

MATHEMATICAL METHODS 3 & 4
CAT 2 SECTION A SOLUTIONS

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E

SECTION B: Short answer questions
Marking scheme

Question 1

- a. $E(X) = np = 8(0.4) = 3.2$ A1
- b. $P(X \geq 1) = 1 - P(X=0)$
 $= 1 - (0.6)^8$ M1
 $= 0.9832$ A1

Question 2

- a. $\frac{1}{3} \times \frac{1}{-2} (3x+1)^{-2} + c = -\frac{1}{6(3x+1)^2} + c$ M1,A1
- b. $\left[-\frac{1}{6(3x+1)^2} \right]_0^{0.5} = \frac{7}{50}$ sq units A1

Question 3

- a. $E(X) = 1(0.5) + 2(0.2) + 3(0.15) + 4(0.1) + 5(0.05) = 2.0$ A1
- b. $E(0.1X + 1) = 0.1(2.0) + 1 = \1.20 M1,A1

Question 4

- a. $\cos \pi x = \frac{1}{2}, x = \frac{1}{3}$ M1,A1
- b. $f'(x) = 2\pi \sin \pi x$, therefore $f'\left(\frac{1}{3}\right) = 2\pi \sin\left(\frac{\pi}{3}\right) = \pi\sqrt{3}$ M1,A1

Question 5

- a. $C'(x) = 10 - \frac{4000}{x^2}$ A1
- b. $C'(x) = 0, x^2 = 400$ M1
 $x = \pm 20$ A1
 Using sign of first derivative, minimum occurs when $x = 20$ A1

Total 17 marks