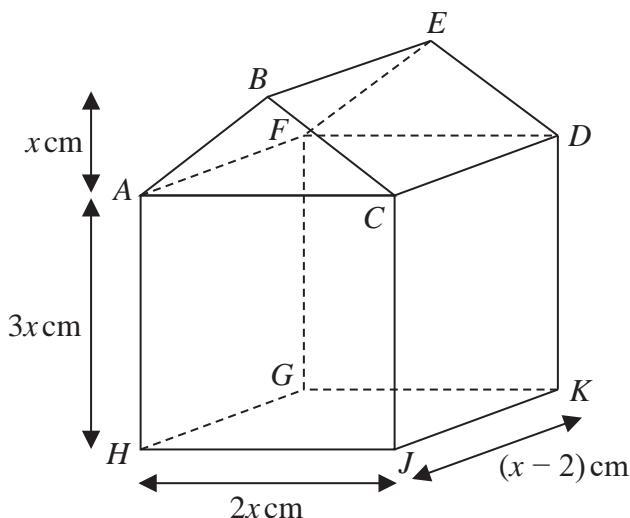


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**Figure 2**

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Figure 2 shows a solid right pentagonal prism $ABCDEF GHJK$ which is made by fixing a solid right triangular prism $ABCDEF$ onto a solid cuboid $ACDFGHJK$.

The triangle ABC is isosceles with $BA = BC$ and the height of the triangle is x cm.

$$AH = FG = CJ = DK = 3x \text{ cm}$$

$$AC = HJ = FD = GK = 2x \text{ cm}$$

$$HG = JK = AF = CD = (x - 2) \text{ cm}$$

The volume of the pentagonal prism is 1008 cm^3

(a) Show that $x^3 - 2x^2 - 144 = 0$

(4)

Given that $f(x) = x^3 - 2x^2 - 144$

(b) use the factor theorem to show that $(x - 6)$ is a factor of $f(x)$

(2)

(c) (i) Find the value of p , the value of q and the value of r so that

$$f(x) = (x - 6)(px^2 + qx + r)$$

(ii) Hence explain why the equation $f(x) = 0$ has only one solution.

(4)

$$\left[\text{Solutions of } ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$$



Question 8 continued

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(Total for Question 8 is 10 marks)



P 6 6 3 1 1 A 0 3 1 4 0