
\text{y} &> x + 2 \\
\text{y} &\leq x + 2 \\
\text{y} &< x + 2 \\
\text{y} &\geq x + 2
\end{align*}
\]

26) Find the domain of the function: \[ f(x) = \sqrt{x - 2} \] 
Write your answer using set–builder notation

27) Use rational exponents to simplify: \[ \sqrt[3]{x^2} \cdot \sqrt[4]{x} \] 
Write your answer using rational exponents

28) Simplify: \[ \sqrt{20x^2y} \] 
Assume that all expressions under radicals represent nonnegative numbers.

29) Simplify: \[ \sqrt{128} + 5\sqrt{18} - 5\sqrt{50} \]

30) Simplify: \[ (\sqrt{5} - 4)(\sqrt{5} - 4) \]

31) Simplify: \[ (2 + \sqrt{7})^2 \]

32) Solve: \[ \sqrt{4x - 9} - 2 = 0 \]

33) Solve: \[ y^{1/3} - 3 = 1 \]

34) Simplify: \[ i^{14} \] 
where \( i \) is the "imaginary number"

35) Simplify: \[ i^{19} \]
36) Solve: \((3s + 4)^2 = 9\)

37) Solve: \(5x^2 + 2x = 1\)

38) Let \(f(x) = x^2 - 8x + 16\). Find \(x\) so that \(f(x) = 22\).

39) Find the \(x\)-intercepts: \(f(x) = 2x^2 + 5x - 3\)

40) Sue rowed her boat across Lake Bend and back in 3 hours. If her rate returning was 2 mph less than the rate going, and if the distance each way was 7 miles, find her rate going.
   
   Round to one decimal place, if necessary

41) Solve: \(3 + \frac{10}{x^2} = \frac{-11}{x}\)

42) Solve for \(r\): \(A = \frac{1}{3}\pi r^2\) (assume that all variables represent nonnegative numbers.)

43) Find the \(y\)-intercept: \(f(x) = 4x^2 + 10x + 3\)

44) Find the vertex: \(f(x) = -2x^2 + 20x - 47\)

45) The number of mosquitoes \(M(x)\), in millions, in a certain area depends on the June rainfall \(x\), in inches: What amount of rainfall produces the maximum number of mosquitoes?

   \[M(x) = -x^2 + 18x\]

46) The graph below is best represented by which function?
   
   (Note: the dashed curve, \(y = x^2\) is provided for reference)
47) Find the inverse, if it exists: \( f(x) = \frac{3x - 1}{2} \)

48) Given \( f(x) = 3x^2 - 5 \) and \( g(x) = \frac{5}{x} \), find \( f \circ g(x) \).

49) The graph below is best represented by which function?

![Graph with function options](image)

- \( f(x) = e^x \)
- \( f(x) = \log x \)
- \( f(x) = (0.3)^x \)
- \( f(x) = \log_{0.1} x \)

50) The graph below is best represented by which function?

![Graph with function options](image)

- \( f(x) = \left( \frac{2}{5} \right)^x \)
- \( f(x) = \log_{0.35} x \)
- \( f(x) = 10^x \)
- \( f(x) = \ln x \)

51) Solve: \( \log_9 x = \frac{1}{2} \)

52) Express in terms of \( \log_a \), \( \log_b \) and \( \log_c \): \( \log_a \frac{4c^2}{b^3} \)
53) Solve: \(5^x = 7\) (Round to the nearest ten-thousandth.)

54) Suppose that $750 is invested at 6% annual interest, compounded continuously. How much will be in the account in 4 years if no money is withdrawn?
   \(Hint: \) Use \(A = P(1 + i)^t\) or \(A = Pe^{rt},\) whichever is more appropriate.

55) Suppose that $10,000 is invested at an interest rate of 5.8\% per year, compounded continuously. What is the doubling time?
   \(Hint: \) Use \(A = P(1 + i)^t\) or \(A = Pe^{rt},\) whichever is more appropriate.
1) 5
2) \( \frac{2x^2 + 2x + 11}{(x - 3)(x + 4)} \)
3) \(-x^3 + 9x^2 - 2x + 9\)
4) \(3x^2 - 8x - 16\)
5) \(\frac{2x + 3}{x + 3}\)
6) \(f(x) = -\frac{1}{2}x + 3\)

7) \{y | -2 \leq y \leq 4\}
8) \{x | x \neq 3\}
9) \{x | x \text{ is a real number and } x \neq 8\}
10) \{x | x \text{ is a real number and } x \neq 12 \text{ and } x \neq \frac{5}{4}\}
11) 28 lb
12) 138 cm³
13) -10
14) Infinite number of solutions
15) 13 quarters
16) $3000
17) P(x) = 55x - 40,000
18) 262
19) ($35, 2510)
20) 

21) \emptyset, \text{ no solution}
22) 7, -3
23) \(-9, 6\)

24) 

25) \(y > x + 2\)
26) None of these
27) \(x^{11/12}\)
28) \(2x\sqrt{5y}\)
29) \(-2\sqrt[3]{2}\)
30) \(\sqrt{15} - 4\sqrt{3} - 4\sqrt{5} + 16\)
31) \(11 + 4\sqrt{7}\)
32) \(\frac{13}{4}\)
33) 64
34) -1
35) -i
36) \(-\frac{1}{3}, -\frac{7}{3}\)
37) \(-\frac{1}{5}, \frac{\sqrt{6}}{5}\)
38) \(4 + \sqrt{22}, 4 - \sqrt{22}\)
Answer Key
Testname: PRACTICE FINAL EXAM (MATH 11000)

39) (-3, 0) and \( \left( \frac{1}{2}, 0 \right) \)
40) 5.9 mph
41) \(-\frac{5}{3}, -2\)
42) \(r = \sqrt{\frac{3A}{\pi}}\)
43) (0, 3)
44) (5, 3)
45) 9 inches
46) \(f(x) = -3(x+2)^2 - 1\)
47) \(f^{-1}(x) = 2x^3 + 1\)
48) \(\frac{75}{x^2} - 5\)
49) \(f(x) = \log x\)
50) \(f(x) = \left( \frac{2}{5} \right)^x\)
51) 3
52) \(4\log a - 3\log b + 2\log c\)
53) 1.2091
54) $953.43
55) 12 years