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Sports, exercise and health science
Higher level
Paper 1B

28 April 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

Session number

1 hour 45 minutes [Paper 1A and Paper 1B]

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Instructions to students

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- A clean copy of the **SEHS data booklet** is required for this paper.
- The maximum mark for paper 1B is **[25 marks]**.
- The maximum mark for paper 1A and paper 1B is **[65 marks]**.

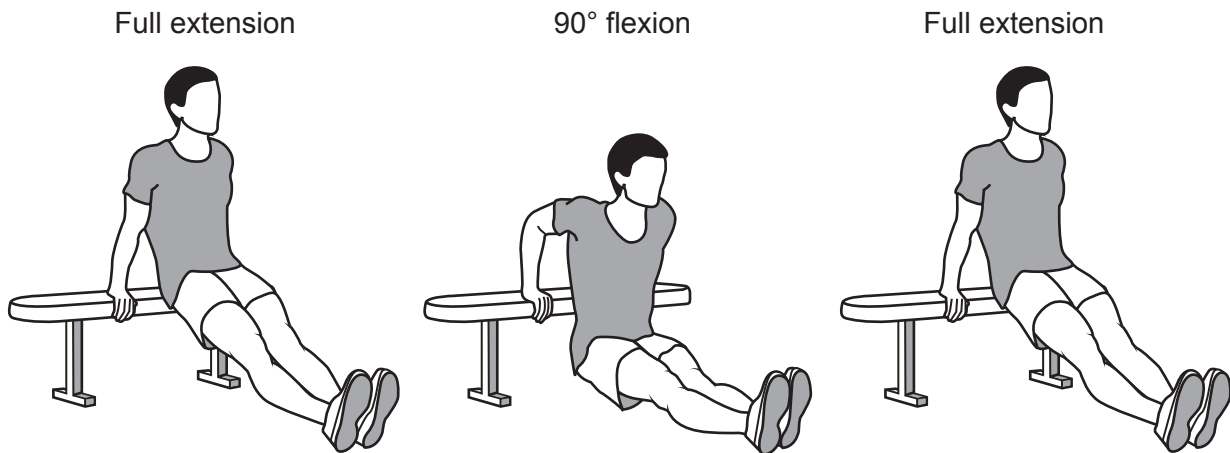


Answer **all** questions. Answers must be written within the answer boxes provided.

- The CoolMitt is a cooling device used by athletes to lower body temperature, decrease recovery time and enhance performance. It is commonly applied between sets during resistance training.

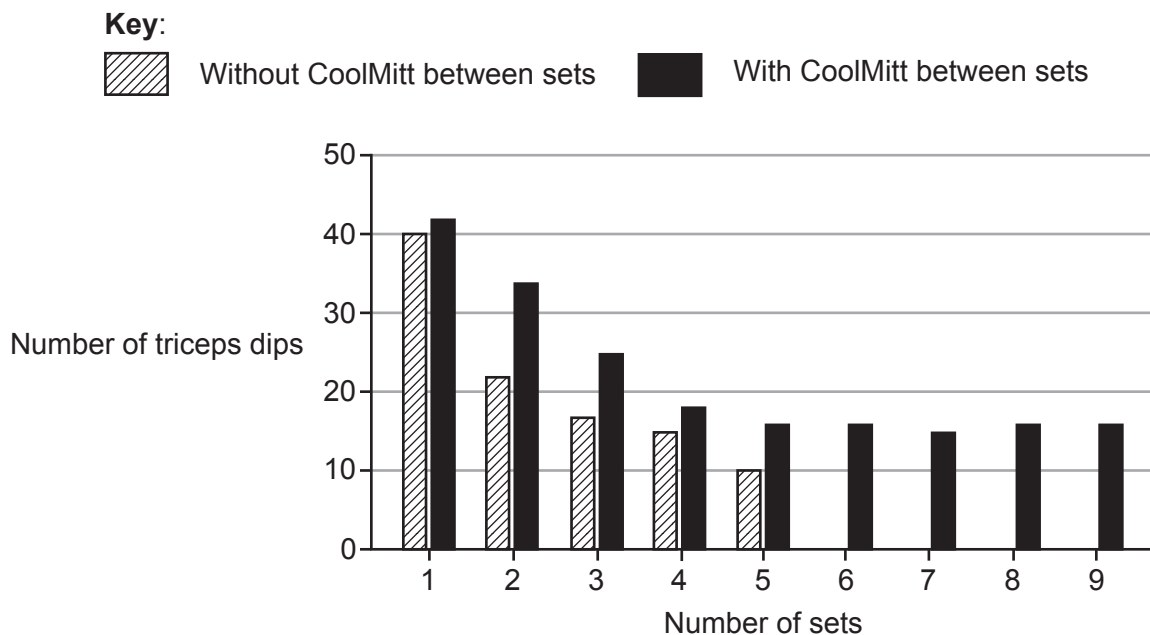
Figure 1 shows an athlete performing a triceps dip. They begin with full extension, move to 90° flexion and then back to full extension at the elbow.

Figure 1: Triceps dip



An athlete performed sets of triceps dips to failure without using a CoolMitt during their two-minute recovery periods. They repeated the exercise the following week, this time using a CoolMitt during the same recovery periods. The number of triceps dips completed per set is presented in **Figure 2**.

Figure 2: Number of triceps dips with and without a CoolMitt between sets



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(Question 1 continued)

- (a) Using the data from **Figure 2**, discuss the hypothesis that using a CoolMitt improves recovery between sets.

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- (b) Suggest **two** factors affecting accuracy when recording the number of triceps dips completed in each set.

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- (c) Explain **two** weaknesses of study design when collecting data from only one athlete.

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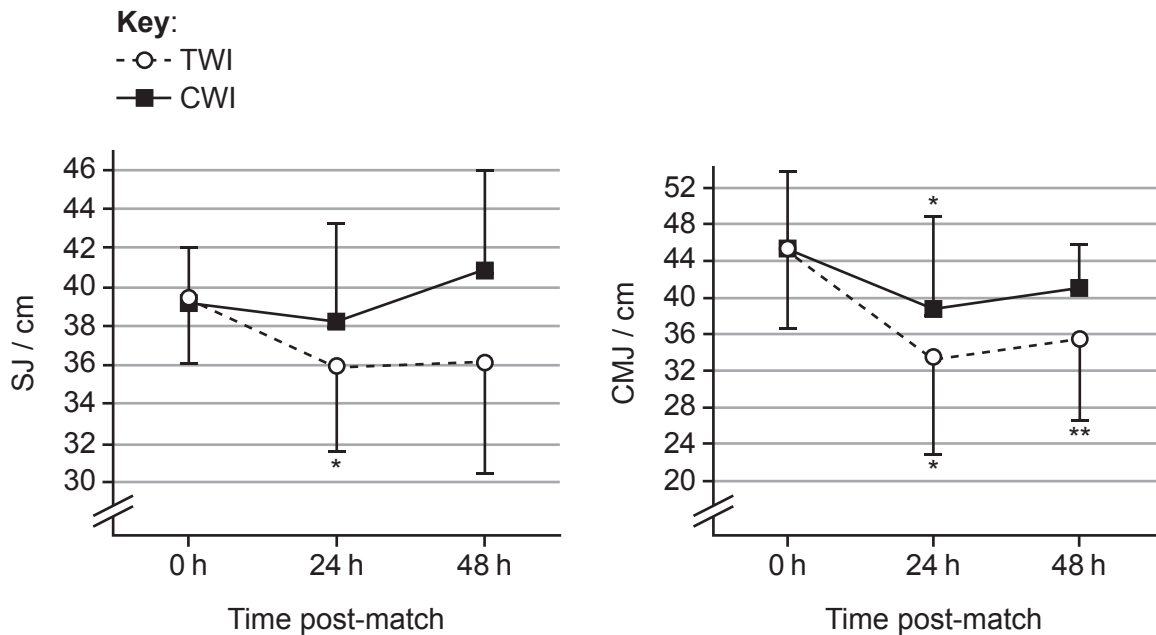
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2. A study investigated thermoneutral water immersion (TWI) and cold water immersion (CWI) after a soccer (football) match on 22 athletes. After 20 minutes of immersion, the athletes performed maximal squat jumps (SJ) and countermovement jumps (CMJ). The tests were repeated 24 and 48 hours later.

Figure 3 shows the mean and standard deviation of the jump heights (cm) for maximal squat jumps and countermovement jumps recorded 0, 24 and 48 hours (h) post-match.

Figure 3: Number of squat jumps and countermovement jumps post-match



* $p < 0.05$ significance between 0 and 24 hours post-match

** $p < 0.05$ significance between 0 and 48 hours post-match

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(Question 2 continued)

- (a) Calculate the difference between the mean of the squat jump heights 48 hours post-match for CWI and TWI.

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- (b) Interpret the data of TWI in relation to countermovement jumps.

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- (c) Discuss **two** safety considerations when using CWI for recovery.

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3. A group of 13 golfers used sensors to collect data about how their golf club and ball interact. Each golfer completed 2 sessions, hitting 10 balls per session. The results are provided in **Table 1**.

Table 1: Golf club and ball interaction data for 13 golfers

	Mean $\pm$ standard deviation (session 1)	Mean $\pm$ standard deviation (session 2)
Flight distance / m	209.39 $\pm$ 43.29	233.41 $\pm$ 40.57
Club speed / km h ⁻¹	162.54 $\pm$ 26.96	172.96 $\pm$ 26.43
Ball speed / km h ⁻¹	234.36 $\pm$ 41.79	247.28 $\pm$ 39.50
Ball launch angle / degrees	13.50 $\pm$ 2.11	13.18 $\pm$ 2.03

- (a) Research suggests that hitting a golf ball further leads to better scores. Interpret the impact of the data in **Table 1** on flight distance.

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- (b) Explain why measuring the flight distance of a golf ball indoors is more accurate than outdoors.

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(Question 3 continued)

- (c) A second study assessed the effect of different golf clubs on flight distance. Participants were randomly assigned one of two types of golf club. Outline the concept of double blinding in the context of this study.

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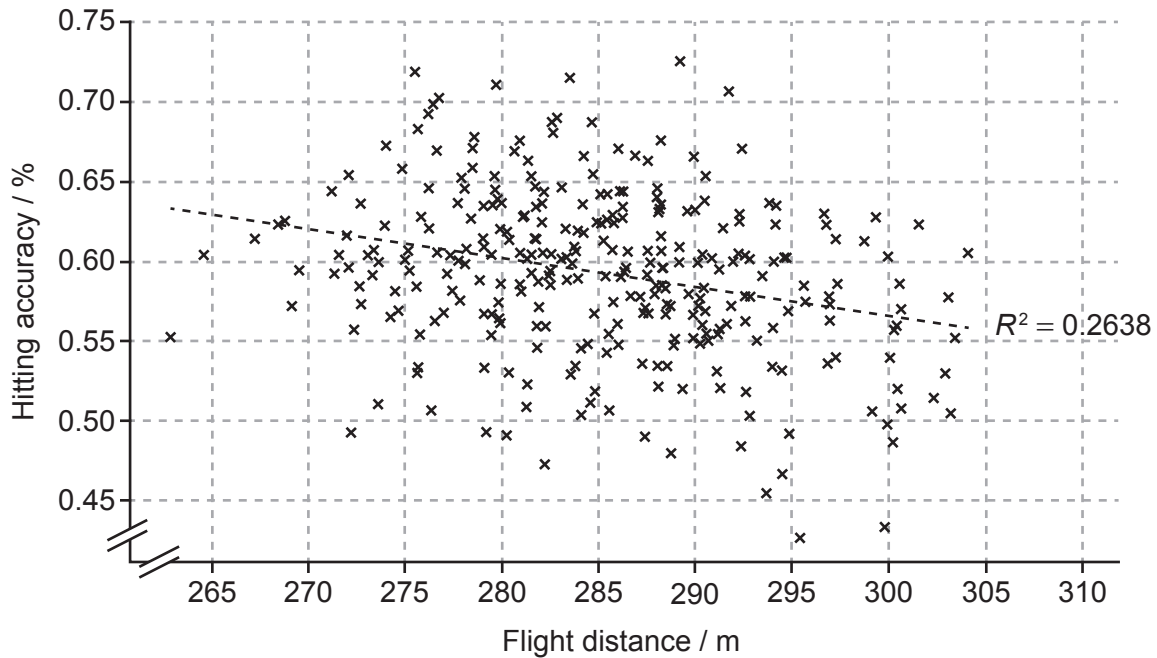
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4. Over the course of a season, the hitting accuracy and flight distance of 130 golfers was recorded. The correlation between hitting accuracy and flight distance is provided in **Figure 4**.

Figure 4: The correlation between hitting accuracy and flight distance for 130 golfers



- (a) State the flight distance associated with the highest hitting accuracy.

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- (b) Explain what the R^2 value represents in **Figure 4**.

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(Question 4 continued)

- (c) The sensors used to measure the interaction between the golf club and the ball consistently recorded a flight distance error. Discuss the impact of this measurement error.

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References:

- Figure 1** Bulgakov, O., 2021. *Bench Triceps Dips Man Exercise. Workout Exercising Guide. Colorful Concept Guy Working on His Triceps - stock illustration.* [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/bench-triceps-dips-man-exercise-workout-royalty-free-illustration/1354012432?phrase=tricep%20dips&searchscope=image,film&adppopup=true> [Accessed 4 April 2025]. Source adapted.
- Figure 3** Ascensão, A., Leite, M., Rebelo, A.N., Magalhães, S., and Magalhães, J., 2010. Effects of cold water immersion on the recovery of physical performance and muscle damage following a one-off soccer match. *Journal of Sports Sciences*, 29(3), pp. 217–225. Reprinted by permission of Informa UK Limited, trading as Taylor & Francis Group, www.tandfonline.com. Source adapted.
- Table 1** Bishop, C., Wells, J., Ehlert, A., Turner, A., Coughlan, D., Sachs, N., and Murray, A., 2023. Trackman 4: Within and between-session reliability and inter-relationships of launch monitor metrics during indoor testing in high-level golfers. *Journal of Sports Sciences*, 41(23), pp. 2138–2143. Reprinted by permission of Informa UK Limited, trading as Taylor & Francis Group, www.tandfonline.com. Source adapted.

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12EP10

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12EP11

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