Answer **all** the questions.

1 **(a)** Simplify $\frac{24c^3d^2}{(3de^2)^3} \div \frac{5c^{-2}}{10df}$. [2]

(b) Express as a single fraction $\frac{7}{(6-5p)^2} - \frac{2p-1}{10p-12}$. [3]

(c) Simplify $\frac{6x^2-17x+5}{18x^2-2} \times \frac{15x+5}{10-4x}$. [3]

(d) It is given that $1-\frac{a-b}{b+2c} = \frac{2a-1}{2}$.

Express b in terms of a and c. [3]

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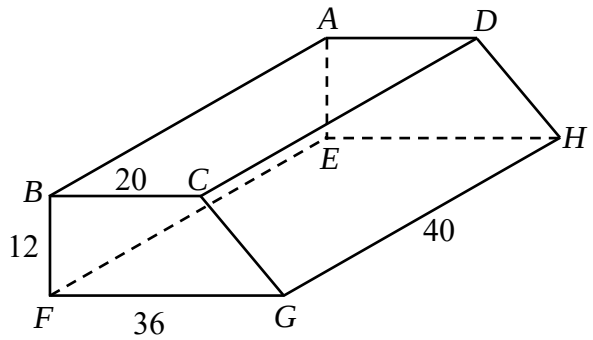
2 The diagram shows a solid prism $ABCDEFGH$ with a horizontal rectangular base $EFGH$ and a horizontal rectangular top $ABCD$.
B is vertically above F and A is vertically above E.
BC = 20 cm, FG = 36 cm, BF = 12 cm and GH = 40 cm.

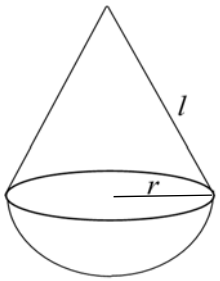


(a) Find the length of BH. [2]

(b) Find the **total surface area** of the prism. [3]

(c) The prism is melted and recast into a right pyramid with a square base.
The height of the pyramid is 24 cm.
Find the length of each side of the square base. [3]

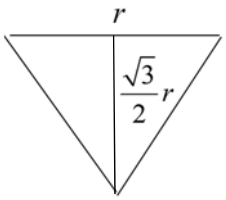
22(a) A solid is made from a cone and a hemisphere. The cone has radius r cm and slant height l cm. The hemisphere has radius r. Write down the total surface area of the solid in terms of r and l.



Answer ..... cm^2 [1]

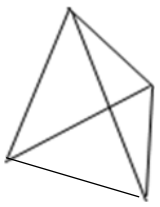
(b) The height and base an equilateral triangle are $\frac{\sqrt{3}}{2}r$ cm and r cm respectively.

(i) Find the area of the equilateral triangle.



Answer ..... cm^2 [1]

(ii) 4 of the equilateral triangles in (i) are used to make a tetrahedron (a right triangular pyramid) shown in the diagram. Find the total surface area of the tetrahedron.



Answer ..... cm^2 [1]

(c) The total surface area of the solid in (a) is equal to the total surface area of the tetrahedron in (b). Find l in terms of r.

Answer $l =$ ..... [2]

8 A hollow glass container, shown in Diagram 1, is formed by joining a hemispherical base to a cone.
The hemisphere has a radius of 6 cm and the height of the cone is h cm.
The volume of the cone is 980 cm^3.

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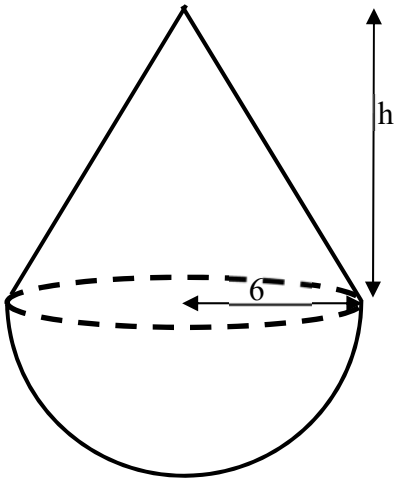

Diagram 1

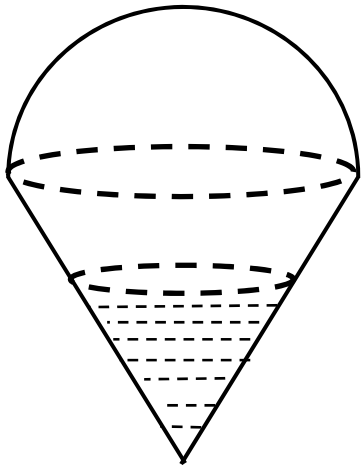

Diagram 2

(i) Show that $h = 26.0$ cm. [2]

(ii) Find the surface area, in square metres, of the exterior of container. [3]

(b) The container was half filled with water and then inverted as shown in diagram 2.
Find the height of water level in Diagram 2. [4]