

- [4] 8. Solve the system of equations:

$$4x^2 + y^2 = 13$$

$$x^2 + y^2 = 10$$
- [8] 9. (a) Which of the points $A(6, 9)$, $B(2, -3)$ is closer to the point $C(5, 0)$?
 (b) Show that the equation $x^2 + y^2 + 4x + 2y - 20 = 0$ represents a circle. Find coordinates of the center and radius of the circle.
- [6] 10. Find the domain and range of the functions (do not graph):
 (a) $f(x) = \frac{2}{(2-x)^2}$ (b) $g(x) = -\sqrt{x-3x^2}$ (c) $h(x) = 3|x+1| - 3$
- [5] 11. Sketch the graph of the function $f(x) = \log(x-4) + 2$, starting from the graph of the function $g(x) = \log x$ and using appropriate transformations.
- [8] 12. Let $f(x) = \frac{1}{x+2}$ and $g(x) = \frac{4}{x-1}$. Find:
 (a) fg (b) $\frac{f}{g}$ (c) $f \circ g$ (d) $g \circ f$
- [8] 13. (a) Find the inverse of the function $f(x) = \frac{3x}{x+2}$.
 (b) Find the vertical and horizontal asymptotes of both f and f^{-1} above.
- [5] 14. A bank wants to lend \$1,000,000 and wants to obtain an average return of 18% per year. If they lend at 19% or at 16%, how much can they lend at 16% and 19% to meet their requirements?
- [5] 15. A rectangle has an area that is numerically twice its perimeter. If the length is twice the width, what are its dimensions?
- [8] 16. Iodine 131 is a radioactive material that decays according to the function

$$A(t) = A_0 e^{-0.87t}$$
 where A_0 is the initial amount present and A is the amount present at the time t (in days). Assume that a scientist has a sample of 100 grams of iodine 131.
 (a) How much iodine 131 is left after 9 days?
 (b) When will 70 grams of iodine 131 be left?
 (c) What is the half-life of iodine 131?

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