

# Drawing the Graphs of Cubic Equations - PDF Copy

The presentation contains the slides below with the objective of enabling students to: **Draw the graphs of cubic equations.** The presentation contains explanation and graphs to draw that can be checked with answers.

Drawing the Graphs of Cubic Equations

Objectives: Draw the graphs of cubic equations

Grade C - A

☆ 1

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

Draw a table and put the  $x$  numbers at the top. The exam question will usually tell you which  $x$  numbers to use. In this case we've used the integer values  $-2 \leq x \leq 4$

☆ 2

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|     |    |    |   |   |   |   |   |
|-----|----|----|---|---|---|---|---|
| $x$ | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
|-----|----|----|---|---|---|---|---|

First we have found the value of  $x^3$

☆ 3

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|       |    |    |   |   |   |   |    |
|-------|----|----|---|---|---|---|----|
| $x$   | -2 | -1 | 0 | 1 | 2 | 3 | 4  |
| $x^3$ | 4  | 1  | 0 | 1 | 4 | 9 | 16 |

Next, we have found the value of  $x^2$

☆ 4

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|       |    |    |   |   |   |    |    |
|-------|----|----|---|---|---|----|----|
| $x$   | -2 | -1 | 0 | 1 | 2 | 3  | 4  |
| $x^3$ | 4  | 1  | 0 | 1 | 4 | 9  | 16 |
| $x^2$ | -8 | -1 | 0 | 1 | 8 | 27 | 64 |

Now, we can find the value of  $x^3 - 3x^2$

☆ 5

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|              |     |    |   |    |    |    |    |
|--------------|-----|----|---|----|----|----|----|
| $x$          | -2  | -1 | 0 | 1  | 2  | 3  | 4  |
| $x^3$        | 4   | 1  | 0 | 1  | 4  | 9  | 16 |
| $x^2$        | -8  | -1 | 0 | 1  | 8  | 27 | 64 |
| $x^3 - 3x^2$ | -20 | -4 | 0 | -2 | -4 | 0  | 16 |

Subtract  $3x^2$  from this value to find  $x^3 - 3x^2 - 3x$

☆ 6

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|                   |     |    |   |    |     |    |    |
|-------------------|-----|----|---|----|-----|----|----|
| $x$               | -2  | -1 | 0 | 1  | 2   | 3  | 4  |
| $x^3$             | 4   | 1  | 0 | 1  | 4   | 9  | 16 |
| $x^2$             | -8  | -1 | 0 | 1  | 8   | 27 | 64 |
| $x^3 - 3x^2$      | -20 | -4 | 0 | -2 | -4  | 0  | 16 |
| $x^3 - 3x^2 - 3x$ | -14 | -1 | 0 | -6 | -10 | -9 | 4  |

Finally, add 6 to find the value of  $x^3 - 3x^2 - 3x + 6$

☆ 7

To draw the graph of  $y = x^3 - 3x^2 - 3x + 6$  we...

|                       |     |    |   |    |     |    |    |
|-----------------------|-----|----|---|----|-----|----|----|
| $x$                   | -2  | -1 | 0 | 1  | 2   | 3  | 4  |
| $x^3$                 | 4   | 1  | 0 | 1  | 4   | 9  | 16 |
| $x^2$                 | -8  | -1 | 0 | 1  | 8   | 27 | 64 |
| $x^3 - 3x^2$          | -20 | -4 | 0 | -2 | -4  | 0  | 16 |
| $x^3 - 3x^2 - 3x$     | -14 | -1 | 0 | -6 | -10 | -9 | 4  |
| $x^3 - 3x^2 - 3x + 6$ | -8  | 5  | 6 | 1  | -4  | -3 | 10 |

Now, we have the  $y$  value

☆ 8

Here are the coordinates

|     |    |    |   |   |    |    |    |
|-----|----|----|---|---|----|----|----|
| $x$ | -2 | -1 | 0 | 1 | 2  | 3  | 4  |
| $y$ | -8 | 5  | 6 | 1 | -4 | -3 | 10 |

Plot the coordinates

Now we can join the points with a curve like this...

☆ 9

Here are the coordinates

|     |    |    |   |   |    |    |    |
|-----|----|----|---|---|----|----|----|
| $x$ | -2 | -1 | 0 | 1 | 2  | 3  | 4  |
| $y$ | -8 | 5  | 6 | 1 | -4 | -3 | 10 |

Plot the coordinates

Now we can join the points with a curve like this...

Outs the  $x$ -axis

Comes from minus infinity

Goes up to infinity

The graph is typical of all cubic equations, it...

$y = x^3 - 3x^2 - 3x + 6$

☆ 10

Complete this table for  $y = x^3 - 2x^2 - 4x - 7$  and then draw the graph for the given  $x$  values

|                       |     |    |    |     |   |    |    |
|-----------------------|-----|----|----|-----|---|----|----|
| $x$                   | -2  | -1 | 0  | 1   | 2 | 3  | 4  |
| $x^3$                 | 4   |    |    |     |   |    | 16 |
| $x^2$                 |     |    | 0  | 1   | 8 | 27 |    |
| $x^3 - 2x^2$          | -16 | -3 |    |     |   |    | 32 |
| $x^3 - 2x^2 - 4x - 7$ |     |    | 0  | -5  |   |    |    |
| $x^3 - 2x^2 - 4x - 7$ |     |    | -7 | -12 |   |    | 8  |
| $y$                   |     |    |    |     |   |    |    |

☆ 11

Completed table for  $y = x^3 - 2x^2 - 4x - 7$  and then draw the graph for the given  $x$  values

|                       |     |    |    |     |     |     |    |
|-----------------------|-----|----|----|-----|-----|-----|----|
| $x$                   | -2  | -1 | 0  | 1   | 2   | 3   | 4  |
| $x^3$                 | 4   | 1  | 0  | 1   | 4   | 9   | 16 |
| $x^2$                 | -8  | -1 | 0  | 1   | 8   | 27  | 64 |
| $x^3 - 2x^2$          | -16 | -3 | 0  | -1  | 0   | 9   | 32 |
| $x^3 - 2x^2 - 4x - 7$ | -8  | 1  | 0  | -5  | -8  | -3  | 16 |
| $x^3 - 2x^2 - 4x - 7$ | -16 | -6 | -7 | -12 | -15 | -10 | 8  |
| $y$                   | -16 | -6 | -7 | -12 | -15 | -10 | 8  |

☆ 12

|     |     |    |    |     |     |     |   |
|-----|-----|----|----|-----|-----|-----|---|
| $x$ | -2  | -1 | 0  | 1   | 2   | 3   | 4 |
| $y$ | -16 | -6 | -7 | -12 | -15 | -10 | 8 |

Plot the coordinates

Now we can join the points with a curve like this...

$y = x^3 - 2x^2 - 4x - 7$

☆ 13