



Subject/Topic: A Maths P2 2018

Date:

7(iii) Time taken to reach B is given by

$$\frac{21}{2} e^{-t/80} - 2 = 1.5$$

$$\frac{21}{2} e^{-t/80} = 3.5$$

$$= \frac{7}{2}$$

$$e^{-t/80} = \frac{1}{3}$$

$$\ln e^{-t/80} = \ln \frac{1}{3}$$

$$\left(-\frac{t}{80}\right) \ln e = \ln \frac{1}{3}$$

$$-\frac{t}{80} (1) = \ln \frac{1}{3}$$

$$t = -80 \ln \frac{1}{3}$$

$$= 87.88898309$$

$$\approx 87.9 \text{ s}$$

$$(ii) p\left(\frac{3}{2}\right) = 2\left(\frac{3}{2}\right)^3 + 5\left(\frac{3}{2}\right)^2 - 18$$

$$= \frac{27}{4} + \frac{45}{4} - 18$$

$$= 0 \text{ (i.e. no remainder)}$$

Therefore,  $(2x-3)$  is a factor of  $p(x)$ .

$$(iii) \text{ By factorisation, } 2x^3 + 5x^2 - 18 = (2x-3)(ax^2+bx+c)$$

$$= (2x-3)(x^2+bx+6)$$

$$= (2x-3)(x^2+4x+6)$$

$$p(x) = 0$$

$$2x^3 + 5x^2 - 18 = 0$$

$$(2x-3)(x^2+4x+6) = 0$$

Distance from A at this instance

$$= 840 \left(1 - e^{-\frac{87.9}{80}}\right) - 2(87.9)$$

$$= 384.2220338$$

$$\approx 384 \text{ m}$$

For the solutions given by  $x^2+4x+6=0$ ,

$$b^2 - 4ac = 4^2 - 4(1)(6)$$

$$= -8 < 0$$

Distance she has to push bicycle

$$= 500 - 384$$

$$= 116 \text{ m}$$

So,  $x^2+4x+6=0$  has no real root.

Therefore,  $p(x)$  has only one real root  $x = \frac{3}{2}$ .

$$8(i) p(x) = 2x^3 + 5x^2 - 18$$

$$p(-2) = 2(-2)^3 + 5(-2)^2 - 18$$

$$= -16 + 20 - 18$$

$$= -14$$

(iv)

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Tuition classes for English, Math (including E Maths & A Maths), Science (including combined science [phy/chem/bio]), Physics, Chemistry, Biology, Social Studies/Geography/History and Principles of Accounts (POA). Secondary 1 to Secondary 4.

