

Differential Equations LINK

| Verbal | Solve Differential Equation |
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| <p>At the beginning of 2010, a landfill contained 1400 tons of solid waste. The increasing function W models the total amount of solid waste stored at the landfill. Planners estimate that W will satisfy the differential equation</p> $dW/dt = (1/25)(W - 300)$ <p>for the next 20 years. W is measured in tons, and t is measured in years from the start of 2010.</p> | <p>Find the particular solution $W = W(t)$ to the given differential equation dW/dt with initial condition $W(0) = 1400$.</p> |
| Analysis | Slope Field |
| <p>1. Use the line tangent to the graph of W at $t = 0$ to estimate the amount of waste the landfill contains at the end of first three months of 2010 ($t = \frac{1}{4}$).</p> <p>2. Find $\frac{d^2W}{dt^2}$ in terms of W. Use $\frac{d^2W}{dt^2}$ to determine whether your answer to Question 1 is an underestimate or overestimate of the amount of solid waste that the landfill contains at $t = \frac{1}{4}$.</p> | <p>This is the graph of the slope field for the differential equation dW/dt. Sketch your particular solution for the given initial condition on this slope field.</p> <p>$W(t)$</p> <p style="text-align: center;">Adapted from 2011 AB/BC # 5</p> |