

Exercise walk-through

2.13

Exponential and Logarithmic Equations and Inequalities

AP Precalculus

What we will cover

- 1 Arithmetic & geometric sequences
- 2 Linear vs exponential change
- 3 Exponential functions
- 4 Composition & inverses
- 5 Logarithms
- 6 Solving equations
- 7 Modelling & semi-log plots

Modelling, and choosing between models

Exponentials model growth by a **constant proportion** over equal intervals.

- build from a ratio + an initial value, or from **two points**
- **exponential regression** fits a data set
- the **natural base**
 $e \approx 2.718$ is the standard

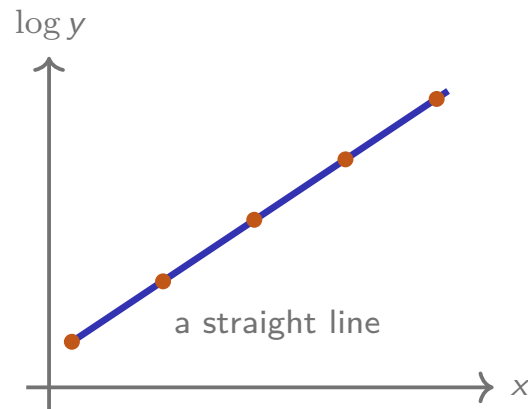


Exponential sprint

Semi-log plots

On a **logarithmic scale**, each unit is a **multiplicative step** ($10^0, 10^1, 10^2, \dots$).

Plot $\log y$ against x : an **exponential becomes a straight line**, whose slope and intercept recover the model.



Exercises 2.1·2.3

2.1 Solve $10^x = 1000$.

[1]

2.2 Solve $\log_2(x) = 5$.

[2]

2.3 State the domain restriction to check for a log equation.

[1]

Exercises 2.1·2.3

2.1 Solve $10^x = 1000$. [1]

2.1

- $x = 3$
-

2.2 Solve $\log_2(x) = 5$. [2]

2.2

- $x = 2^5 = 32$
-

2.3 State the domain restriction to check for a log equation. [1]

2.3

- the argument of the log must be positive ($x > 0$)

Exercises 3.1·3.2

3.1 To solve $2^x = 20$, you take

[1]

☐

A log base 2 of both sides

B the square root

C the reciprocal

D nothing

3.2 The solution of $\log_3(x) = 2$ is

[1]

☐

A 6

B 8

C 9

D 5

Exercises 3.1-3.2

3.1 To solve $2^x = 20$, you take

[1]

☐

A log base 2 of both sides

B the square root

C the reciprocal

D nothing

3.1 A

- log base 2 of both sides.

3.2 The solution of $\log_3(x) = 2$ is

[1]

☐

A 6

B 8

C 9

D 5

3.2 C

- 9.

Exercise 3.3 (a)

3.3 Solve $\log_5(x) = 3$.

(a) Rewrite in exponential form.

[1]

Exercise 3.3 (a)

3.3 Solve $\log_5(x) = 3$.

(a) Rewrite in exponential form.

[1]

(a)

- $x = 5^3$

Exercise 3.3 (b)

3.3 Solve $\log_5(x) = 3$.

(b) Evaluate.

[1]

Exercise 3.3 (b)

3.3 Solve $\log_5(x) = 3$.

(b) Evaluate.

[1]

(b)

- 125

Exercise 3.3 (c)

3.3 Solve $\log_5(x) = 3$.

(c) Confirm the domain is satisfied.

[1]

Exercise 3.3 (c)

3.3 Solve $\log_5(x) = 3$.

(c) Confirm the domain is satisfied.

[1]

(c)

- $125 > 0$, so it is valid