Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.1 Practice

 ***Determine whether each relation represents a function. For each function, state the domain and range.***

1. {(-2,4),(-2,6),(0,3),(3,7)} 2. {(0,-2),(1,3),(2,3),(3,7)} 3. {(-4,4),(-3,3),(-2,2),(-1,1),(0,-4)}

***Determine whether the equation is a function.***

4. $y=\frac{1}{x}$ 5. $x=y^{2}$ 6. $2x^{2}+3y^{2}=1$

***Find the domain of each function.***

7. $f\left(x\right)=\frac{x^{2}}{x^{2}+1}$ 8. $G\left(x\right)=\frac{x+4}{x^{3}-4x}$

9. $p\left(x\right)=\sqrt{\frac{2}{x-1}}$ 10. $q\left(x\right)=\sqrt{-x-2}$

***For the given functions f and g, find the following functions and state the domain of each.***

***a) f + g b) f – g c) f*** ***g d)*** $\frac{f}{g}$

***e)*** $\left(f+g\right)(3)$ ***f)*** $\left(f-g\right)(4)$ ***g)*** $(f∙g)(2)$ ***h)***$ \left(\frac{f}{g}\right)(1)$

11. $f\left(x\right)=2x+1; g\left(x\right)=3x-2$ 12. $f\left(x\right)=\left|x\right|; g\left(x\right)=x$

13. $f\left(x\right)=\frac{2x+3}{3x-2}; g\left(x\right)=\frac{4x}{3x-2}$ 14. $f\left(x\right)=\sqrt{x+1}; g\left(x\right)=\frac{2}{x}$

15. ***Express the area A of a rectangle as function of the length x if the length of the rectangle is twice its width.***

16. ***A Boeing 747 crosses the Atlantic Ocean (3000 miles) with an airspeed of 500 miles per hour. The cost C (in dollars) per passenger is given by***

 $C\left(x\right)=100+\frac{x}{10}+\frac{36,000}{x}$

***where x is the ground speed (airspeed*** ± ***wind).***

1. ***What is the cost per passenger for quiescent (no wind) conditions?***
2. ***What is the cost per passenger with a head wind of 50 miles per hour?***
3. ***What is the cost per passenger with a tail wind of 100 miles per hour?***
4. ***What is the cost per passenger with a head wind of 100 miles per hour?***

17. ***Suppose that I(x) represents the income of an individual in year x before taxes and T(x) represents the individual’s tax bill in year x. Determine a function N that represents the individual’s net income (income after taxes) in year x.***