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| C:\Users\David\Dropbox\rossmoyne.png | **MATHEMATICS METHODS : UNITS 1 & 2, 2020** Test 3 –Trigonometric, Probability, Counting, Exponentials (10%)(1.2.10 to 1.2.16, 1.3.6 to 1.3.17, 2.1.1 to 2.1.7)Calculator Assumed - Allow 1 Minute of Reading Time |
| **Time Allowed****25 Minutes** | **First Name Surname** | **Marks** **23 marks** |

**Circle your Teacher’s Name:** Bestall Goh Fraser-Jones Freer Koulianos Luzuk Rudland Tanday

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| **Assessment Conditions: *(N.B. Sufficient working out must be shown to gain full marks)***

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| * Calculators: Allowed
* Formula Sheet: Provided
* Notes: Not Allowed
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1. **(1, 3 = 4 marks)**

An under 16 soccer coach must choose a team of 11 players from 2 Goalkeepers, 8 Defenders, 6 Midfielders and 6 Strikers.

* 1. Determine how many different teams of 11 players he can make if there are no restrictions.
	2. Determine how many different teams can be made if he has to pick 1 Goalkeeper, 4 Defenders, 3 Midfielders and 3 Strikers to form a team.

1. **(2, 2, 2 = 6 marks)**

In a small suburb of Perth, it is found that the population of mosquitoes decreases as the population of spiders increases. Scientists found that this can be modelled exponentially.

* 1. The population of mosquitoes decreased at a rate of 10% per month and was originally 100,000. Determine an exponential equation in the form $P\_{m}=k(a)^{t}$ to represent this information.
	2. Determine, after which month the mosquito population will be halved.
	3. If the population of spiders increases by 20% per month and can be modelled according to the exponential equation $P\_{s}=10000\left(1.2\right)^{t}$, determine when the populations will be equal leaving your answer to one decimal place.
1. **(2, 2, 3 = 7 marks)**

Given that for events $A$ and $B$ the $P(A) = 0.6, P(A|B) =0.6 and P(A∩B) = 0.3$

* 1. Determine $P(B|A)$
	2. Determine $P(\overbar{A∪B}|\overbar{B})$
	3. Determine whether $A$ and $B$ are independent, mutually exclusive or other.

Justify your answer.

1. **(2, 2, 2 = 6 marks)**

In Zombieland you have a 90% chance of becoming a Zombie from a worldwide airborne virus called Zee. The disease takes 1 week for an individual to experience symptoms and start turning into a Zombie. A test to identify the disease has been rushed into production, but it only shows an 80% success rate in detecting those who have the disease and a 90% success rate for those who do not have the disease.

* 1. Draw a probability tree to represent this information.
	2. Determine the probability that the test will give the correct result.
	3. Determine the probability that the test is incorrect, despite the test showing they have the disease.

