Each problem 2 points. Students either get 2 or zero. There is no credit for partially correct answers. Note that a and b are positive constants.

$\int \sqrt{a^2 + x^2} dx =$

$\int \frac{1}{x^2 - a^2} dt =$

$\int \frac{1}{\sqrt{a^2 - b^2 x^2}} dx =$

$\int \frac{1}{\sqrt{x^2 \pm a^2}} dx =$

$\int \frac{1}{a^2 + b^2 x^2} dx =$

$\int \sec x dx =$

$\int \csc x dx =$

$\int \tan x dx =$

$\int \cot x dx =$

$\int sec^2 x dx =$

There are partial credits for solving the following problems. All problems require the solving processes. If only a right answer is given without proper process, the total credit earned is zero. If any intermediate step is wrong, all following steps will be counted as wrong. There is no credit for partially correct answers. Each is worth 10 points.

1. $\int \cos^2 x \sin^3 x dx$

2. $\int tan^2 x sec^4 x dx$

3. $\int x \sin(x) dx$

4. $\int sin^{-1}(x) dx$

5. $\int \sin(3x) \sin(2x) dx$

6. $\int \cos(3x) \sin(2x) dx$

7. $\int \frac{x-8}{(x-2)(x+1)} dx$

8. $\int \frac{\sqrt{x^2-1}}{x^2} dx$

9. Solve the separable equation $y' = \frac{2xy}{\ln(y)}$.

10. $\int \frac{x^4+4}{x^2-4} dx$