Sample solutions to the 2025 NHT VCAA papers

Specialist Mathematics Examination 2

Question 14

Consider the vectors

$\underset{\sim}{a} = \underset{\sim}{i} - p\underset{\sim}{j}$ and $\underset{\sim}{b} = p\underset{\sim}{i} - 4\underset{\sim}{j}$, where $p \in R$, and $\underset{\sim}{a}$ is parallel to $\underset{\sim}{b}$.

The magnitude of p is

A. 1

B. 2

C. 3

D. 4

$\underset{\sim}{a} = m\underset{\sim}{b}$

$1 = mp$ so $m = \frac{1}{p}$

$p = 4m$

$p = \frac{4}{p}$, $p^2 = 4$ so $|p| = 2$

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Mathematical Methods Examination 2

Question 5

The scores of a national standardised test are approximately normally distributed with mean of 120 and standard deviation of 15. Andrew scored 117.9 and Chloe's score is 1.2 standard deviations above the mean. The probability that a randomly selected participant achieved a score between Andrew and Chloe is closest to

A. 0.33

B. 0.39

C. 0.44

D. 0.87

$x_A = 117.9$

$1.2 = \frac{x_C - 120}{15}$ $\therefore$ $x_C = 138$

(CAS): normCdf(117.9, 138, 120, 15) 0.4406...

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General Mathematics Examination 1

Question 20

Teresa has office equipment that she purchased for $8000.

She depreciates the value of the equipment using the reducing balance method.

After four years the office equipment is valued at $3000.

The annual reducing balance rate used by Teresa is closest to

A. 15.6%

B. 17.8%

C. 21.7%

D. 27.9%

$3000 = 8000\left(1 - \frac{r}{100}\right)^4$

$r = 21.745$

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