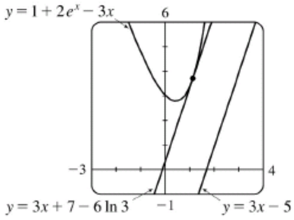
48. The slope of $y=1+2e^{x}-3x$ is given by $m=y'=2e^{x}-3$.
The slope of $3x-y=5\Leftrightarrow y=3x-5$ is 3 .
$m=3\Rightarrow 2e^{x}-3=3\Rightarrow e^{x}=3\Rightarrow x=\ln 3$. This occurs at the point $(\ln 3,\ 7-3\ln 3)\approx(1.1,\ 3.7)$.



32. We are given that $f(3)=4$, $g(3)=2$, $f'(3)=-6$, and $g'(3)=5$.

(a) $(f+g)'(3)=f'(3)+g'(3)=-6+5=-1$

(b) $(fg)'(3)=f(3)g'(3)+g(3)f'(3)=(4)(5)+(2)(-6)=20-12=8$

(c) $\left(\frac{f}{g}\right)'(3)=\frac{g(3)f'(3)-f(3)g'(3)}{[g(3)]^{2}}=\frac{(2)(-6)-(4)(5)}{(2)^{2}}=\frac{-32}{4}=-8$

(d)

$$\left(\frac{f}{f-g}\right)'(3)=\frac{[f(3)-g(3)]f'(3)-f(3)[f'(3)-g'(3)]}{[f(3)-g(3)]^{2}}$$
$$=\frac{(4-2)(-6)-4(-6-5)}{(4-2)^{2}}=\frac{-12+44}{2^{2}}=8$$

40. **(a)** $f(20)=10,000$ means that when the price of the fabric is \$20/ yard, 10 , 000 yards will be sold.

$f'(20)=-350$ means that as the price of the fabric increases past \$20/ yard, the amount of fabric which will be sold is decreasing at a rate of 350 yards per (dollar per yard).

(b) $R(p)=pf(p)\Rightarrow R'(p)=pf'(p)+f(p)\cdot 1\Rightarrow R'(20)=20f'(20)+f(20)\cdot 1=20(-350)+10{,}000=3000$.
This means that as the price of the fabric increases past \$20/ yard, the total revenue is increasing at \$3000/(\$/yard). Note that the Product Rule indicates that we will lose \$7000/(\$/yard) due to selling less fabric, but that that loss is more than made up for by the additional revenue due to the increase in price.

10. $y=\frac{1+\sin x}{x+\cos x}\Rightarrow$

$$y'=\frac{(x+\cos x)(\cos x)-(1+\sin x)(1-\sin x)}{(x+\cos x)^{2}}=\frac{x\cos x+\cos^{2}x-(1-\sin^{2}x)}{(x+\cos x)^{2}}$$
$$=\frac{x\cos x+\cos^{2}x-(\cos^{2}x)}{(x+\cos x)^{2}}=\frac{x\cos x}{(x+\cos x)^{2}}$$