La Scoula d'Italia / Huson / IB Math: Sequences First & last name:
7 October 2025 Grade:

1.5 Homework: Geometric sequences & algebra review, due Thursday 9 October

1. The second term of an arithmetic sequence is 9 and the fifth term is 31.

   (a) Find the value of the common difference. [2]

   (b) Find an expression for u_n, the n^{th} term. [3]

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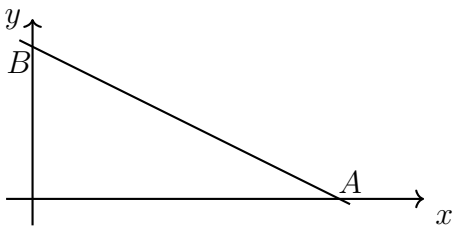
2. The diagram shows the straight line L_1, which intersects the x-axis at $A(6, 0)$ and the y-axis at $B(0, k)$. The gradient of L_1 is $-\frac{1}{3}$. *Diagram is not to scale*



(a) Find the value of k. [2 points]

(b) Write down the equation for the line L_1. [2 points]

(c) The line L_2 is perpendicular to L_1 and passes through the origin. [2 points]
Find the equation for the line L_2.

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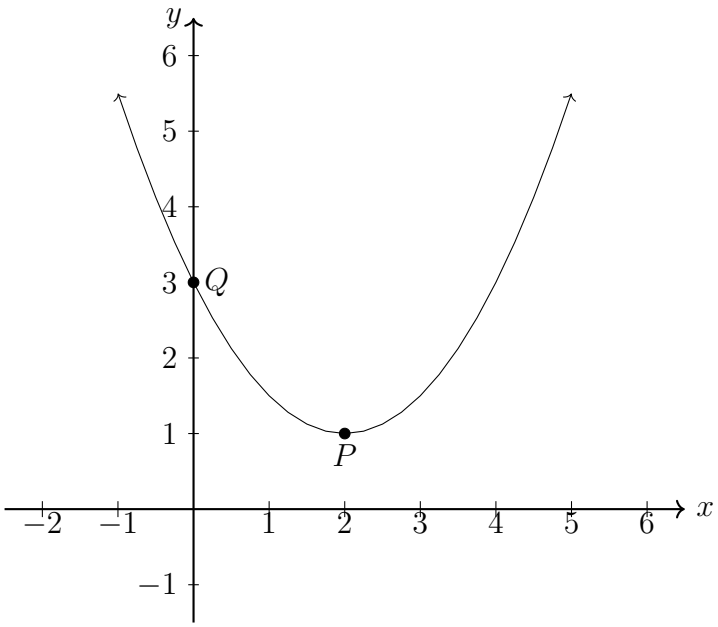
3. Let f be a quadratic function. Part of the graph of f is shown below. The vertex is at $P(2, 1)$ and the y-intercept is at $Q(0, 3)$.



(a) Write down the equation of the axis of symmetry.

(b) The function f can be written in the form $f(x) = a(x - h)^2 + k$. Write down the value of h and of k.

(c) Find a.

4. BMI is a measure of a healthy personal weight,

$$BMI = \frac{w}{h^2}$$

where
w is a person's weight in kilograms, and
h is height in meters

(a) Given a height of 160 cm and weight of 54 kg, find the BMI [3 marks]

(b) These measurements are not exact. Assuming the height is between 159-161 cm and weight 53-55 kg, find the bounds of the BMI. [4 marks]

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