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NPTEL

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Courses » Phase field modelling: the materials science, mathematics and computational aspects

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Unit 6 - Week 5

Course outline

How to access the portal ?

Week-1

Week 2

Week 3

Week 4

Week 5

- Module 8 - Lecture 31 : Diffusion equation : Analytical solution I
- Module 8 - Lecture 32 : Diffusion equation : Analytical solution II
- Module 8 - Lecture 33 : Diffusion equation : Error function solution I
- Module 8 - Lecture 34 : Diffusion equation: Error function solution II

Assignment 5

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-12, 23:59 IST.**

1) An FCC iron-carbon alloy, initially containing 0.20 wt% C, is carburized at elevated temperature and in an atmosphere that gives a constant surface carbon concentration of 1 wt%. How long will it take to yield a carbon concentration of 0.35% at a position of 4 mm below the surface ? ($D = 2.6 \times 10^{-11} m^2 s^{-1}$)

z	erf(z)
0.50	0.5205
0.55	0.5633
0.60	0.6039
0.65	0.6420
0.70	0.6778
0.75	0.7112
0.80	0.7421
0.85	0.7707
0.90	0.7970
0.95	0.8209
1.00	0.8427

- 49.5 hrs
- 43.4 hrs
- 42.1 hrs
- 46.8 hrs

No, the answer is incorrect.**Score: 0****Accepted Answers:**

49.5 hrs

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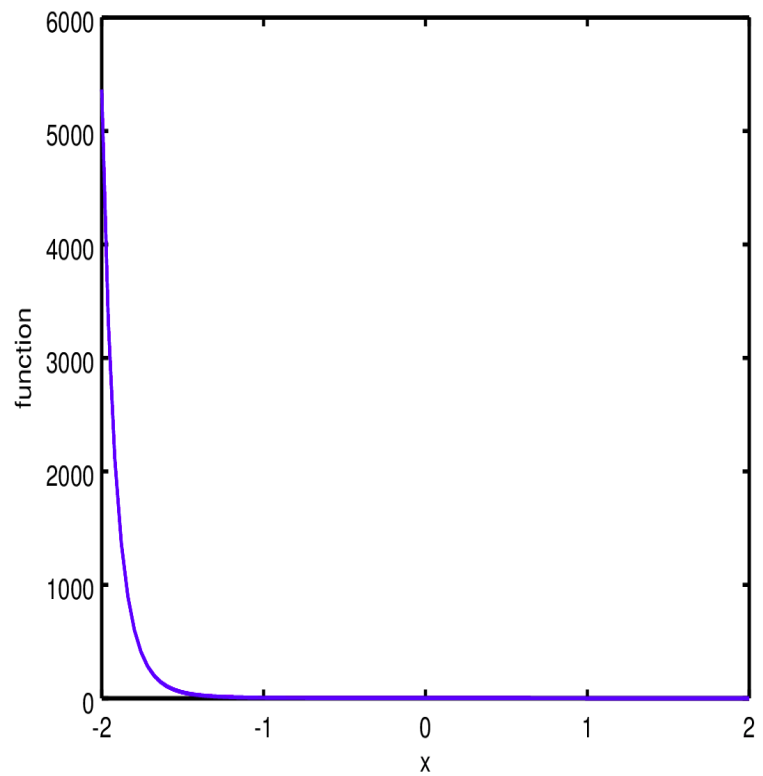
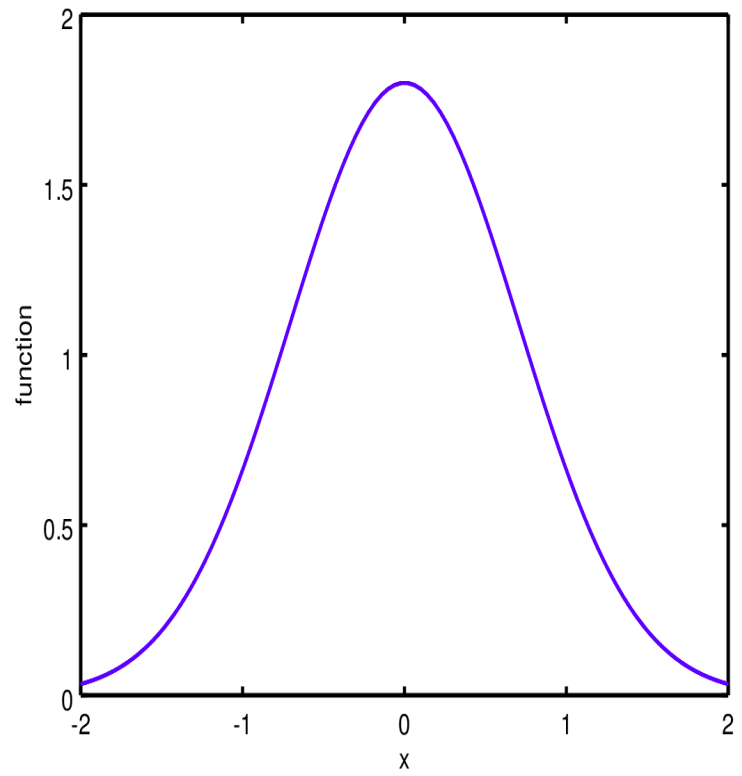
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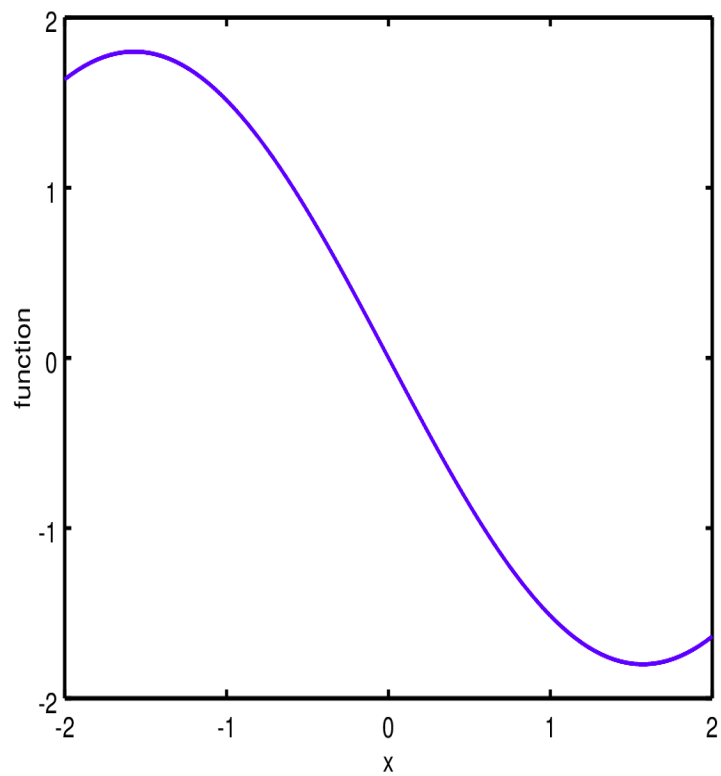
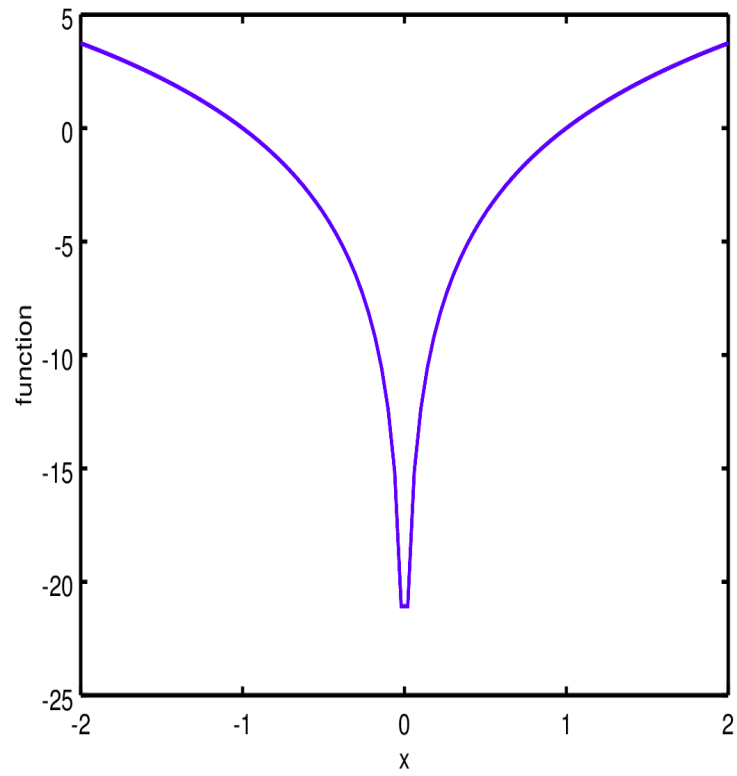


Funded by

solution

- Week 6
- Week 7
- Week 8
- Week 9
- Week 10
- Week 11
- Week 12

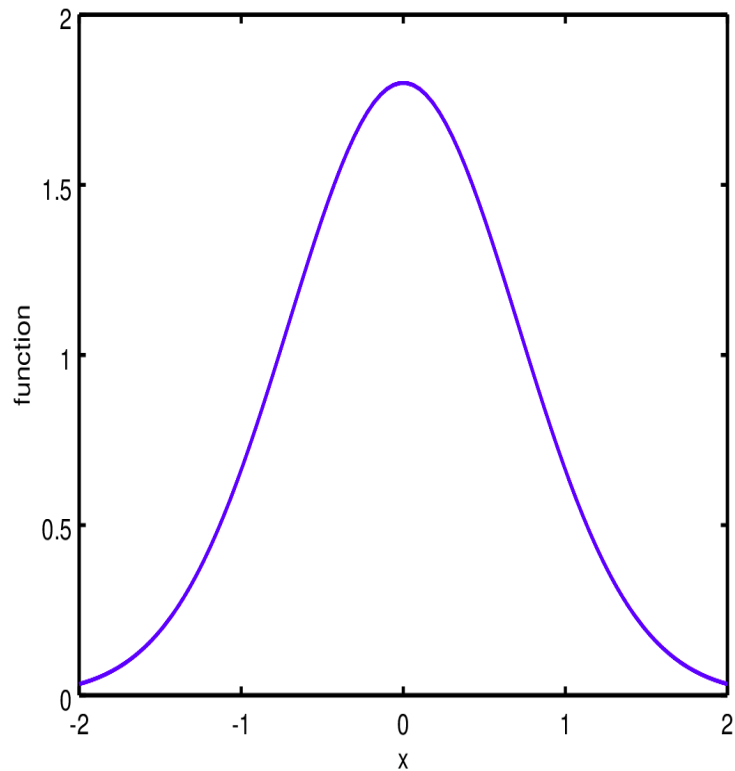




No, the answer is incorrect.

Score: 0

Accepted Answers:



3) Consider the partial differential equation, $\frac{\partial^2 u}{\partial x^2} + 2 \times \frac{\partial^2 u}{\partial y^2} = 0$ where $u = g\left(\frac{x}{y}\right)$. Which **2 points** of the following is the equivalent ordinary differential equation in g

- $g''\left(1 - 2\left(\frac{x}{y}\right)^2\right) - 4g' \frac{x}{y} = 0$
- $g''\left(1 + 2\left(\frac{x}{y}\right)^2\right) + 4g' \frac{x}{y} = 0$
- $g''\left(1 + 2\left(\frac{y}{x}\right)^2\right) + 4g' \frac{y}{x} = 0$
- $g''\left(1 + 2\left(\frac{x}{y}\right)^4\right) + 4g' \left(\frac{x}{y}\right)^2 = 0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$g''\left(1 + 2\left(\frac{x}{y}\right)^2\right) + 4g' \frac{x}{y} = 0$$

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