

Sample solutions to the 2024 VCAA papers

Specialist Mathematics Examination 2

Question 14

Consider the vectors \underline{r} and \underline{s} where $|\underline{r}| = 9$ and $\underline{s} = 2\mathbf{i} - 2\mathbf{j} + \mathbf{k}$.

If the vector resolute of \underline{r} in the direction of \underline{s} is equal to $-4\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$, then the scalar resolute of \underline{s} in the direction of \underline{r} is equal to

A. -18

B. -2

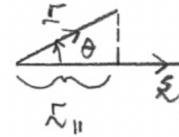
C. 2

D. 3

$$\underline{r}_{||} = |\underline{r}| \cos(\theta) \hat{\underline{s}}$$
$$-4\mathbf{i} + 4\mathbf{j} - 2\mathbf{k} = 9 \cos(\theta) \times \frac{1}{3} (2\mathbf{i} - 2\mathbf{j} + \mathbf{k})$$

$$\therefore 9 \cos(\theta) \times \frac{1}{3} = -2$$

$$\cos(\theta) = -\frac{2}{3} \quad \text{Hence } s_{||} = |\underline{s}| \cos(\theta) = 3 \times -\frac{2}{3} = -2$$



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Mathematical Methods Examination 2

Question 4

If $\int_a^b f(x) dx = -5$ and $\int_a^c f(x) dx = 3$, where $a < b < c$, then $\int_b^c 2f(x) dx$ is equal to

A. -16

B. 16

C. -4

D. 4

$$\int_b^c 2f(x) dx = 2 \int_b^c f(x) dx$$
$$= 2 \left(\int_a^c f(x) dx - \int_a^b f(x) dx \right)$$
$$= 2(3 - (-5)) = 16$$

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General Mathematics Examination 1

Question 21

Lee took out a loan of \$121 000, with interest compounding monthly. He makes monthly repayments of \$2228.40 for five years until the loan is repaid in full.

The total interest paid by Lee is closest to

A. \$4434

B. \$5465

C. \$10 539

D. \$12 704

$$2228.40 \times 12 \times 5 - 121000 = 12704$$

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Foundation Mathematics Examination

Question 16

For every 1600 litres (L) of water added to a pool, the water level rises by 4 cm. If the water level in the pool increased by 0.64 m, how many litres of water were added to the pool?

A. 256 L

B. 2560 L

C. 25600 L

D. 256000 L

$$0.64 \text{ m} = 64 \text{ cm}$$

$$64 \div 4 = 16$$

$$16 \times 1600 \text{ L} = 25600 \text{ L}$$

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