1. Find the domain of $f(x) = \dfrac{1}{x - 4}$.

<div align="right">[8 points]</div>

2. Find the inverse of $f(x)$ in the previous problem and its domain.

<div align="right">[8 points]</div>

3. Let $f(x) = \sqrt{x-3}$ and $g(x) = x+4$. Find each of the following and their domains:

(a) $(f+g)(x)$

[3 points]

(b) $(f-g)(x)$

[3 points]

(c) $(f \cdot g)(x)$

[3 points]

(d) $(f/g)(x)$

[3 points]

(e) $(f \circ g)(x)$

[3 points]

4. Show that $f(x) = 3x + 2$ is one-to-one either graphically or algebraically.

[7 points]

5. Do the following.

(a) Express the following function in the form $f \circ g \circ h$:
$$(\sqrt{x^3} + 1)^4$$

[4 points]

(b) Find $f \circ g \circ h$:
$$f(x) = 2x - 3, \quad g(x) = x^2, \quad h(x) = \sqrt{x + 3}$$

[4 points]

6. Give the definition of a function f in terms of sets. Define range.

[7 points]

7. Solve the inequality for x.

$$2 \ln x \leq 6$$

[7 points]

8. Find x.

$$e^{2-3x} = 1$$

[7 points]

9. The monthly cost of driving a car depends on the number of miles driven. Lynn found that in May it cost her \$380 to drive 480 mi and in June it cost her \$460 to drive 800 mi.

   (a) Express the monthly cost C as a function of the distance driven d, assume a linear relationship.

   [4 points]

   (b) Using part (a), predict the cost of driving 1500 miles per month.

   [4 points]

10. Given $f(x) = 6x^2 + 1$, find and simplify $\dfrac{f(x+h) - f(x)}{h}$ (Assume $h \neq 0$.)

    [7 points]

11.Consider the function $f(x) = 3 - x^2$ and the point $P(1, 2)$ on the graph f.

(a) Graph f and the secant lines passing through $P(1, 2)$ and $Q(x, f(x))$ for x-values 2 and 1.5.

[5 points]

(b) Find the slope of each secant line.

[5 points]

12. The graph of f(x) is given. Draw the graph of f(x - 3) + 1.

[6 points]