

1 (a) Expand and simplify $\left(2a - b + \frac{c}{8}\right)^2$. [2]

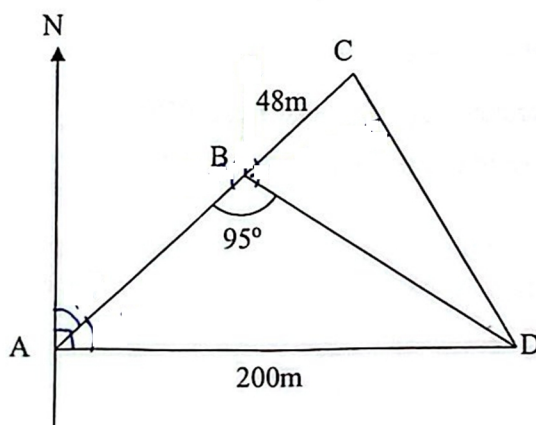
(b) Simplify $\frac{(p+2q)^2}{p^3+8q^3} \times \frac{(p^2-2pq)^2-16q^4}{p+2q}$. [3]

2 Express $\frac{5}{12x+4y} + \frac{1}{2y-3x} + \frac{3}{9x^2-3xy-2y^2}$ as a single fraction, leaving your answer in its simplest form. [3]

3 Make r the subject of the formula $3h = 2p\sqrt{\frac{r+k}{r-k}}$. [3]

4 Solve $8(3p+2)^6 = 7(3p+2)^3 + 1$ by substituting $y = (3p+2)^3$. [4]

- 5 A, B, C and D are four points on a horizontal field where D is due east of A . $AD = 200\text{m}$, $BC = 48\text{m}$ and angle $ABD = 95^\circ$. The bearing of B from A is 040° .



(a) Find the bearing of A from B . [1]

(b) Show that the length of CD is 157.07 m , correct to 5 significant figures. [4]

(c) Find the shortest distance from B to CD . [2]

A pole of height 9.5 m is located at C .

(d) Calculate the angle of depression of D from the top of the pole at C . [2]

- 6 Diagram I shows a figure formed using a **regular** hexagon $ABCDEF$ and three identical sectors OGH , OIJ and OKL . The hexagon has sides 6 cm and the radius of the sectors is 9 cm. The centres of the hexagon and sectors coincide at O as shown in diagram II.

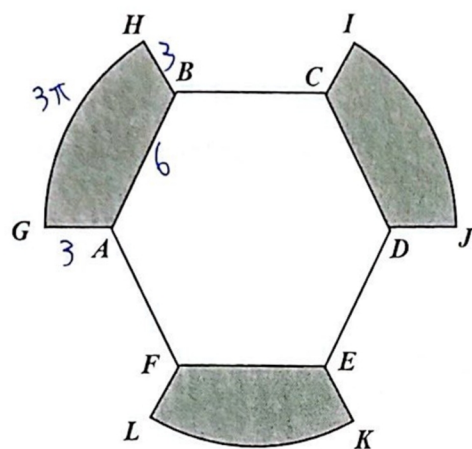


Diagram I

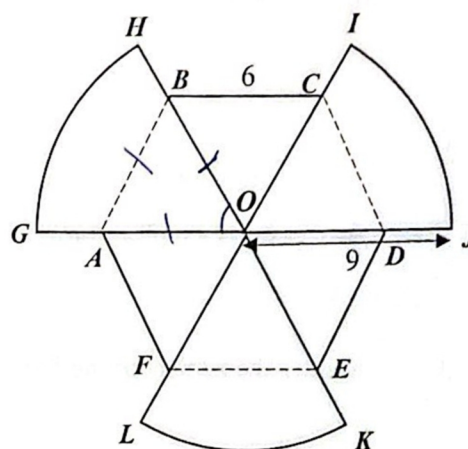


Diagram II

- (a) Show that the angle AOB is $\frac{\pi}{3}$ rad. [1]
- (b) Find
- (i) the perimeter of the shaded area $ABHG$, [2]
 - (ii) the area of whole figure in Diagram I. [3]

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