

11 Maths C Diagnostic Test Mid Term 3**KAPS**

- 1a George has 3 different shirts, 5 different pairs of pants and 2 different pairs of shoes. If he wears one of each of these, how many different ways can he dress?

$$3 \times 5 \times 2 = 30$$

- 1b There are 8 horses in a race. How many possible different results are there for the first three places if there are no ties?

$${}^8P_3 = 336$$

- 1c Scraggo the Scary took 7 prisoners and told them to choose 3 to be sacrificed to the Meat God. In how many different ways can the prisoners make their choice? Do you think they would come to a unanimous decision?

$${}^7C_3 = 35$$

- 1d Use the binomial theorem to expand $(x + 2)^6$.

$$x^6 + 12x^5 + 60x^4 + 160x^3 + 240x^2 + 192x + 64$$

- 2a There are 12 girls and 10 boys in a class. They need 4 girls and 3 boys for the mixed netball team. How many different selections are possible?

$${}^{12}C_4 \times {}^{10}C_3 = 59400$$

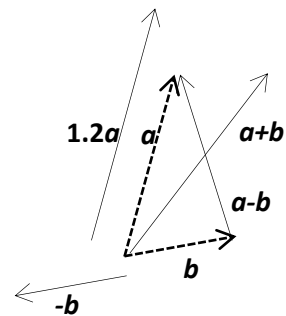
- 2b 13 knights were sat at random around a round table. To 3 significant figures, what is the probability that Lancelot, Lucifer and Laser were sat together?

$$(11! \div 11) \div (13! \div 13) \times 3! = 0.0455$$

3a For each of the following quantities, say whether it is a scalar or a vector

Mass	s
Length	s
Speed	s
Displacement	v
Velocity	v
Acceleration	v
Force	v
Energy	s

3b If \mathbf{a} and \mathbf{b} are two vectors, draw on a single diagram \mathbf{a} , \mathbf{b} , $\mathbf{a}+\mathbf{b}$, $\mathbf{a}-\mathbf{b}$, $-\mathbf{b}$, $1.2\mathbf{a}$



MAPS

4 letters were placed into 4 envelopes. What is the probability that just one goes into the right envelope?

There are $4!$ ways of placing the letters. If letter 1 goes into envelope 1, the others can be arranged in 2 ways to be all wrong. Ditto for 2, 3 and 4. Total 8 ways. $P = \frac{1}{3}$.

What main assumption needs to be made to get this result? If this assumption was not met, how would this affect the probability?

Placed at random. Any attempt to put them in the right envelope will increase the probability.