**1.** A ranger in a national park is driving at 28.0 mi/h when a deer jumps into the road 155 ft ahead of the vehicle. After a reaction time t, the ranger applies the brakes to produce an acceleration of a = -9.00 ft/s2. What is the maximum reaction time allowed if she is to avoid hitting the deer?

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|---|---|
| $v = 28\frac{mi}{h} = 41.1\frac{ft}{s}$<br>$d = 155\ ft$<br>$a = -9\frac{ft}{s^2}$ | *Solution.*<br>The maximum reaction time is for the case when the ranger stopped directly opposite the deer, so he covers the distance $d$. The movement of the ranger's car is with the constant velocity during the time $t$, and then with the constant acceleration until stopping the car:<br>$d = v \cdot t + \frac{v^2}{2\lvert a\rvert}.$ |
| $t - ?$ | |

We can express the time from the last equation:

$$\boxed{t = \frac{d}{v} - \frac{v}{2|a|}}.$$

Let check the dimension.

$$[t] = \frac{ft}{\frac{ft}{s}} - \frac{\frac{ft}{s}}{\frac{ft}{s^2}} = s.$$

Let evaluate the quantity.

$$t = \frac{155}{41.1} - \frac{41.1}{2 \cdot 9} = 1.49(s).$$

**Answer**: $1.49\,s$.