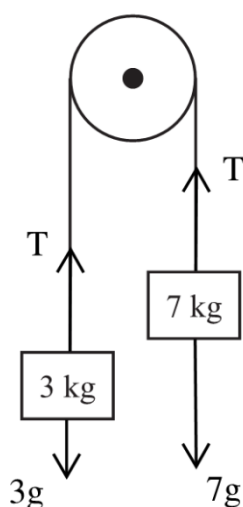


2018 VCE Specialist Mathematics 1 (NHT) examination report

Specific information

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

Question 1a.



Question 1b.

$$\frac{21g}{5} \quad (= 4.2g, 41.16)$$

Question 2

$$m = 2, -\frac{22}{3}$$

The scalar resolute can take two values, $\sqrt{14}$ or $-\sqrt{14}$, leading to two possible values of m .

Question 3

$$\frac{56}{65}$$

Question 4a.

$$\bar{x} = 48.2, n = 144$$

Question 4b.

1764

Question 5

$$\frac{\pi}{24}$$

Question 6

$$a = -\frac{1}{4}, b = 1$$

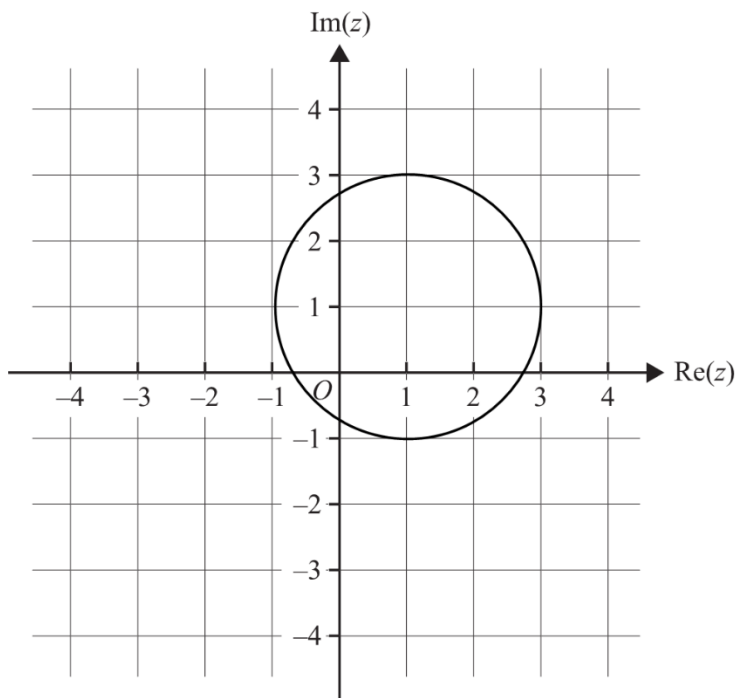
Question 7a.

$$\frac{-x}{\sqrt{1-x^2}}$$

Question 7b.

$$\frac{\pi}{6}$$

Question 8a.



Question 8bi.

$$\begin{aligned}(x-1)^2 + (y-1)^2 &= 4 \\ 2(x-1) + 2(y-1)\frac{dy}{dx} &= 0 \\ \frac{dy}{dx} &= -\frac{x-1}{y-1} \\ &= \frac{1-x}{y-1}\end{aligned}$$

Question 8bii.

$$-\frac{1}{\sqrt{3}}$$

Question 8c.

$$\text{Arg}(z) = -\frac{3\pi}{4}, \text{Arg}(z) = \frac{\pi}{4}$$

Question 9

Each part of Question 9a. was a 'show that' question. Success in 'show that' questions requires students to set out solutions explicitly.

Question 9ai.

$$\begin{aligned}\frac{1}{\tan(2\theta)} &= a \\ \tan(2\theta) &= \frac{1}{a} \\ \frac{2 \tan(\theta)}{1 - \tan^2(\theta)} &= \frac{1}{a} \\ 2a \tan(\theta) &= 1 - \tan^2(\theta) \\ \tan^2(\theta) + 2a \tan(\theta) - 1 &= 0\end{aligned}$$

Question 9a.ii.

$$\begin{aligned}\tan^2(\theta) + 2a \tan(\theta) + a^2 &= a^2 + 1 \\ (\tan(\theta) + a)^2 &= a^2 + 1 \\ \tan(\theta) + a &= \pm\sqrt{a^2 + 1} \\ \tan(\theta) &= -a \pm \sqrt{a^2 + 1}\end{aligned}$$

Alternatively, students could have used the quadratic formula.

Question 9a.iii.

$$a = \sqrt{3}$$

$$\tan(\theta) = -\sqrt{3} \pm 2$$

θ in first quadrant, $\tan(\theta) > 0$

$$\tan(\theta) = 2 - \sqrt{3}$$

Question 9b.

$$\frac{4}{\sqrt{3}+2} \quad (= 8 - 4\sqrt{3})$$

Question 9c.

$$\pi \left(2\sqrt{3} - 2 - \frac{\pi}{4} \right)$$