Second Year Assignment Test 2 Version O

1. Find an expression in terms of x and y for $\frac{dy}{dx}$, given that

a) $x^2 + y^3 = 2$ b) $y^3 + 3x^2y - 4x = 0$ c) $e^x y = xe^y$

2. $f(x) = \frac{4}{(2x+1)(1-2x)}$, $x \neq \pm\frac{1}{2}$

Using partial fractions, find $\int f(x)dx$,   writing your answer as a single logarithm

3. A particle of mass 0.3 kg is on a rough plane which is inclined at an angle of 30° to the horizontal. The particle is held at rest on the plane by a force of magnitude 3 N acting up the plane, in a direction parallel to a line of greatest slope of the plane. The particle is on the point of slipping up the plane. Find the coefficient of friction between the particle and the plane.

Second Year Assignment Test 2 Version P

1. Find an expression in terms of x and y for $\frac{dy}{dx}$, given that

a) $\frac{3}{2}x^2 + y^3 = 3$ b) $y^3 + 4x^2y - 4x = 2$ c) $e^x y = 2xe^y$

2. $f(x) = \frac{1}{(2x+1)(1-2x)}$, $x \neq \pm\frac{1}{2}$

Using partial fractions, find $\int f(x)dx$,   writing your answer as a single logarithm

3. A particle of mass 0.4 kg is on a rough plane which is inclined at an angle of 30° to the horizontal. The particle is held at rest on the plane by a force of magnitude 3 N acting up the plane, in a direction parallel to a line of greatest slope of the plane. The particle is on the point of slipping up the plane. Find the coefficient of friction between the particle and the plane.

Second Year Assignment Test 2 Version Q

1. Find an expression in terms of x and y for $\frac{dy}{dx}$, given that

a) $x^2 + y^4 = 2$ b) $y^3 - x^2y - 4x = 0$ c) $e^x y = -xe^y$

2. $f(x) = \frac{4}{(4x+1)(1-2x)}$, $x \neq \frac{1}{2}$ or $-\frac{1}{4}$

Using partial fractions, find $\int f(x)dx$, writing your answer as a single logarithm

3. A particle of mass 0.4 kg is on a rough plane which is inclined at an angle of 30° to the horizontal. The particle is held at rest on the plane by a force of magnitude 2 N acting up the plane, in a direction parallel to a line of greatest slope of the plane. The particle is on the point of slipping up the plane. Find the coefficient of friction between the particle and the plane.

Second Year Assignment Test 2 Version R

1. Find an expression in terms of x and y for $\frac{dy}{dx}$, given that

a) $x^3 + y^3 = 12$

b) $y^3 + ax^2y - 4x = 0$ (where a is a constant number)

c) $e^x y = axe^y$ (where a is a constant number)

2. $f(x) = \frac{1}{(ax+1)(1-bx)}$, $x \neq -\frac{1}{a}$ or $\frac{1}{b}$

Using partial fractions, find $\int f(x)dx$, writing your answer as a single logarithm

3. A particle of mass 0.5 kg is on a rough plane which is inclined at an angle of 30° to the horizontal. The particle is held at rest on the plane by a force of magnitude 4 N acting up the plane, in a direction parallel to a line of greatest slope of the plane. The particle is on the point of slipping up the plane. Find the coefficient of friction between the particle and the plane.

Answers Version O

1) a) $-\frac{2x}{3y^2}$ b)$\frac{4-6xy}{3x^2+3y^2}$ c)$\frac{e^x y - e^y}{xe^y - e^x}$

2) $\ln\left|\frac{2x+1}{1-2x}\right| + c$

3) 0.60

Answers Version P

1) a) $-\frac{x}{y^2}$ b)$\frac{4-8xy}{4x^2+3y^2}$ c)$\frac{e^x y - 2e^y}{2xe^y - e^x}$

2) $\frac{1}{4}\ln\left|\frac{2x+1}{1-2x}\right| + c$

3) 0.31

Answers Version Q

1) a) $-\frac{x}{2y^3}$ b)$\frac{4+2xy}{-x^2+3y^2}$ c)$\frac{e^x y + e^y}{-xe^y - e^x}$

2) $-\frac{2}{3}\ln\left|\frac{1-2x}{4x+1}\right| + c$

3) 0.012

Answers Version R

1) a) $-\frac{x^2}{y^2}$ b)$\frac{4-2axy}{ax^2+3y^2}$ c)$\frac{e^x y - ae^y}{axe^y - e^x}$

2) $\frac{1}{a+b}\ln\left|\frac{ax+1}{1-bx}\right| + c$

3) 0.37