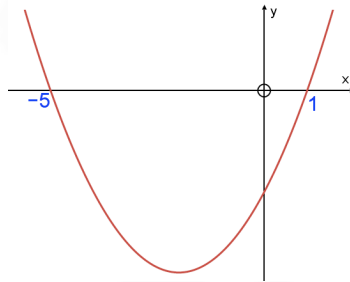


Exponential Graphs

Starter

1. **(Review of last lesson)** Solve the inequality $x^2 + 4x - 5 \leq 0$.

Working: Solve $x^2 + 4x - 5 = 0$
 $x^2 + 5x - x - 5 = 0 \Rightarrow x(x + 5) - (x + 5) = 0$
 $(x + 5)(x - 1) = 0 \Rightarrow x = -5 \text{ or } x = 1$
 The coefficient of x^2 is 1 which is > 0 so the curve is concave-up



From the inequality, ≤ 0 means below the x -axis.
 This happens when the x -values are between -5 and 1 .
 So $\{x : -5 \leq x \leq 1\}$
 In set notation $\{x : -5 \leq x \leq 1\}$

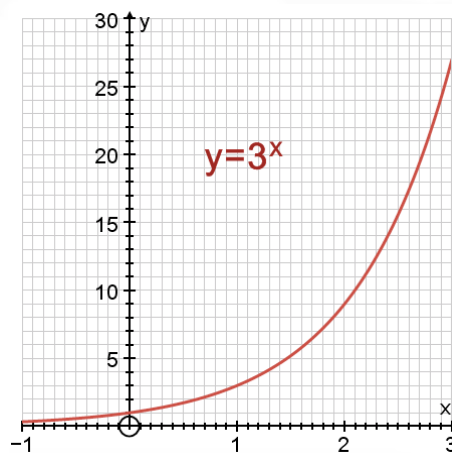
- E.g. 1** (a) Copy and complete the table of values for $y = 3^x$.

| | | | | | | | | | |
|---|------|------|---|-----|---|-----|---|-----|---|
| x | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| y | 0.33 | | | | | | | | |

- (b) Draw graph of $y = 3^x$ for $-1 \leq x \leq 3$.
 (c) Use your graph to estimate the value of x when:
 (i) $y = 7$
 (i) $y = 20$

Working: (a)

| | | | | | | | | | |
|---|------|------|---|------|---|-----|---|------|----|
| x | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| y | 0.33 | 0.58 | 1 | 1.73 | 3 | 5.2 | 9 | 15.6 | 27 |



- (c) (i) $x \approx 1.77$
 (ii) $x \approx 2.73$

E.g. 2 (a) By completing the table of values, draw the graph of $y = 3(2^x)$.

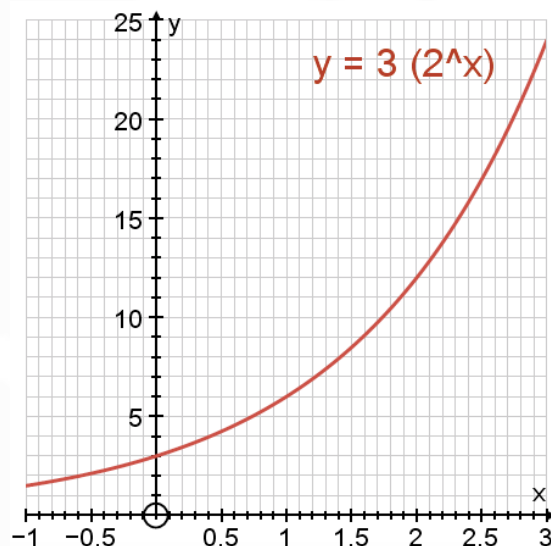
| | | | | | | | | | |
|---|-----|------|---|-----|---|-----|---|-----|---|
| x | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| y | 1.5 | | | | | | | | |

N.B. $y = 3(2^x)$ means find 2^x then multiply by 3 i.e. $y = 3 \times 2^x$

- (b) Use your graph to estimate the value of x when:
 (i) $y = 11$
 (ii) $y = 19$

Working: (a)

| | | | | | | | | | |
|---|-----|------|---|-----|---|-----|----|------|----|
| x | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| y | 1.5 | 2.1 | 3 | 4.2 | 6 | 8.5 | 12 | 17.0 | 24 |



- (b) (i) $x \approx 1.87$
 (ii) $x \approx 2.66$

Video: [Exponential graphs](#)

[Solutions to Starter and E.g.s](#)

Exercise

- 9-1 class textbook: p409 E12.11 Qu 1-6, 7-10*
 A*-G class textbook: p366 E12.6 Qu 1-6, 7-8*
 9-1 homework book: p141 E12.6 Qu 1-2, 3-5*
 A*-G homework book: p103 E12.6 Qu 1-4

[Homework book answers \(only available during a lockdown\)](#)