

Q1. (2019)

20 Expressions for consecutive triangular numbers are

$$\frac{n(n+1)}{2} \quad \text{and} \quad \frac{(n+1)(n+2)}{2}$$

Prove that the sum of two consecutive triangular numbers is always a square number.

[4 marks]

Q2. (2020)

4 Circle the expression that has the **largest** value when $a < -1$

[1 mark]

$$\frac{1}{2}a \qquad a \qquad a^2 \qquad a^3$$

Q3. (2020)

19 a and b are positive values.

Show that $\frac{7a+2b-3a}{8a+6b+2a-b}$ always simplifies to the same value.

[3 marks]

Q4. (2021)

21 x is an integer.

Prove that $35 + (3x + 1)^2 - 2x(4x - 3)$ is a square number.

[4 marks]

Q5. (2023)

8 $(a-3)x^2 + 2b \equiv 5x^2 + 12$

Work out the values of a and b .

[2 marks]

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$

Q5. (2023)

15 Expand $(x^2 - 9xy)(2x + 5y)$

[2 marks]

Q6. (2023)

25 Show that $\frac{x-5}{x-2} + \frac{x+5}{x+2}$

simplifies to $\frac{ax^2-b}{x^2-4}$ where a and b are integers.

[3 marks]