

1. (1 point) Which of the following DEs can be solved using the method of separable equations?

- A. $y' - 5y = x + 9$
- B. $\frac{dS}{dt} = rS$, where r is a constant
- C. $\frac{dy}{dx} + y = e^{2x}$
- D. $\frac{dy}{dx} = e^{2x+6y}$

2. (1 point) Which of the following DEs can be solved using the method developed for linear first order DEs?

- A. $\frac{dy}{dx} + y = e^{3x}$
- B. $\frac{dS}{dt} = rS$, where r is a constant
- C. $y' - 3y = x + 8$
- D. $\frac{dy}{dx} = e^{2x+8y}$

3. (1 point) Find the general solution of the differential equation $\frac{dS}{dt} = rS$, where r is a constant.

(Use C to denote the arbitrary constant.)
 $S =$ _____ help (formulas)

4. (1 point) Find the general solution of the differential equation $\frac{dy}{dx} = e^{2x-5y}$.

(Use C to denote the arbitrary constant.)
 $y =$ _____ help (formulas)

5. (1 point) Find the general solution of the differential equation $\frac{dy}{dx} + y = e^{5x}$.

(Use C to denote the arbitrary constant.)
 $y =$ _____ help (formulas)

6. (1 point) Find the general solution of the differential equation $y' - 4y = x + 7$.

(Use C to denote the arbitrary constant.)
 $y =$ _____ help (formulas)

7. (1 point) Are the following differential equations exact? (You have only one attempt! Submit all answers at the same time)

(a) [Choose/Exact/Not Exact] $\left(1 - \frac{5}{y} + x\right) \frac{dy}{dx} + y = \frac{2}{x} - 1$.

(b) [Choose/Exact/Not Exact] $(2y - 6x)y' - 5y = 0$.

(c) [Choose/Exact/Not Exact] $\left(5y \sin(x) \cos(x) - y + 3y^2 e^{xy^2}\right) dx = (x - \sin^2(x) - 5xye^{xy^2}) dy$.

8. (1 point) Are the following differential equations exact? (You have only one attempt! Submit all answers at the same time)

(a) [Choose/Exact/Not Exact] $(x^8 - y^8) dx + (x^8 - 8xy) dy = 0$.

(b) [Choose/Exact/Not Exact] $(2y - 4x)y' - 4y - 8x = 0$.

(c) [Choose/Exact/Not Exact] $\left(5y \sin^4(x) \cos(x) - y + 4y^2 e^{xy^2}\right) dx = (x - \sin^5(x) - 8xye^{xy^2}) dy$.

9. (1 point)

Solve the following differential equation:

$(8x + 7y)dx + (7x - 9y^3)dy = 0$.

_____ = constant. help (formulas)

10. (1 point)

Solve the following differential equation:

$(y - x^2)dx + (x + y^2)dy = 0$.

_____ = constant. help (formulas)

11. (1 point)

Solve the following differential equation:

$$\left(1 - \frac{3}{y} + x\right) \frac{dy}{dx} + y = \frac{3}{x} - 1.$$

(If you need \ln , use absolute value signs. For example, $\ln|$ input $|$.)

_____ = constant. help (formulas)