

## Mechanics 1 – Basic Moments

Please **complete** this homework by \_\_\_\_\_. Start it early. If you can't do a question you will then have time to ask your teacher for help or go to a drop in session.

### Section 1 – Review of previous topics. Please complete all questions.

1. The table below shows the maximum daily temperature during May 1987 in Camborne.

Temperature (°C)	10	11	12	13	14	15	16	17
Frequency	1	4	7	8	4	4	2	1

a) Calculate the mean and standard deviation for this data.

During May 1987 in Leuchars the Mean and Standard deviation of the maximum daily temperature were 13.4 °C and 3.2 °C respectively.

b) Compare the maximum daily temperature in Camborne and Leuchars during May 1987.

2. A stone is thrown vertically upwards with initial speed 28m/s. Find the time taken to reach the greatest height and find this greatest height.

3. The events A and B are such that

$$P(A) = \frac{5}{16}, \quad P(B) = \frac{1}{2} \quad \text{and} \quad P(A | B) = \frac{1}{4}$$

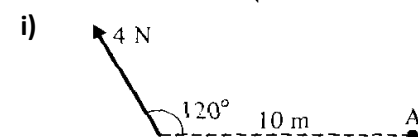
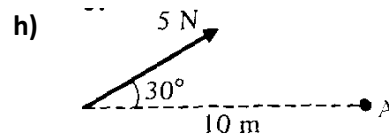
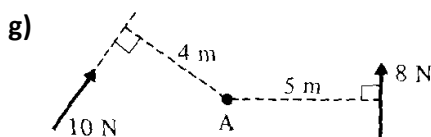
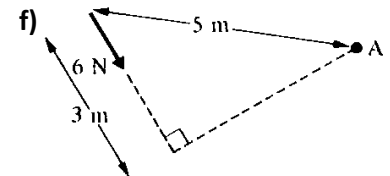
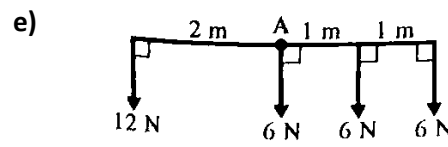
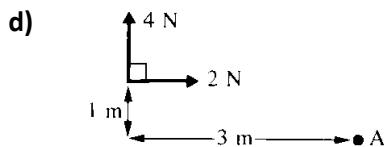
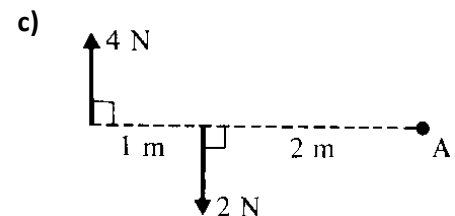
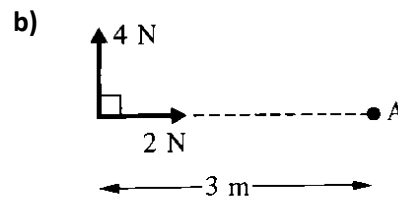
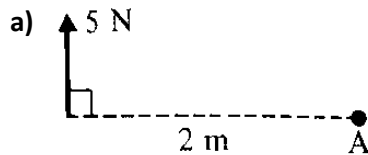
$$\text{Find } (a) P(A \cap B), \quad (b) P(B' | A), \quad (c) P(A' \cup B).$$

(d) Determine, with a reason, whether or not the events A and B are independent.

4. A particle moves along a straight line and t seconds after passing through an origin O the velocity of the particle is given by  $v = kt^2 - ct$  where k and c are constants. When  $t = 2$  the particle is again at O and has an acceleration of 6 m/s<sup>2</sup>. Find the values of k and c.

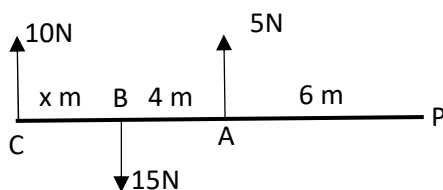
## Section 2 – Consolidation of this week’s topic. Please complete all questions.

1. For each of the Diagrams below, find the total moment about point A, and state whether clockwise or anti clockwise.



(22)

2. In the diagram below P is the Pivot, PA = 6m , AB = 4m , and BC = x m. Find the values of x if the total moment about P is a) zero, b) 20 Nm Clockwise , c) 5 Nm.



(12)

3. A broom consists of a uniform broomstick of length 120 cm and mass 4 kg with a broom head of mass 6 kg attached at one end. Find where a support should be placed so that the broom will balance horizontally.

**(A uniform beam means that the weight of the beam can be taken as acting at the centre point)**

(6)

**TOTAL 40 Marks**