SOLUTIONS

Fortify Sample Exam 2A

Section A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	E	C	B	A	A	D	D	E	E	D	D	D	C	D	D	C	C	A	B

Section B

Question 1

a. $a = 10,\ b = -8,\ c = \dfrac{\pi}{12}$

b. $x = 18$ metres

c. 24 metres

d. $x = 14.58$

e. 23.16 metres

Question 2

a. $h(x) = -\dfrac{7}{200}(x-10)^2 + 14$

b. $\dfrac{21}{2}$ metres

c. $\theta = 19.29°$

di. $g(x) = -\dfrac{7}{400}\left(\dfrac{3}{2}x - 10\right)^2 + \dfrac{49}{4}$

dii. 5.69 metres

diii. $\dfrac{49}{4}$ metres

Question 3

a. $E(X) = 2.01$ hours

b. $n = 2.15$ hours

ci. $\Pr(GGG) = \dfrac{1}{8}$

cii. $\Pr(G' \text{ Fri}) = \dfrac{3}{8}$

ciii. $\Pr(G \text{ Thu} \mid G' \text{ Fri}) = \dfrac{2}{3}$

di. $\Pr(X = 0) = 0.0057$

dii. $\Pr(X > 5) = 0.2127$

ei. $\Pr\left(\hat{p} \leq \dfrac{3}{10} \mid \hat{p} \geq \dfrac{1}{10}\right) = 0.4154$

eii. $CI = (0.099,\ 0.501)$

Question 4

ai. $A = \left(2 - \sqrt{4+2t},\ 2\left(4 - 2\sqrt{4+2t} + t\right)\right)$
$B = \left(2 + \sqrt{4+2t},\ 2\left(4 + 2\sqrt{4+2t} + t\right)\right)$

aii. $A = \dfrac{4\sqrt{2}\,(t+2)^{\frac{3}{2}}}{3}$ units^2

b. $k = \dfrac{32\sqrt{2}}{3}$ units^2

c. $\dfrac{dA}{dt} = 2\sqrt{4+2t}$

d. $t = \dfrac{(\log_e(2))^2}{8} - 2$

Question 5

a. $0 < k < 2$

bi. $L = \sqrt{p^2 + \text{e}^{2p} - 4\text{e}^{p} + 4}$

bii. $p = 0.52$

biii. $L = 0.609$ units

ci. $g(x) = 1.69x - 1.20$

cii. $A = 0.04$ units^2

di. $Q = (0.22,\ -0.12)$

dii. $a = 1.51$