First Year Doubles Assignment Test 16 Version O

1(a)Sketch the two inequalities $y < (2 - x)(3 + x)$ and $y - x \geq 2$
(b)Shade the region that satisfies both inequalities.

2. Given that $e^{2x} + e^{2y} = xy$, find $\frac{dy}{dx}$ in terms of *x* and *y*.

3. Corinne and her brother Dermot are lifted by their parents onto the two ends of a rope which is slung over a large horizontal branch. When their parents let go of them Dermot, whose mass is 54 kg, begins to descend with an acceleration of 1 ms^{-2}. By modelling the children as a pair of particles connected by a light inextensible string, and the branch as a smooth pulley,
a) Find Corinne's mass
b) Calculate the tension in the rope
c) Find the force on the branch
d) In a more sophisticated model, the branch is assumed to be rough. Explain what effect this would have on the initial acceleration of the children.

4. If $X \sim N(\mu, \sigma^2)$, find μ and σ when $P(X > 7) = 0.8$ and $P(X < 6) = 0.1$

5. Find an expression for $\int x(6x - 5\sqrt{x})dx$

First Year Doubles Assignment Test 16 Version P

1(a)Sketch the two inequalities $y < (2 + x)(3 - x)$ and $y + x \geq 2$.
(b)Shade the region that satisfies both inequalities.

2. Given that $e^{3x} + e^{2y} = 2xy$, find $\frac{dy}{dx}$ in terms of *x* and *y*.

3. Corinne and her brother Dermot are lifted by their parents onto the two ends of a rope which is slung over a large horizontal branch. When their parents let go of them Dermot, whose mass is 50 kg, begins to descend with an acceleration of 2 ms^{-2}. By modelling the children as a pair of particles connected by a light inextensible string, and the branch as a smooth pulley,
a) Find Corinne's mass
b) Calculate the tension in the rope

c) Find the force on the branch

d) In a more sophisticated model, the branch is assumed to be rough. Explain what effect this would have on the initial acceleration of the children.

4. If $X \sim N(\mu, \sigma^2)$, find μ and σ when $P(X > 150) = 0.3$ and $P(X < 120) = 0.4$

5. Find an expression for $\int x(7x - 6\sqrt{x})dx$

First Year Doubles Assignment Test 16 Version Q

1(a)Sketch the two inequalities $y < (2-x)(3-x) - 10$ and $y - x \geq -7$.
(b)Shade the region that satisfies both inequalities.

2. Given that e-2x + e-3y = axy, find $\frac{dy}{dx}$ in terms of x and y.

3. Corinne and her brother Dermot are lifted by their parents onto the two ends of a rope which is slung over a large horizontal branch. When their parents let go of them Dermot, whose mass is 46 kg, begins to descend with an acceleration of 3 ms–2. By modelling the children as a pair of particles connected by a light inextensible string, and the branch as a smooth pulley,
a) Find Corinne's mass
b) Calculate the tension in the rope
c) Find the force on the branch
d) In a more sophisticated model, the branch is assumed to be rough. Explain what effect this would have on the initial acceleration of the children.

4. If $X \sim N(\mu,\ \sigma^2)$, find μ and σ when $P(X > 0.1) = 0.4$ and $P(X \geq 0.6) = 0.25$

5. Find an expression for $\int x(8x - 7\sqrt{x})dx$

First Year Doubles Assignment Test 16 Version R

1(a)Sketch the two inequalities $y < (2-x)(3-x) - 2$ and $2y - x \geq -2$.
(b)Shade the region that satisfies both inequalities.

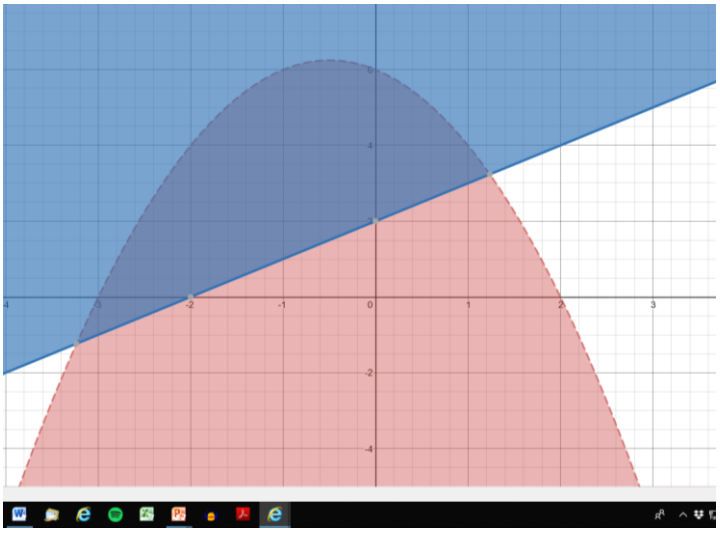
2. Given that $e^{px} + e^{qy} = axy$, find $\frac{dy}{dx}$ in terms of x and y.

3. Corinne and her brother Dermot are lifted by their parents onto the two ends of a rope which is slung over a large horizontal branch. When their parents let go of them Dermot, whose mass is 42 kg, begins to descend with an acceleration of 4 ms^{-2}. By modelling the children as a pair of particles connected by a light inextensible string, and the branch as a smooth pulley,
a) Find Corinne's mass
b) Calculate the tension in the rope
c) Find the force on the branch
d) In a more sophisticated model, the branch is assumed to be rough. Explain what effect this would have on the initial acceleration of the children.

4. If $X \sim N(\mu,\ \sigma^2)$, find μ and σ when $P(X > 700) = 0.8$ and $P(X \geq 400) = 0.99$

5. Find an expression for $\int x(9x - 8\sqrt{x})dx$

Answers Version O

1. 

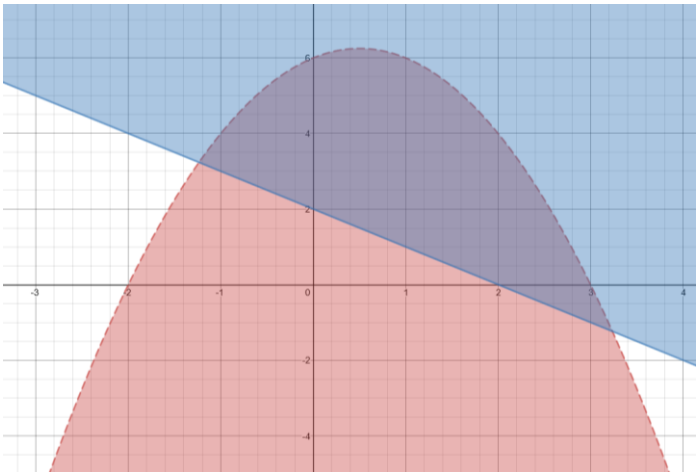
2. $\frac{dy}{dx} = \frac{y-2e^{2x}}{2e^{2y}-x}$

3. a) 44 b) 475 N c) 950 N
d) Friction opposes motion, therefore acceleration is smaller

4. $\mu = 8.91,\ \sigma = 2.27$

5. $2x^3 - 2x^{\frac{5}{2}} + c$

Answers Version P

1. 

2. $\frac{dy}{dx} = \frac{2y-3e^{3x}}{2e^{2y}-2x}$

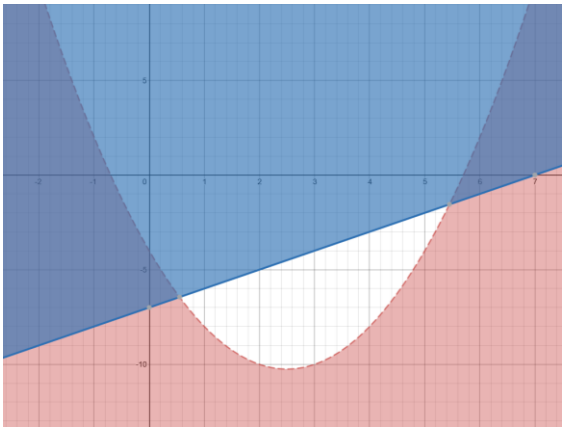
3. a) 33 kg b) 390 N c) 780 N
d) Friction opposes motion, therefore acceleration is smaller

4. $\mu = 130,\ \sigma = 38.6$

5. $\frac{7}{3}x^3 - \frac{12}{5}x^{\frac{5}{2}} + c$

Answers Version Q

1.



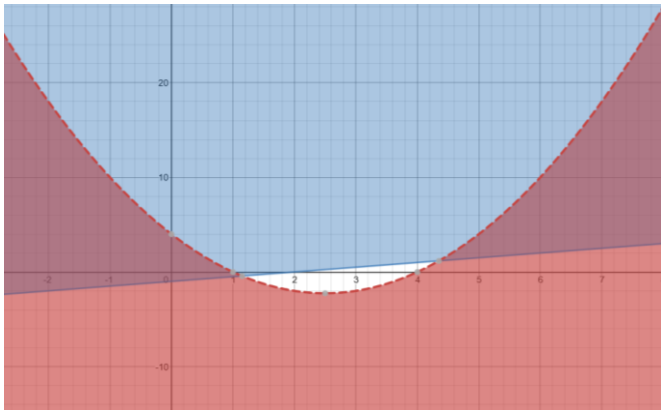
2. $\frac{dy}{dx} = \frac{-2-\mathrm{ay}}{\mathrm{ax}+3}$

3. a) 24.4 b) 313 N c) 689 N
d) Friction opposes motion, therefore acceleration is smaller

4. $\mu = -0.201,\ \sigma = 1.19$
5. $\frac{8}{3}x^3 - \frac{14}{5}x^{\frac{5}{2}} + c$

Answers Version R

1.



2. $\frac{dy}{dx} = \frac{ay-\mathrm{p}e^{px}}{\mathrm{q}e^{qy}-\mathrm{a}x}$

3. a) 17.7 b) 244 N c) 487 N
d) Friction opposes motion, therefore acceleration is smaller

4. $\mu = 870,\ \sigma = 202$
5. $3x^3 - \frac{16}{5}x^{\frac{5}{2}} + c$