Zero Point Quiz #4

MA103 06 OCT 2025
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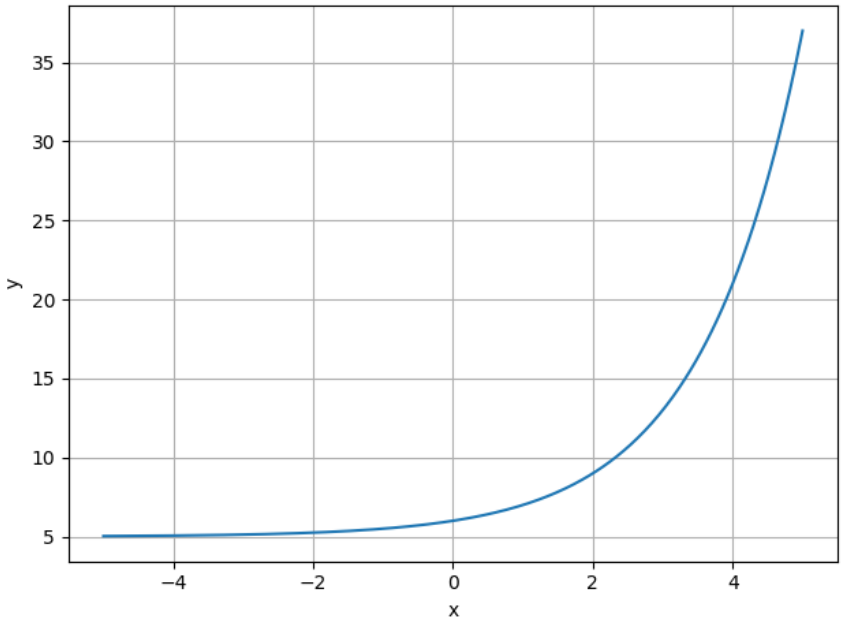
Exponential Function Identification

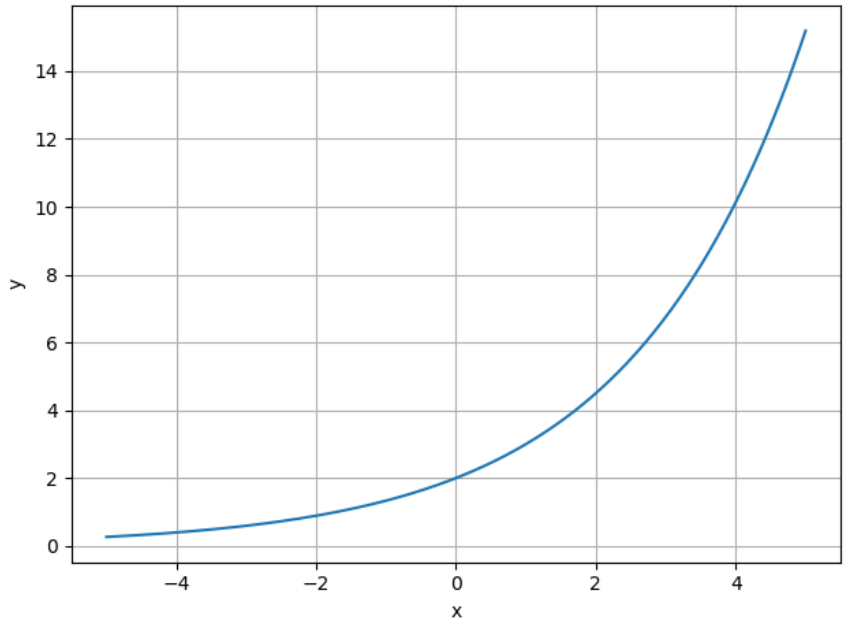
Below are graphs of exponential functions of the form $y = ab^x + d$. For each graph, estimate the parameters a, b, and d.

Figure 1:



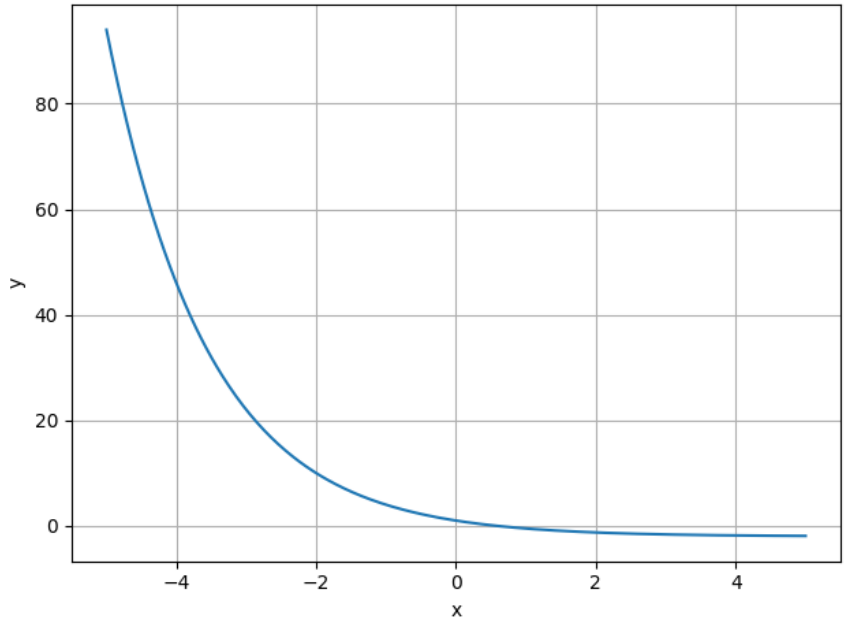
1. Estimate the parameters a, b, and d for the function shown in Figure 1.

Figure 2:



2. Estimate the parameters a, b, and d for the function shown in Figure 2.

Figure 3:



3. Estimate the parameters a, b, and d for the function shown in Figure 3.

Exponential Cooling Modeling

A cup of coffee is poured at 90°C and placed in a room where the temperature remains constant at 20°C. After 10 minutes, the coffee has cooled to 60°C.

4. Develop an exponential cooling model of the form

$$T(t) = ab^t + d,$$

where $T(t)$ is the temperature (in °C) after t minutes and d represents the ambient temperature.

5. Use your model to predict the temperature of the coffee after 20 minutes.

6. How long will it take for the coffee to cool to 30°C?

Compound Interest Modeling

You invest $5,000 in an account that earns 4.5% annual interest, compounded annually.

7. Write an exponential model for the value of the investment after t years.

8. How much will the investment be worth after 15 years?

9. How long will it take for the investment to double?