

## 2010 Mathematics (2)

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### Section A

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## **Section B**

**11S**

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**12T**

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**13X**

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**14Y**

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**15R**

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**16S**

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**17X**

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***Solution(s):***

From user: ar857

17X 2010 Paper 2

a) ① 20 r: 30g      ② 180 r: 170g

i)  $\frac{1}{2} \cdot \frac{2}{5} + \frac{1}{2} \cdot \frac{18}{35} = \frac{7+18}{35} = \frac{25}{35} = \frac{5}{7} \leftarrow P(\cdot)$

ii)  $P(X|R) = \frac{P(X \cap R)}{P(R)} = \frac{\frac{1}{2} \cdot \frac{2}{5}}{\frac{25}{35}} = \frac{7}{25}$

b) 2B 37W 61C

$\binom{3}{3} \cdot \binom{34}{3} \cdot \binom{61}{4} / \binom{100}{7}$

c)  $P(B) = P(B|A)P(A) + P(B|\bar{A})P(\bar{A})$

fixed fixed determines fixed  
min+max

$P(B)_{\min}$  if  $P(B|\bar{A})=0$        $P(B)_{\min} = P(B|A)P(A) + (1-P(A)) \cdot 0 = P(B|A)P(A)$

$P(B)_{\max}$  if  $P(B|A)=1$        $P(B)_{\max} = P(B|A)P(A) + 1 - P(A)$

cycle done

d)  $P(B) = P(B|A)P(A) + P(B|\bar{A})P(\bar{A})$

fixed fixed

$P(B)_1 = P(B|\bar{A})$  if  $P(A)=0, P(\bar{A})=1$

$P(B)_2 = P(B|A)$  if  $P(\bar{A})=0, P(A)=1$

if  $P(B|\bar{A}) > P(B|A)$  then  $P(B)_1$  is max  $P(B)_2$  is min

if  $P(B|A) > P(B|\bar{A})$  then  $P(B)_2$  is max  $P(B)_1$  is min

good

18Y

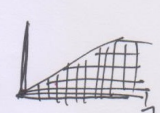
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**Solution(s):**

From user: ar857

2010184

a)  $\int_{-1}^1 \int_{-2}^2 \int_{-3}^3 (x^2 + y^2 + z^2) dz dy dx = \int_{-1}^1 \int_{-2}^2 (6x^2 + 6y^2 + 18) dy dx$   
 $= \int_{-1}^1 (24x^2 + 72 + 32) dx = \frac{48}{3} + 2 \times (72 + 32) = 224$

b)  $\int_0^1 \int_0^1 e^{x^2} dx dy$    
 $= \int_0^1 \int_0^x e^{x^2} dy dx = \int_0^1 x e^{x^2} dx = \frac{e-1}{2}$

c)  $z=r^2$ ,  $z=9-r^2$ ,  $r=\sqrt{z}$   
 $V = 2 \times \int_0^{2\pi} \int_0^{3/2} \int_0^{\sqrt{z}} r dr dz = 2 \times 2\pi \cdot \int_0^{9/2} \frac{z}{2} dz = 2\pi \cdot \frac{81}{4} \cdot \frac{1}{2} = \frac{81\pi}{4}$

*Handwritten notes:* "dV in cylindricals", "z=r^2", "r=sqrt(z)", and a diagram of a sphere with a horizontal slice at height z.

**19R\***

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**20T\***

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