YEAR 12

IARTV TEST — OCTOBER 1994

MATHEMETICAL METHODS Units 3 and 4

CAT 2 — Facts and Skills Task

SECTION A — ANSWERS & SOLUTIONS

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

YEAR 12

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MATHEMETICAL METHODS Units 3 and 4

CAT 2 — Facts and Skills Task — SECTION B — ANSWERS & SOLUTIONS

1 (a) $2x^3 + x^2 - 8x - 4$

$= x^2(2 + 1) - 4(2x + 1)$

$= (2x + 1)(x^2 - 4)$

$= (2x + 1)(x - 2)(x + 2)$

(b) $6x^4 + 5x^3 - 6x^2$

$= x^2(6x^2 + 5x - 6)$

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

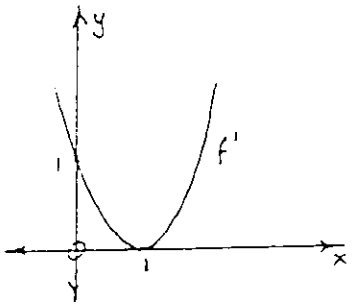
$= xx(3x - 2)(2x + 3)$

2 $f(x) = \frac{1}{3}x^3 - x^2 + x$

Hence $f'(x) = x^2 - 2x + 1$

$= (x - 1)^2$

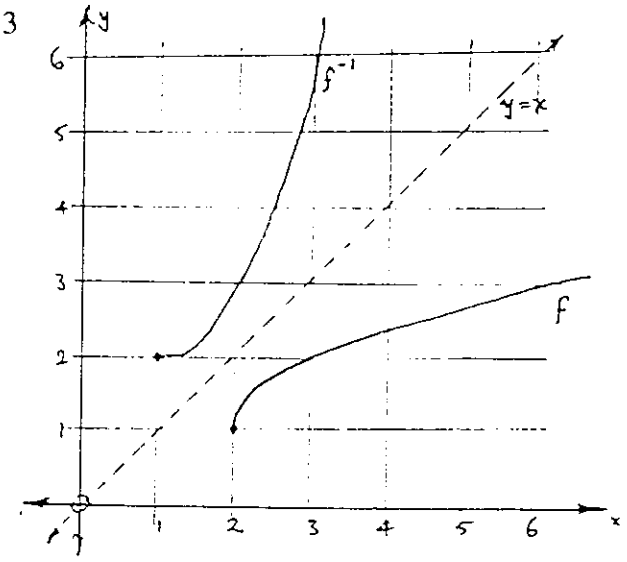
(a)



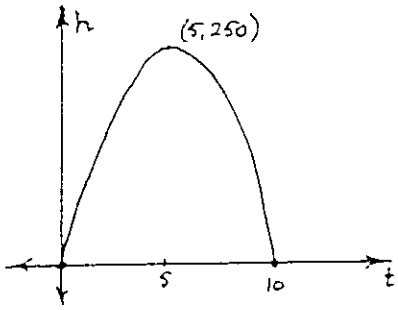
(b) (i) Local minimum point and x-intercept [$f'(1) = 0$]

(ii) Stationary point of inflexion

3



4 $h = 100t - 10t^2 = -10t(t - 10)$



(a) Average velocity over first 5 sec. = (250-0)/(5-0) m/s

= 50 m/s

(b) $\frac{dh}{dt} = 100 - 20t$

When $t = 0$, $\frac{dh}{dt} = 100$

Hence initial velocity = 100 m/s

5 For first quartile Q_1, $Pr(Z<z) = 0.25$

Hence $Pr(Z>z) = 0.75$

Hence (from table), $z = -0.6745$

Hence $Q_1 = 175 - 0.6745 \times 12$ cm

$= 166.906$ cm

For third quartile Q_3, $Pr(Z<z) = 0.75$

Hence (from table), $z = 0.6745$

Hence $Q_3 = 175 + 0.6745 \times 12$ cm

$= 183.094$ cm

Hence inter-quartile range

= 183.094 - 166.906 cm

≈ 16 cm (to nearest cm)