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Courses » Ordinary and Partial Differential Equations and Applications

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# Unit 10 - Week 9

## Course outline

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Week 9

- Charpit's method-II
- Second Order PDE with Variable Coefficients
- Classification and Canonical Form of Second Order PDE-I
- Classification and Canonical Form of

## Assignment 9

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-10-03, 23:59 IST.**

1) Complete integral of the equation  $p^2q^2 + x^2y^2 = x^2q^2(x^2 + y^2)$  is **1 point**

$$3z = (x^2 + a^2)^{3/2} + (y^2 - a^2)^{3/2} + b$$

$$3z = (x^2 + a^2)^{3/2} + (y^2 - a^2)^{1/2} + b$$

$$3z = (x^2 + a^2)^{3/2} + 3(y^2 - a^2)^{1/2} + b$$

$$z = (x^2 + a^2)^{1/2} + (y^2 - a^2)^{3/2} + b$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$3z = (x^2 + a^2)^{3/2} + 3(y^2 - a^2)^{1/2} + b$$

2) Complete integral of  $zpq = p + q$  is **1 point**

$$z^2 = 2\left(1 + \frac{1}{a}\right)(ax + y) + b \text{ where } a \text{ and } b \text{ are arbitrary constants}$$

$$z = ax + y + b \text{ where } a \text{ and } b \text{ are arbitrary constants}$$

$$z = (ax - y)^2 + b \text{ where } a \text{ and } b \text{ are arbitrary constants}$$

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Quiz : Assignment 9

Solution of assignment 9

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WEEKLY FEEDBACK

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$z^2 = 2\left(1 + \frac{1}{a}\right)(ax + y) + b$  where  $a$  and  $b$  are arbitrary constants

3) 1 point

If

$z = f(x^2 - y) + g(x^2 + y)$ ,

then the PDE obtained by eliminating arbitrary functions  $f$  and  $g$  is given by

$r - \frac{1}{x}p = 4x^2t$

$r - \frac{1}{x}p = 4xt$

$r - \frac{1}{x}q = 4xs$

$r - \frac{1}{x}q = 4x^2s$

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

**Accepted Answers:**  
 $r - \frac{1}{x}p = 4x^2t$

4) 1 point

If

$z = \frac{1}{x}\phi(y - x) + \phi'(y - x)$ ,

then the PDE obtained by eliminating arbitrary functions  $\phi$  is given by

$r - t = \frac{2}{x^2}$

$r - t = \frac{2z}{x}$

$r - t = \frac{2z}{x^2}$

$r - t = \frac{2z^2}{x^2}$

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

**Accepted Answers:**  
 $r - t = \frac{2z}{x^2}$

5) The canonical form of the PDE 1 point

$x^2r - y^2t = 0$

is given by

$z_{uv} = 0$

$2uz_{uv} - z_v = 0$

$uz_{uv} - z_v = 0$

$uz_{uv} + z_v = 0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$2uz_{uv} - z_v = 0$

6) The canonical form of

1 point

$$y^2 r - 2xys + x^2 t = \frac{y^2}{x} p + \frac{x^2}{y} q$$

is given by

$z_{vv} = 0$

$z_{uv} = 0$

$z_{uu} = 0$

$z_{uu} - z_{vv} = z_{uv}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$z_{vv} = 0$

7) The canonical form of

1 point

$$y^2 r + x^2 t = 0$$

is given by

$z_{\alpha\alpha} + z_{\beta\beta} + \frac{1}{2}(z_{\alpha} + z_{\beta}) = 0$

$z_{\alpha\alpha} + z_{\beta\beta} + \left(\frac{1}{\alpha} z_{\alpha} + \frac{1}{\beta} z_{\beta}\right) = 0$

$z_{\alpha\alpha} + z_{\beta\beta} + \frac{1}{2}\left(\frac{1}{\alpha} z_{\alpha} + \frac{1}{\beta} z_{\beta}\right) = 0$

$z_{\alpha\alpha} + z_{\beta\beta} = 0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$z_{\alpha\alpha} + z_{\beta\beta} + \frac{1}{2}\left(\frac{1}{\alpha} z_{\alpha} + \frac{1}{\beta} z_{\beta}\right) = 0$

8)

1 point

The general solution of the equation

$$(y - 1)r - (y^2 - 1)s + y(y - 1)t + p - q - 2ye^{2x}(1 - y)^3 = 0$$

after reducing to canonical form, is given by

$z = uv + \phi_1(u) + \phi_2(v)$

$z = uv^2 + \phi_1(u)$

$z = uv^2 + \phi_1(u) + \phi_2(v)$

$z = uv + \phi_2(v)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$z = uv^2 + \phi_1(u) + \phi_2(v)$

9)

1 point

The characteristics of the PDE  $(\sin^2 x)r + (2 \cos x)s - t = 0$  are given by

$y - \csc x + \cot x = c_1$   
 $y + \csc x + \cot x = c_2$

$y - \csc x + \cot x = c_1$   
 $y - \csc x - \cot x = c_2$

$y + \csc x - \cot x = c_1$   
 $y + \csc x + \cot x = c_2$

$y + \csc x - \cot x = c_1$   
 $y - \csc x - \cot x = c_2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$y + \csc x - \cot x = c_1$

$y + \csc x + \cot x = c_2$

10) The characteristics of the PDE  $yr + (x + y)s + xt = 0$  are given by

1 point

$y + x = c_1$   
 $y^2 - x^2 = c_2$

$y - x = c_1$   
 $y^2 + x^2 = c_2$

$y + x = c_1$   
 $y^2 + x^2 = c_2$

$y - x = c_1$   
 $y^2 - x^2 = c_2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$y - x = c_1$$

$$y^2 - x^2 = c_2$$

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