

## Solutions

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**2.1** An antiderivative is  $x^3$ . Subtract its values:  $2^3 - 0^3 = 8$ .

**2.2** Displacement =  $[t^3 - 3t]$  from 0 to 2 =  $8 - 6 = 2$ .

**2.3** Velocity changes sign at  $t = 1$ . The two positive distances are 2 and 4, giving 6.

**2.4** False. The integral of  $1/x$  is  $\ln|x| + C$ , not the power rule with  $n = -1$ . Signed area can be zero even when the total enclosed area is positive.

**2.5 A** A function whose derivative equals the given integrand.

**3.1** Integral  $[t^2/2 - 2t]_0^5 = 2.5$ . Sign changes at 2; signed integrals are  $-2$  then 4.5, so distance 6.5. Units follow velocity/time units. Distance integrates  $|v|$ .