1. At the end of the semester, half the final exam grade will replace the lowest test grade.
   
   (a) False.
   (b) True, but only for some students.
   (c) True for all students.
   (d) None of the above.

2. \( \ln(e^{\cos x}) = \)
   
   (a) \( \sin x \)
   (b) \( \ln(\sin x) \)
   (c) \( \cos x \)
   (d) \( \tan x \)
   (e) None of the above.

3. \( e^{3\ln x} = \)
   
   (a) \( 3x \)
   (b) \( \ln(x^3) \)
   (c) \( 3^x \)
   (d) \( x^3 \)
   (e) None of the above.

4. \( \int 6x \sin x^2 \, dx = \)
   
   (a) \( -3 \cos x^2 + C \)
   (b) \( 6 \cos x^2 + C \)
   (c) \( 3 \cos x^2 + C \)
   (d) \( -12 \cos x^2 + C \)
   (e) None of the above.

5. \( \int e^{x^2} \, dx = \)
   
   (a) \( \frac{e^{x^2}}{2x} + C \)
   (b) \( e^{x^2} + C \)
   (c) \( 2xe^{x^2} + C \)
   (d) \( e^{x^2} - 2xe^{x^2} + C \)
   (e) None of the above.
6. \( \int \frac{\ln x}{x} \, dx = \)
   
   (a) \( \ln(\ln x) + C \)
   (b) \( \frac{1}{2} (\ln x)^2 + C \)
   (c) \( 4 \ln (x^2) + C \)
   (d) \( \frac{1}{2} \ln (x^2) + C \)
   (e) None of the above.

7. \( \int e^x \ln x \, dx = \)
   
   (a) \( 4 \ln 4 \)
   (b) \( \ln(\ln 4) \)
   (c) \( \ln(\ln 4) - \ln e \)
   (d) \( -\ln(\ln 4) \)
   (e) None of the above.

8. \( \int \frac{dx}{\sqrt{9 - x^2}} = \)
   
   (a) \( \frac{1}{2} \sin^{-1}(x/3) + C \)
   (b) \( -\frac{1}{3} \sqrt{9 - x^2} + C \)
   (c) \( \sin^{-1}(x/3) + C \)
   (d) \( 2\sqrt{9 - x^2} + C \)
   (e) None of the above.

9. \( \int \frac{x \, dx}{\sqrt{4 - x^2}} = \)
   
   (a) \( \frac{1}{2} \sqrt{4 - x^2} + C \)
   (b) \( \frac{1}{2} \sin^{-1}(x/2) + C \)
   (c) \( -2\sqrt{4 - x^2} + C \)
   (d) \( -\sqrt{4 - x^2} + C \)
   (e) None of the above.

10. The order of the differential equation
    \[ \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} = \frac{d^3(\cos 2x)}{dx^3} \]
    is:
    
    (a) 1   (b) 2   (c) 3   (d) 4   (e) None of the above

11. The order of the differential equation
    \[ \frac{\partial^2 u}{\partial x^2} + \frac{\partial^3 u}{\partial x^2 \partial y} + \frac{\partial^2 u}{\partial y^2} = xy \frac{\partial u}{\partial x} \]
    is:
    
    (a) 1   (b) 2   (c) 3   (d) 4   (e) None of the above
12. The value(s) of $r$ such that $y = e^{rx}$ is a solution of $y'' - 2y' - 8y = 0$

is (are):

(a) $r = -4$, $r = 2$
(b) $r = -2$
(c) $r = -4$
(d) $r = -2$, $r = 4$
(e) None of the above.

13. The value(s) of $r$ such that $y = e^{rx}$ is a solution of $y'' - 6y' + 9y = 0$

is (are):

(a) $r = 3$
(b) $r = -3$, $r = 3$
(c) $r = 0$, $r = 3$
(d) $r = -3$
(e) None of the above.

14. The value(s) of $r$ such that $y = x^r$ is a solution of $y'' - \frac{3}{x}y' - \frac{12}{x^2}y = 0$

is (are):

(a) $r = 6$
(b) $r = 2$, $r = -6$
(c) $r = -2$, $r = 6$
(d) $r = 2$, $r = 6$
(e) None of the above.

15. The value(s) of $r$ such that $y = x^r$ is a solution of $x^2y'' + 9xy' + 16y = 0$

is (are):

(a) $r = 4$
(b) $r = -4$, $r = 4$
(c) $r = 0$, $r = -4$
(d) $r = -4$
(e) None of the above.