Sample solutions to the 2016 VCAA papers

Question 1 (Specialist Mathematics Examination 1)
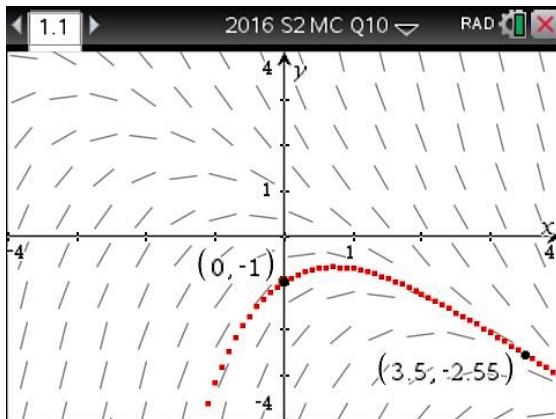
a.

$$\text{rope length is } \frac{5}{3} \text{ m}$$
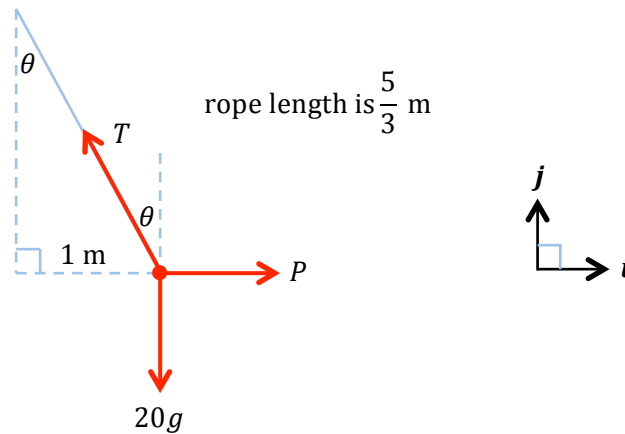
b. $\quad \sin(\theta) = \dfrac{1}{\frac{5}{3}} = \dfrac{3}{5}$ as required

c. $\quad$ ***j*:** $\quad T\cos(\theta) - 20g = 0$

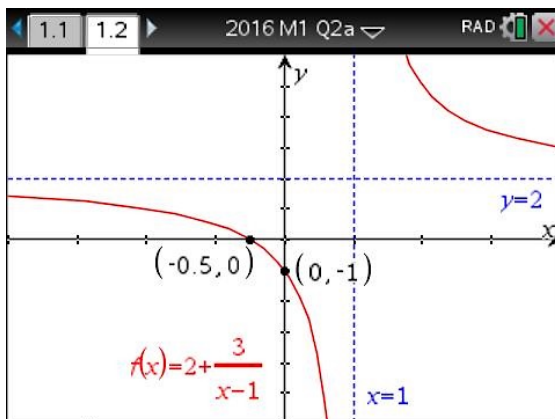$$T = \frac{20g}{\cos(\theta)} = \frac{20g}{\frac{4}{5}} = 25g = 245 \text{ newtons}$$

Multiple-Choice Question 10 (Specialist Mathematics Examination 2)

B
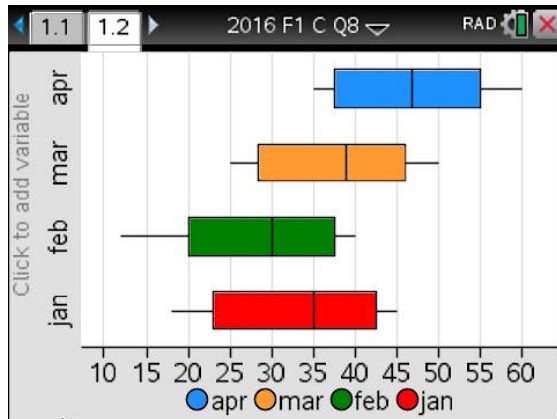
Question 3 (Mathematical Methods Examination 1)

a.

b. $\quad \displaystyle\int_2^4 \left(2 + \frac{3}{x-1}\right) dx = \left[2x + 3\ln(x-1)\right]_2^4 = \left(8 + 3\ln(3)\right) - \left(4 - 3\ln(1)\right) = 4 + 3\ln(3)$

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Extended-Response Question 3a (Mathematical Methods Examination 2)
a. Let X be the number of laptops not correctly plugged into the trolley
$X \sim \text{Bi}(22, 0.1)$
$\Pr(X \geq 1) = 0.9015$
CAS note: binomCdf(22,0.1,1,100)

Core Question 8 (Further Mathematics Examination 1)

C

Core Question 7a (Further Mathematics Examination 2)
a. i.

Amount owed after 12 repayments is \$65,076.22
ii. $800 \times 12 - (70,000 - 65,076.22) = \$4,676.22$