Mathematics 31A

Precalculus Review Problems

1. Let $g(x)=\frac{1}{x}$. After finding $\frac{g(x)-g(a)}{x-a}$, evaluate the result when $x=a$.

2. Let $f(x)=x^2-3x$. After finding $\frac{f(x+h)-f(x)}{h}$, evaluate the result using $x=-2$ and $h=0$.

In problems 3-5, the graph of the function $y=f(x)$ is a line segment joining the two points $(-2,-1)$ and $(3,2)$. In each case, after determining the graph of the indicated equation, compute the slope.

3. $y=f^{-1}(-x)$

4. $y=-f(x+3)+1$

5. $y=f(1-x)$

6. Simplify $\frac{\sin\theta+\tan\theta}{1+\sec\theta}$

7. In the expression $\frac{\sqrt{x^2-a^2}}{x}$, make the substitution $x=a\sec\theta$ and simplify.
(Assume $a>0$ and $0<\theta<\pi/2$)

8. Let $f(x)=x^2$ and $g(x)=4-x^2$. Compute $\frac{f(g(x))-f(g(a))}{g(x)-g(a)}$.

9. Solve for x

a) $(\frac{1}{8})^{3x-1}=2\cdot\sqrt{2}$ b) $3^{6x+1}=12$ c) $\ln x=-\ln(6x+1)$

10. Find the domain of $f(x)$

a) $f(x)=-\sin(3x+1)$ b) $f(x)=\frac{3(x-1)^2}{2x^2-6}$ c) $f(x)=\sqrt{7x-1}$

11. Find the equation of the line perpendicular to the line $3x+2y=5$, and having x-intercept 2. Write your final answer in the form $y=mx+b$