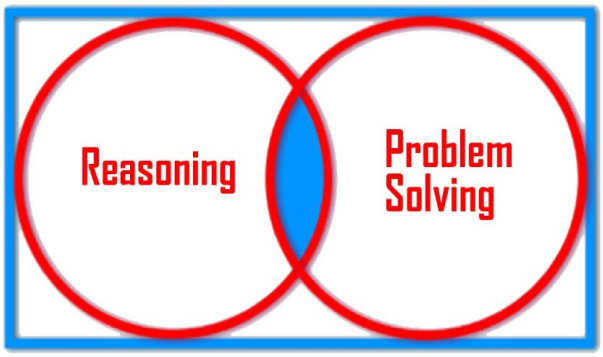
Bridging the Gap

GCSE to A – Level Transition



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Surds

Answers

1 Simplify the following surds.
Give your answers in the form $a\sqrt{b}$.
Where a and b are rational numbers

a) $\sqrt{48} = \mathbf{4\sqrt{3}}$

b) $\sqrt{75} = \mathbf{5\sqrt{3}}$

c) $\sqrt{200} = \mathbf{10\sqrt{2}}$

d) $\sqrt{\frac{1}{32}} = \mathbf{\frac{1}{4\sqrt{2}}} = \mathbf{\frac{\sqrt{2}}{8}}$

e) $\sqrt{\frac{3}{375}} = \sqrt{\mathbf{\frac{1}{125}}} = \mathbf{\frac{1}{5\sqrt{5}}} = \mathbf{\frac{\sqrt{5}}{25}}$

2 Simplify the following calculations.
Give your answer in the form $k\sqrt{m}$.
Where k and m are rational numbers

a) $\sqrt{12} + \sqrt{27} + 6\sqrt{3} = \mathbf{11\sqrt{3}}$

b) $\sqrt{125} - 8\sqrt{5} + \sqrt{500} = \mathbf{7\sqrt{5}}$

c) $\sqrt{63} - \sqrt{343} - 10\sqrt{7} = \mathbf{-14\sqrt{7}}$

d) $\sqrt{90} + \sqrt{40} - \sqrt{250} = \mathbf{0}$

e) $\sqrt{48} + 3\sqrt{3} - (\sqrt{12} \times 5\sqrt{3}) - \sqrt{75} = \mathbf{-30 + 2\sqrt{3}}$

3 Expand and simplify the following surds

a)) $\sqrt{2}(3+\sqrt{3})+\sqrt{8}$

b) $5(3+\sqrt{3})+\sqrt{3}(\sqrt{27}+\sqrt{3})$

c) $(5-\sqrt{5})(4+\sqrt{5})$

d) $(1+3\sqrt{2})(1+3\sqrt{10})$

e) $(2\sqrt{3}-3\sqrt{2})(5\sqrt{2}+4\sqrt{3})$

Answers

a) $\sqrt{6}+5\sqrt{2}$
b) $27+5\sqrt{3}$
c) $15+\sqrt{5}$
d) $1+3\sqrt{10}+3\sqrt{2}+36\sqrt{5}$
e) $-6-2\sqrt{6}$

4 Rationalise the following surds

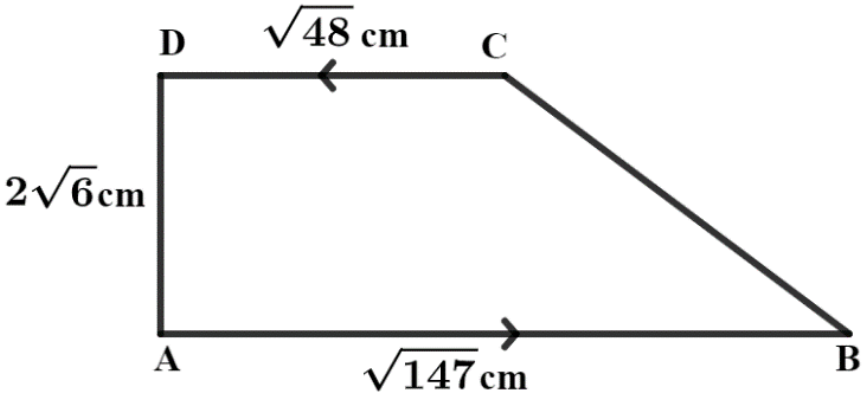
a) $\frac{-2\sqrt{6}}{5\sqrt{3}} = -\frac{2\sqrt{2}}{5}$

b) $\frac{\sqrt{6}+\sqrt{3}}{4\sqrt{3}} = \frac{1+\sqrt{2}}{4}$

c) $\frac{\sqrt{2}-\sqrt{3}}{2+\sqrt{3}} = 3+2\sqrt{2}-\sqrt{6}-2\sqrt{3}$

d) $\frac{2\sqrt{3}-\sqrt{5}}{2\sqrt{3}+\sqrt{5}} = \frac{17-4\sqrt{15}}{7}$

5 ABCD is a trapezium.
Where AB is parallel to CD
AD is the perpendicular height.



Calculate the area and perimeter of the trapezium.
Give your answers as exact values.

Answer

Area $= 33\sqrt{2}\ \text{cm}^2$

Perimeter $= 2\sqrt{6} + 11\sqrt{3} + \sqrt{51}\ \text{cm}$