CALCULUS BC
WORKSHEET ON 7.1

Work the following on notebook paper.

Find the area bounded by the given curves. Draw and label a figure for each problem, and show all work. No calculator.

1. $f(x)=x^2+2x+1,\ g(x)=3x+3$
2. $y=x^3-3x^2+3x,\ y=x^2$
3. $f(x)=\dfrac{1}{1+x^2},\ g(x)=\dfrac{x^2}{2}$
4. $f(y)=y^2,\ g(y)=y+2$
5. Consider the curve $y^2=4+x$ and chord AB joining points $A(-4,\ 0)$ and $B(0,\ 2)$ on the curve. Find the area of the region R enclosed by the curve and chord AB.

Find the area bounded by the given curves. Draw and label a figure for each problem, set up the integral(s) needed, and then evaluate on your calculator.

6. $f(x)=x^4,\ g(x)=3x+4$
7. $f(x)=x^2,\ g(x)=2^x$
8. $y=\ln\left(x^2+1\right),\ y=\cos x$

Find $\dfrac{dy}{dx}$ in terms of x. No calculator.

9. $y=5^{\tan\left(x^3\right)}$
10. $y=\log_3\left(5x^6+e^{x^2}\right)$
11. $xe^y-10x+3y=0$
12. $y=(\sin x)^{2x}$

Evaluate. No calculator.

13. $\int e^{3x}dx$
14. $\int x^3 7^{x^4}dx$

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15. If $f(x)=\int_3^x\sqrt{2+t^3}\,dt$, find $\left(f^{-1}\right)'(0)$.

16. Let $f(x)$ be the particular solution to the differential equation $\dfrac{dy}{dx}=x+y$ with the initial condition $f(1)=-3$. Use Euler's method starting at $x=1$, with two equal steps, to approximate $f(0.4)$. Show the work that leads to your answer.

17. Solve the differential equation $\dfrac{dy}{dx}=\dfrac{3x^2+1}{2y}$ with the initial condition $y(1)=-4$.