

$$1. \int \left(4 \sin(4v) + \frac{2}{v^2} + \frac{5}{\sqrt{1-v^2}} \right) dv.$$

Solution. Break up the sum and remember the derivative of arcsin.
 $-\cos(4v) + (-2v^{-1}) + 5 \arcsin v$

$$2. \int_2^e \left(\frac{9w^3 - 5}{w} \right) dw.$$

Solution. Break up the fraction and then remember the derivative of ln.
 $-29 + 3e^3 + 5 \ln 2.$

$$3. \int \sin(3y) e^{6 \cos(3y)} dy.$$

Solution. Substitute for $\cos(3y)$ and integrate by parts
 $\frac{-e^{6 \cos(3y)}}{18}.$

$$4. \int \left(4e^{6z} + \frac{3}{z^3} + \frac{5}{1+z^2} \right) dz.$$

Solution. Break up the sum and remember the derivative of arctan.
 $\frac{2e^{6z}}{3} - \frac{3}{2}z^{-2} + 5 \arctan z.$

$$5. \int_1^4 \frac{v}{5v^2 - 4} dv.$$

Solution. Substitute for $5v^2 - 4$ and remember the derivative of ln.
 $\frac{\ln 76}{10}.$

$$6. \int 7 \arctan(8w) dw.$$

Solution. Integrate by parts with $u = \arctan(8w)$ and $dv = dw.$
 $7w \arctan(8w) - \frac{7}{16} \ln(1 + 64w^2).$

$$7. \int \frac{-2x + 3}{x^2 + 3x - 4} dx.$$

Solution. Partial Fractions.
 $\frac{1}{5} \ln|x - 1| - \frac{11}{5} \ln|x + 4|.$

$$8. \int 6 \arcsin(4t) dt.$$

Solution. See the hint for 6.
 $6t \arcsin(4t) + \frac{3}{2} \sqrt{1 - 16t^2}.$

$$9. \int \frac{14z - 5}{z^2 + 4z + 20} dz.$$

Solution. Complete the square in the denominator and break up the fraction as two, one with an easy substitution and another with a constant numerator.

$$7 \ln |(z + 2)^2 + 16| - \frac{33}{4} \arctan \left(\frac{z + 2}{4} \right).$$

$$10. \int_1^2 \left(\frac{3x^5 - 1}{x^2} \right) dx.$$

Solution. See the hint for 2.

$$\frac{43}{4}.$$

$$11. \int \frac{-6y + 2}{y^2 - 2y} dy.$$

Solution. Partial Fractions, again.

$$-5 \ln |y - 2| - \ln |y|.$$

$$12. \int \frac{18u + 6}{u^2 - 4u + 29} du.$$

Solution. See the hint for 9.

$$9 \ln |(u - 2)^2 + 25| + \frac{42}{5} \arctan \left(\frac{u - 2}{5} \right).$$

$$13. \int \frac{\cos(2\sqrt{y})}{\sqrt{y}} dy.$$

Solution. Substitute for $2\sqrt{y}$.

$$\sin(2\sqrt{y}).$$