Second Year Assignment Test 3 Version O

1. a) Given that the function $f(x) = x^2 + px$ is increasing on the interval $[-1,1]$, find one possible value for p.

b) State with justification whether this is the only possible value for p

2. In this question, all figures are rounded to 1 d.p. The masses of arctic foxes are found and the mean mass was 6.1 kg. The variance was 4.2
An outlier is an observation which lies ± 2 standard deviations from the mean.
   a) Which of these arctic fox masses are outliers?   2.4 kg, 10.1 kg, 3.7 kg, 11.5 kg

   b) What are the smallest and largest masses that an arctic fox can be without being an outlier?

3. A curve C is described by the equation $2x^2 + 3y^2 - x + 6xy - 1 = 0$
Find an equation of the tangent to C at the point (1,-2), giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

Second Year Assignment Test 3 Version P

1. a) Given that the function $f(x) = x^2 + px$ is increasing on the interval $[-3,1]$, find one possible value for p.

b) State with justification whether this is the only possible value for p

2. In this question, all figures are rounded to 1 d.p. The masses of arctic foxes are found and the mean mass was 5.3 kg. The variance was 3.8
An outlier is an observation which lies ± 2 standard deviations from the mean.
   a) Which of these arctic fox masses are outliers?   2.4 kg, 10.1 kg, 3.7 kg, 11.5 kg

   b) What are the smallest and largest masses that an arctic fox can be without being an outlier?

3. A curve C is described by the equation $3x^2 + 2y^2 + x + 2xy - 38 = 0$
Find an equation of the tangent to C at the point (3,1), giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

Second Year Assignment Test 3 Version Q

1. a) Given that the function $f(x) = x^2 + px$ is increasing on the interval $[-5,1]$, find one possible value for p.

b) State with justification whether this is the only possible value for p

2. In this question, all figures are rounded to 1 d.p. The masses of arctic foxes are found and the mean mass was 8 kg. The variance was 3
An outlier is an observation which lies ± 2 standard deviations from the mean.
   a) Which of these arctic fox masses are outliers?   2.4 kg, 10.1 kg, 3.7 kg, 11.5 kg

   b) What are the smallest and largest masses that an arctic fox can be without being an outlier?

3. A curve C is described by the equation $-2x^2 + 5y^2 + 2x - 3xy + 1 = 0$
Find an equation of the tangent to C at the point (-2,1), giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

Second Year Assignment Test 3 Version R

1. a) Given that the function $f(x) = x^2 + px$ is increasing on the interval $[-a, 1]$, find one possible value for p in terms of a.

b) State with justification whether this is the only possible value for p

2. In this question, all figures are rounded to 1 d.p. The masses of arctic foxes are found and the mean mass was 5 kg. The variance was 8
An outlier is an observation which lies ± 2 standard deviations from the mean.
   a) Which of these arctic fox masses are outliers?   2.4 kg, 10.1 kg, 3.7 kg, 11.5 kg

   b) What are the smallest and largest masses that an arctic fox can be without being an outlier?

3. A curve C is described by the equation $2x^2 + 3y^2 - x + 6xy + 5 = 0$
Find an equation of the tangent to C at the point (e, f), Write your answer in the form $ax + by + c = 0$, where a, b and c are in terms of e and f.

Answers Version O

1 a) $p \geq 2$ b) No. Can be any $p \geq 2$

2 a) 11.5 kg   b) Smallest 2.0 kg, Largest 10.2 kg

3. $3x + 2y + 1 = 0$

Answers Version P

1 a) $p \geq 6$ b) No. Can be any $p \geq 6$

2 a) 10.1 and 11.5 kg   b) Smallest 1.4 kg, Largest 9.1 kg (9.2 is an outlier)

3. $21x + 10y - 73 = 0$

Answers Version Q

1 a) $p \geq 10$ b) No. Can be any $p \geq 10$

2 a) 2.4kg, 3.7 kg, 11.5 kg   b) Smallest 4.5 kg, Largest 11.4 kg (11.5 is an outlier)

3. $7x + 16y - 2 = 0$

Answers Version R

1 a) $p \geq 2a$ b) No. Can be any $p \geq 2a$

2 a) 11.5 kg   b) There is no smallest value, Largest 10.6 kg (10.7 is an outlier)

3. $(4e + 6f - 1)x + (6e + 6f)y + e - 12ef - 6f^2 - 4e^2 = 0$