Activity 8.7 – Modeling Accumulated Change with the TI-84

1. $r(t) = -32t^2 + 933t + 507$ ft³/min, where t is in minutes

2. $t = 11.48$ min

3. $t = 14.58$ min; $r(14.58) = 7308$ ft³/min

4. $\int_0^{10} \left(-32t^2 + 933t + 507 \right) dt \approx 41053$ ft³

5. $A(t) = \int \left(-32t^2 + 933t + 507 \right) dt = -\frac{32}{3}t^3 + \frac{933}{2}t^2 + 507t + C$; since $A(0) = 5000$, $C = 5000$.

    Therefore, $A(t) = -\frac{32}{3}t^3 + \frac{933}{2}t^2 + 507t + 5000$ ft³, where t is minutes.

6. $A(20) = -\frac{32}{3}(20)^3 + \frac{933}{2}(20)^2 + 507(20) + 5000 \approx 116407$ ft³

7. Set $-\frac{32}{3}t^3 + \frac{933}{2}t^2 + 507t + 5000 = 150000$ to get $t = 27.55$ min.