

# MATH 1320 Final Examination

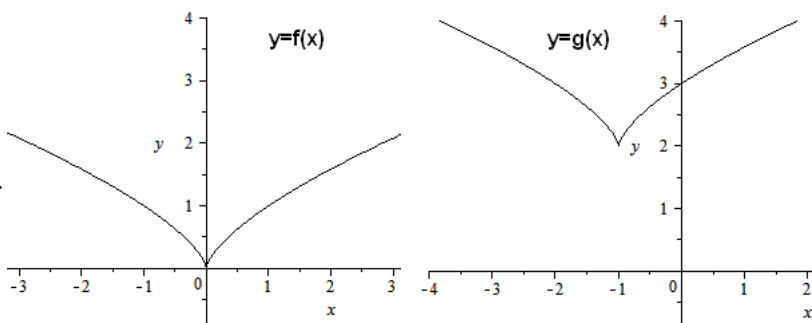
1. Find the solution of the equation  $\frac{3x}{5} - x = \frac{x}{10} - \frac{5}{2}$ .
2. Find all the solutions of the equation  $3x^2 - 6 = -8x$ .
3. Find all the solutions of the equation  $x - 2 = \sqrt{10 - x^2}$ .
4. Solve the inequality  $x^2 - 2x - 15 \geq 0$  and express the solution in interval notation.
5. Solve the inequality  $|2x + 5| - 13 \geq -6$  and express the solution in interval notation.
6. Find the equation of the line passing through  $(1, -1)$  and parallel to the line  $y = -2x + 5$ .

7. In Figure,  $f(x) = \sqrt[3]{x^2}$ . Find the expression of  $g(x)$ .

8. Let  $h(x) = \frac{x+1}{2x-1}$ ,  $k(x) = x^2$ . Find  $h(k(x))$  and  $k(h(x))$ .

9. Find the inverse function of  $h(x) = \frac{x+3}{2x-5}$ .

10. Find the quadratic function having vertex  $(-1, -4)$  and passing through  $(0, 8)$ .



Figure

11. Find all real and complex zeros of  $p(x) = x^3 + 3x^2 + 7x + 5$ .
12. Find all vertical, horizontal, or slant asymptotes of  $R(x) = \frac{x^3 - 2x^2 - x + 2}{x^2 + x - 6}$ .
13. Find the domain of the logarithm function  $f(x) = \log_9(x + 2)$  in interval notation.
14. Write the expression  $\frac{1}{2} \ln(x - 1) + \frac{1}{2} \ln(x + 1) - 2 \ln(x^2 + 1)$  as a single logarithm.
15. Solve the logarithmic equation  $\log_4(5x) - \log_4(x + 4) = 3$  exactly.
16. Simplify the expression  $e^{\ln(2x-6)} + \log_2 4^{(x-3)}$ .

17. Solve the system 
$$\begin{aligned} x_2 - 2x_3 &= -5 \\ x_1 - 2x_2 &= 3 \\ -x_1 + 3x_2 - x_3 &= -6 \end{aligned}$$
 Show your work.

18. Let  $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 3 & 1 \\ 5 & 0 & -2 \end{bmatrix}$ ,  $B = \begin{bmatrix} -1 & 7 & 2 \\ 3 & 0 & 1 \end{bmatrix}$ . Find  $BA + 5B$ . Show your work.

19. Find the value of the finite arithmetic series  $\sum_{n=1}^{100} (-2n + 5)$ .
20. Determine whether the sequence  $-2, 4, -8, 16, \dots, 2^{100}$  is arithmetic or geometric, and find its sum exactly.