



@COMPUTERENGINEE
RINGDEPARTMENT22

By: @EzzeldeenAlmjdalawi

سؤال 5

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem

$$x^2 y'' - 3xy' + 8y = 0, \quad y(1) = 4, \quad y'(1) = 0.$$

$$y(x) = -4x^2 [\cos(2 \ln |x|) + \sin(2 \ln |x|)] \quad \text{○}$$

$$y(x) = 4x^2 [\cos(2 \ln |x|) - \sin(2 \ln |x|)] \quad \text{●}$$

$$y(x) = 4x^2 [\sin(2 \ln |x|) - \cos(2 \ln |x|)] \quad \text{○}$$

none of the given answers is true ○

$$y(x) = 4x^2 [\cos(2 \ln |x|) + \sin(2 \ln |x|)] \quad \text{○}$$



الإجابة الصحيحة هي: $y(x) = 4x^2 [\cos(2 \ln |x|) - \sin(2 \ln |x|)]$

سؤال 6

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem

$$4x^2 y'' + 8xy' + y = 1, \quad y(1) = 2, \quad y'(1) = 1.$$

$$y(x) = 3 - x^{-1/2} + \frac{3}{2}x^{-1/2} \ln x \quad \text{○}$$

none of the given answers is true ○

$$y(x) = 3 - x^{-1/2} - \frac{3}{2}x^{-1/2} \ln x \quad \text{○}$$

$$y(x) = 1 + x^{-1/2} + \frac{3}{2}x^{-1/2} \ln x \quad \text{●}$$

$$y(x) = 1 + x^{-1/2} - \frac{3}{2}x^{-1/2} \ln x \quad \text{○}$$



الإجابة الصحيحة هي: $y(x) = 1 + x^{-1/2} + \frac{3}{2}x^{-1/2} \ln x$

سؤال 3

صحيح

درجة 1.0 من 1.0

علم السؤال

$x^2 y'' + \frac{3}{2} x y' - \frac{1}{2} y = 0$. Find the general solution of the differential equation

$y(x) = c_1 |x|^{-1/2} + c_2 |x|$ ☐

$y(x) = c_1 |x|^{-1/2} + c_2 |x|^{-1}$ ☐

$y(x) = c_1 |x|^{1/2} + c_2 |x|$ ☐

none of the given answers is true ☐

$y(x) = c_1 |x|^{1/2} + c_2 |x|^{-1}$ ☒



الإجابة الصحيحة هي: $y(x) = c_1 |x|^{1/2} + c_2 |x|^{-1}$

سؤال 4

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the general solution of the differential equation

$$x^2 y'' + x y' + \frac{1}{4} y = 4 \cos\left(\frac{1}{2} \ln x\right) - 4 \sin\left(\frac{1}{2} \ln x\right)$$

$y(x) = c_1 \cos\left(\frac{1}{2} \ln x\right) + c_2 \sin\left(\frac{1}{2} \ln x\right) - 4(\ln x) \cos\left(\frac{1}{2} \ln x\right) - 4(\ln x) \sin\left(\frac{1}{2} \ln x\right)$ ☐

$y(x) = c_1 \cos\left(\frac{1}{2} \ln x\right) + c_2 \sin\left(\frac{1}{2} \ln x\right) - 4(\ln x) \cos\left(\frac{1}{2} \ln x\right) + 4(\ln x) \sin\left(\frac{1}{2} \ln x\right)$ ☐

$y(x) = c_1 \cos\left(\frac{1}{2} \ln x\right) + c_2 \sin\left(\frac{1}{2} \ln x\right) + 4(\ln x) \cos\left(\frac{1}{2} \ln x\right) + 4(\ln x) \sin\left(\frac{1}{2} \ln x\right)$ ☒

$y(x) = c_1 \cos\left(\frac{1}{2} \ln x\right) + c_2 \sin\left(\frac{1}{2} \ln x\right) + 4(\ln x) \cos\left(\frac{1}{2} \ln x\right) - 4(\ln x) \sin\left(\frac{1}{2} \ln x\right)$ ☐

none of the given answers is true ☐



الإجابة الصحيحة هي: $y(x) = c_1 \cos\left(\frac{1}{2} \ln x\right) + c_2 \sin\left(\frac{1}{2} \ln x\right) + 4(\ln x) \cos\left(\frac{1}{2} \ln x\right) + 4(\ln x) \sin\left(\frac{1}{2} \ln x\right)$

سؤال 1

صحيح

درجة 1.0 من 1.0

علم السؤال

Determine a lower bound for the radius of convergence of the series solutions of

$$(x^2 - 16)y'' + 8xy' + (x^2 + 16)y = 0$$

about $x = -8$.

3 ☐

2 ☐

none of the given answers is true ☐

4 ☒

1 ☐



الإجابة الصحيحة هي: 4

سؤال 2

صحيح

درجة 2.0 من 2.0

علم السؤال

Classify the singular points of the equation

$$(x - 2)^2(x - 4)^2y'' + 2(x - 2)y' - 5y = 0.$$

none of the given answers is true ☐

is regular, but $x = 4$ is irregular $x = 2$ ☒

and $x = 4$ are regular $x = 2$ ☐

and $x = 4$ are irregular $x = 2$ ☐

is regular, but $x = 2$ is irregular $x = 4$ ☐



الإجابة الصحيحة هي: is regular, but $x = 4$ is irregular $x = 2$

سؤال 1

صحيح

درجة 1.0 من 1.0

علم السؤال

Determine a lower bound for the radius of convergence
of the series solutions of

$$(x^2 - 1)y'' + 2xy' + (x^2 + 1)y = 0$$

. $x = 4$ about

none of the given answers is true ☐

1 ☐

4 ☐

2 ☐

3 ☒



الإجابة الصحيحة هي: 3

سؤال 2

صحيح

درجة 2.0 من 2.0

علم السؤال

Classify the singular points of the equation

$$(x + 1)^2(x + 3)^2y'' - (x + 1)y' + 3xy = 0.$$

is regular, but $x = -3$ is irregular $x = -1$ ☒

none of the given answers is true ☐

and $x = -3$ are irregular $x = -1$ ☐

is regular, but $x = -1$ is irregular $x = -3$ ☐

and $x = -3$ are regular $x = -1$ ☐

الإجابة الصحيحة هي: $x = -1$ is regular, but $x = -3$ is irregular

سؤال 5

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem
 $x^2 y'' + 3xy' + 2y = 0, \quad y(1) = -2, \quad y'(1) = 0.$

none of the given answers is true ☐

$y(x) = 2x^{-1}[\sin(\ln |x|) - \cos(\ln |x|)]$ ☐

$y(x) = 2x^{-1}[\cos(\ln |x|) + \sin(\ln |x|)]$ ☐



$y(x) = -2x^{-1}[\cos(\ln |x|) + \sin(\ln |x|)]$ ☒

$y(x) = 2x^{-1}[\cos(\ln |x|) - \sin(\ln |x|)]$ ☐

الإجابة الصحيحة هي:

$y(x) = -2x^{-1}[\cos(\ln |x|) + \sin(\ln |x|)]$

سؤال 6

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem
 $9x^2 y'' + 15xy' + y = 1, \quad y(1) = -3, \quad y'(1) = -1.$

none of the given answers is true ☐

$y(x) = 2 - 5x^{-1/3} - \frac{7}{3}x^{-1/3} \ln x$ ☐

$y(x) = 1 - 4x^{-1/3} + \frac{7}{3}x^{-1/3} \ln x$ ☐



$y(x) = 1 - 4x^{-1/3} - \frac{7}{3}x^{-1/3} \ln x$ ☒

$y(x) = 2 - 5x^{-1/3} + \frac{7}{3}x^{-1/3} \ln x$ ☐

الإجابة الصحيحة هي: $y(x) = 1 - 4x^{-1/3} - \frac{7}{3}x^{-1/3} \ln x$

سؤال 3

صحيح

درجة 1.0 من 1.0

علم السؤال

Find the general solution of the differential equation

$$x^2 y'' + \frac{16}{3} x y' + \frac{4}{3} y = 0.$$

$$y(x) = c_1 |x|^{1/3} + c_2 |x|^{-4} \quad \text{○}$$

$$y(x) = c_1 |x|^{-1/3} + c_2 |x|^4 \quad \text{○}$$

none of the given answers is true ○



$$y(x) = c_1 |x|^{-1/3} + c_2 |x|^{-4} \quad \text{●}$$

$$y(x) = c_1 |x|^{1/3} + c_2 |x|^4 \quad \text{○}$$

الإجابة الصحيحة هي: $y(x) = c_1 |x|^{-1/3} + c_2 |x|^{-4}$

سؤال 4

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the general solution of the differential equation

$$x^2 y'' + x y' + \frac{1}{9} y = 2 \cos\left(\frac{1}{3} \ln x\right).$$

$$y(x) = c_1 \cos\left(\frac{1}{3} \ln x\right) + c_2 \sin\left(\frac{1}{3} \ln x\right) - 3(\ln x) \sin\left(\frac{1}{3} \ln x\right) \quad \text{○}$$

$$y(x) = c_1 \cos\left(\frac{1}{3} \ln x\right) + c_2 \sin\left(\frac{1}{3} \ln x\right) + 3(\ln x) \cos\left(\frac{1}{3} \ln x\right) \quad \text{○}$$

$$y(x) = c_1 \cos\left(\frac{1}{3} \ln x\right) + c_2 \sin\left(\frac{1}{3} \ln x\right) - 3(\ln x) \cos\left(\frac{1}{3} \ln x\right) \quad \text{○}$$

none of the given answers is true ○



$$y(x) = c_1 \cos\left(\frac{1}{3} \ln x\right) + c_2 \sin\left(\frac{1}{3} \ln x\right) + 3(\ln x) \sin\left(\frac{1}{3} \ln x\right) \quad \text{●}$$

الإجابة الصحيحة هي:

$$y(x) = c_1 \cos\left(\frac{1}{3} \ln x\right) + c_2 \sin\left(\frac{1}{3} \ln x\right) + 3(\ln x) \sin\left(\frac{1}{3} \ln x\right)$$

سؤال 1

صحيح

درجة 1.0 من 1.0

علم السؤال

Determine a lower bound for the radius of convergence of the series solutions of

$$(x^2 - 25)y'' + 10xy' + (x^2 + 25)y = 0$$

. $x = -4$ about2 ☐3 ☐none of the given answers is true ☐1 ☒4 ☐

الإجابة الصحيحة هي: 1

سؤال 2

صحيح

درجة 2.0 من 2.0

علم السؤال

 $(x + 2)^2(x - 3)^2y'' + (x + 3)y' - 5y = 0$. Classify the singular points of the equation
and $x = 3$ are irregular $x = -2$ ☒is regular, but $x = 3$ is irregular $x = -2$ ☐is regular, but $x = -2$ is irregular $x = 3$ ☐none of the given answers is true ☐and $x = 3$ are regular $x = -2$ ☐الإجابة الصحيحة هي: and $x = 3$ are irregular $x = -2$

سؤال 3

صحيح

درجة 1.0 من 1.0

علم السؤال

 $x^2y'' - \frac{5}{3}xy' - y = 0$. Find the general solution of the differential equation

$$y(x) = c_1|x|^{1/3} + c_2|x|^{-3} \quad \text{○}$$

$$y(x) = c_1|x|^{-1/3} + c_2|x|^{-3} \quad \text{○}$$

none of the given answers is true ☐

$$y(x) = c_1|x|^{-1/3} + c_2|x|^3 \quad \text{Ⓢ}$$

$$y(x) = c_1|x|^{1/3} + c_2|x|^3 \quad \text{○}$$

الإجابة الصحيحة هي: $y(x) = c_1|x|^{-1/3} + c_2|x|^3$

سؤال 4

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the general solution of the differential equation

$$x^2 y'' + xy' + \frac{16}{9}y = \sin\left(\frac{4}{3}\ln x\right).$$

$$y(x) = c_1 \cos\left(\frac{4}{3}\ln x\right) + c_2 \sin\left(\frac{4}{3}\ln x\right) - \frac{3}{8}(\ln x) \sin\left(\frac{4}{3}\ln x\right) \quad \text{○}$$

$$y(x) = c_1 \cos\left(\frac{4}{3}\ln x\right) + c_2 \sin\left(\frac{4}{3}\ln x\right) - \frac{3}{8}(\ln x) \cos\left(\frac{4}{3}\ln x\right) \quad \text{Ⓢ}$$

$$y(x) = c_1 \cos\left(\frac{4}{3}\ln x\right) + c_2 \sin\left(\frac{4}{3}\ln x\right) + \frac{3}{8}(\ln x) \cos\left(\frac{4}{3}\ln x\right) \quad \text{○}$$

none of the given answers is true ○

$$y(x) = c_1 \cos\left(\frac{4}{3}\ln x\right) + c_2 \sin\left(\frac{4}{3}\ln x\right) + \frac{3}{8}(\ln x) \sin\left(\frac{4}{3}\ln x\right) \quad \text{○}$$

✓

الإجابة الصحيحة هي: $y(x) = c_1 \cos\left(\frac{4}{3}\ln x\right) + c_2 \sin\left(\frac{4}{3}\ln x\right) - \frac{3}{8}(\ln x) \cos\left(\frac{4}{3}\ln x\right)$

سؤال 5

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem

$$x^2 y'' + 7xy' + 10y = 0, \quad y(1) = 2, \quad y'(1) = 0.$$

none of the given answers is true ○

$$y(x) = 2x^{-3} [\cos(\ln |x|) + 3 \sin(\ln |x|)] \quad \text{Ⓢ}$$

$$y(x) = 2x^{-3} [\cos(\ln |x|) - 3 \sin(\ln |x|)] \quad \text{○}$$

$$y(x) = -2x^{-3} [\cos(\ln |x|) + 3 \sin(\ln |x|)] \quad \text{○}$$

$$y(x) = 2x^{-3} [3 \sin(\ln |x|) - \cos(\ln |x|)] \quad \text{○}$$

✓

الإجابة الصحيحة هي: $y(x) = 2x^{-3} [\cos(\ln |x|) + 3 \sin(\ln |x|)]$

سؤال 6

صحيح

درجة 2.0 من 2.0

علم السؤال

Find the solution of the initial value problem

$$x^2 y'' + 3xy' + y = 1, \quad y(1) = 2, \quad y'(1) = -2.$$

$$y(x) = 3 - x^{-1} - x^{-1} \ln x \quad \text{○}$$

$$y(x) = 1 + x^{-1} + x^{-1} \ln x \quad \text{○}$$

none of the given answers is true ○

$$y(x) = 3 - x^{-1} + x^{-1} \ln x \quad \text{○}$$

$$y(x) = 1 + x^{-1} - x^{-1} \ln x \quad \text{Ⓢ}$$

✓

الإجابة الصحيحة هي: $y(x) = 1 + x^{-1} - x^{-1} \ln x$

Question 4

Correct

Mark 2.0 out of 2.0

Flag question

Find the general solution of the differential equation

$$x^2 y'' + xy' + 9y = 6 \cos(3 \ln x) + 6 \sin(3 \ln x).$$

Select one:

- ☐ none of the given answers is true
- ☒ $y(x) = c_1 \cos(3 \ln x) + c_2 \sin(3 \ln x) - (\ln x) \cos(3 \ln x) + (\ln x) \sin(3 \ln x)$
- ☐ $y(x) = c_1 \cos(3 \ln x) + c_2 \sin(3 \ln x) + (\ln x) \cos(3 \ln x) - (\ln x) \sin(3 \ln x)$
- ☐ $y(x) = c_1 \cos(3 \ln x) + c_2 \sin(3 \ln x) - (\ln x) \cos(3 \ln x) - (\ln x) \sin(3 \ln x)$
- ☐ $y(x) = c_1 \cos(3 \ln x) + c_2 \sin(3 \ln x) + (\ln x) \cos(3 \ln x) + (\ln x) \sin(3 \ln x)$

The correct answer is: $y(x) = c_1 \cos(3 \ln x) + c_2 \sin(3 \ln x) - (\ln x) \cos(3 \ln x) + (\ln x) \sin(3 \ln x)$

Question 5

Correct

Mark 2.0 out of 2.0

Flag question

Find the solution of the initial value problem

$$x^2 y'' + 5xy' + 13y = 0, \quad y(1) = -5, \quad y'(1) = 0.$$

Select one:

- ☐ none of the given answers is true
- ☐ $y(x) = \frac{5}{3} x^{-3} [3 \cos(3 \ln |x|) - 2 \sin(3 \ln |x|)]$
- ☐ $y(x) = \frac{5}{3} x^{-3} [3 \cos(3 \ln |x|) + 2 \sin(3 \ln |x|)]$
- ☒ $y(x) = -\frac{5}{3} x^{-3} [3 \cos(3 \ln |x|) + 2 \sin(3 \ln |x|)]$
- ☐ $y(x) = \frac{5}{3} x^{-3} [2 \sin(3 \ln |x|) - 3 \cos(3 \ln |x|)]$

The correct answer is: $y(x) = -\frac{5}{3} x^{-3} [3 \cos(3 \ln |x|) + 2 \sin(3 \ln |x|)]$

Question 6

Correct

Mark 2.0 out of 2.0

Flag question

Find the solution of the initial value problem

$$16x^3 y'' + 24xy' + y = 1, \quad y(1) = 4, \quad y'(1) = 1.$$

Select one:

- ☐ $y(x) = 5 - x^{-1/4} - \frac{7}{4} x^{-1/4} \ln x$
- ☐ none of the given answers is true
- ☐ $y(x) = 1 + 3x^{-1/4} - \frac{7}{4} x^{-1/4} \ln x$
- ☐ $y(x) = 5 - x^{-1/4} + \frac{7}{4} x^{-1/4} \ln x$
- ☒ $y(x) = 1 + 3x^{-1/4} + \frac{7}{4} x^{-1/4} \ln x$

Question 1

Correct

Mark 1.0 out of 1.0

Flag question

Determine a lower bound for the radius of convergence of the series solutions of

$$(x^3 - 9)y'' + 6xy' + (x^3 + 9)y = 0$$

about $x = -7$.

Select one:

- ☒ 4
- ☐ 3
- ☐ none of the given answers is true
- ☐ 2
- ☐ 1

The correct answer is: 4

Question 2

Correct

Mark 2.0 out of 2.0

Flag question

Classify the singular points of the equation $(x-1)^2(x-3)^2y'' + (x-1)y' - 3y = 0$.

Select one:

- ☐ $x = 3$ is regular, but $x = 1$ is irregular
- ☐ $x = 1$ and $x = 3$ are irregular
- ☐ none of the given answers is true
- ☐ $x = 1$ and $x = 3$ are regular
- ☒ $x = 1$ is regular, but $x = 3$ is irregular

The correct answer is: $x = 1$ is regular, but $x = 3$ is irregular

Question 3

Correct

Mark 1.0 out of 1.0

Flag question

Find the general solution of the differential equation $x^2y'' + \frac{5}{2}xy' + \frac{1}{2}y = 0$.

Select one:

- ☐ $y(x) = c_1|x|^{1/2} + c_2|x|$
- ☒ $y(x) = c_1|x|^{-1/2} + c_2|x|^{-1}$
- ☐ $y(x) = c_1|x|^{-1/2} + c_2|x|$
- ☐ none of the given answers is true
- ☐ $y(x) = c_1|x|^{1/2} + c_2|x|^{-1}$

The correct answer is: $y(x) = c_1|x|^{-1/2} + c_2|x|^{-1}$