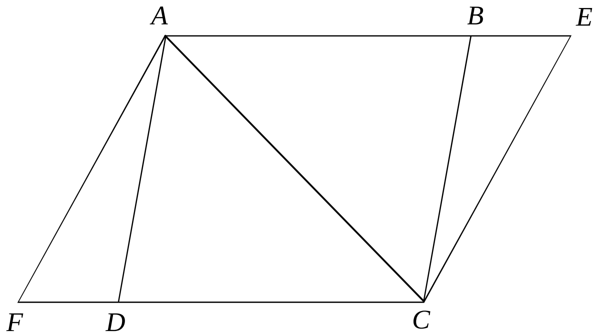
試卷一

解	分	備註
1. $\dfrac{(x^4y^{-3})^2}{x^{-4}y^7}$		
$=\dfrac{x^8y^{-6}}{x^{-4}y^7}$	1M	給 $(ab)^m=a^mb^m$ 或 $(a^m)^n=a^{mn}$
$=\dfrac{x^{8+4}}{y^{7+6}}$	1M	給 $\dfrac{1}{c^{-p}}=c^p$ 或 $\dfrac{c^p}{c^q}=c^{p-q}$
$=\dfrac{x^{12}}{y^{13}}$	1A	或 $c^{-p}=\dfrac{1}{c^p}$ 或 $\dfrac{c^p}{c^q}=\dfrac{1}{c^{q-p}}$
	---------(3)	
2. $t(2s-r)=4(s-5t)$		
$2ts-tr=4s-20t$	1M	給左方或右方全對
$2ts-4s=tr-20t$	1M	給將 s 放在一邊
$(2t-4)s=tr-20t$		
$s=\dfrac{tr-20t}{2t-4}$	1A	給 $s=\dfrac{20t-tr}{4-2t}$ 或等價
	---------(3)	
3. (a) $2p^2+pq-6q^2$		
$=(2p-3q)(p+2q)$	1A	
(b) $2p^2+pq-6q^2+9q-6p$		
$=(2p-3q)(p+2q)+3(3q-2p)$	1M	給利用 (a) 的結果
$=(2p-3q)(p+2q-3)$	1A	或等價
	---------(3)	
4. (a) 小明買入玩具的價錢		
$=\$28\div 20\%$	1M	
$=\$140$	1A	
(b) 小強買入玩具的價錢		
$=\$(140+28)\times(1-25\%)$	1M	給 $\$P\times(1-25\%)$
$=\$168\times 75\%$		
$=\$126$	1A	
	---------(4)	

解	分	備註
5. 設女孩與男孩的人數分別為 $5k$ 及 $4k$， 其中 k 為非零的常數。	1A	
則 $5k+72=2(4k)$	1M	
$3k=72$		
$k=24$	1A	
女孩有 120 人，男孩有 96 人。 女孩與男孩人數之差 $=120-96$		
$=24$ (人)	1A	
設女孩有 n 人，則男孩有 $\frac{4}{5}n$ 人。	1A	
$n+72=2(\frac{4}{5}n)$	1M	
$\frac{3}{5}n=72$		
$n=120$	1A	
女孩與男孩人數之差 $=120-\frac{4}{5}\times120$		或 $120\times\frac{1}{5}$
$=24$ (人)	1A	
設男孩有 n 人，則女孩有 $\frac{5}{4}n$ 人。	1A	
$\frac{5}{4}n+72=2n$	1M	
$\frac{3}{4}n=72$		
$n=96$	1A	
女孩與男孩人數之差 $=96\times\frac{5}{4}-96$		或 $96\times\frac{1}{4}$
$=24$ (人)	1A	
	---------(4)	
6. (a) $\frac{1-4x}{2}\geq 9$		
$1-4x\geq 18$		
$-4x\geq 17$	1M	
$x\leq -\frac{17}{4}$	1A	
由 $5-x<0$ 得 $x>5$		
因此 (*) 的解為 $x\leq -\frac{17}{4}$ 或 $x>5$。	1A	或等價
(b) -5	1A	
	---------(4)	

解	分	備註
7. (a) P' 的坐標為 $(5, 4)$ 。	1A	或 $P'=(5, 4)$ 或 $P'(5, 4)$
(b) Q' 的坐標為 $(4-k, -8)$ 。	1A	或 $Q'=(4-k, -8)$ 或 $Q'(4-k, -8)$
若 $P'OQ'$ 成一直線，		
則 $\dfrac{4-0}{5-0}=\dfrac{-8-0}{4-k-0}$	1M	或等價
$4(4-k)=-40$		
$4k=56$		
$k=14$	1A	
Q' 的坐標為 $(4-k, -8)$ 。	1A	
若 $P'OQ'$ 成一直線，		
則 $\sqrt{(5-0)^2+(4-0)^2}+\sqrt{(4-k-0)^2+(-8-0)^2}$ $=\sqrt{(5-4+k)^2+(4+8)^2}$	1M	或等價
$\sqrt{41}+\sqrt{k^2-8k+80}=\sqrt{145+2k+k^2}$		
$41+2\sqrt{41}\cdot\sqrt{k^2-8k+80}+k^2-8k+80=145+2k+k^2$		
$2\sqrt{41}\cdot\sqrt{k^2-8k+80}=10k+24$		
$164(k^2-8k+80)=100k^2+480k+576$		
$64k^2-1792k+12544=0$		
$k^2-28k+196=0$		
$k=14$	1A	
	---------(4)	
8. (a) 其他 18 人成績之總和為 1266。		
$50+a+80+b=70.2\times 20-1266$	1M	或等價
$a+b=8$ ……(1)		
又 $80+b-(50+a)=34$	1A	或 $b-a+30=34$
$b-a=4$ ……(2)		
解 (1)、(2) 兩式，得 $a=2$ ， $b=6$ 。	1A	給兩項均正確
(b) 所求概率 $=\dfrac{6}{20}$	1M	
$=\dfrac{3}{10}$	1A	
	---------(5)	

解	分	備註
9.		



(a)
$\because\ AB = CD$ (平行四邊形的對邊)
$BE = DF$ (已知)
$\therefore\ AB + BE = CD + DF$
即 $AE = CF$
在 ΔACE 及 ΔCAF 中
$\because\ AE = CF$ (已證)
$AC = CA$ (公共邊)
$\angle EAC = \angle FCA$ (內錯角， $AB // DC$)
$\therefore\ \Delta ACE \cong \Delta CAF$ (SAS)

評分標準：	
情況 1 附有正確理由的任何正確證明。	3
情況 2 未附有正確理由的任何正確證明。	2
情況 3 附有一正確理由和一正確步驟之未完整的證明。	1

(b)

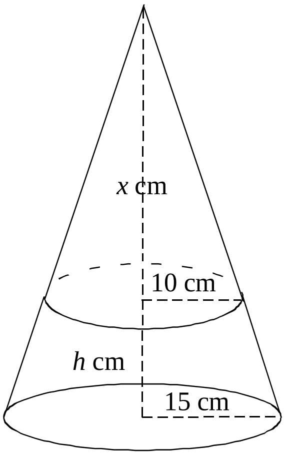
解	分	備註
由 (a) 得 $CE = AF = 20\text{ cm}$		
$\because\ \angle ACB = \angle ABC$		
$\therefore\ AB = AC = 15\text{ cm}$		
$AE = 15\text{ cm} + 10\text{ cm} = 25\text{ cm}$		
$\because\ AC^2 + CE^2 = 15^2 + 20^2$		
$= 625 = AE^2$		
$\therefore\ \angle ACE = 90^\circ$	1M	必須顯示適當的步驟
ΔACE 的面積 $= \dfrac{15 \times 20}{2} = 150\,(\text{cm}^2)$	1A	

ΔACE 的半周長 $= \dfrac{15 + 25 + 20}{2} = 30\,(\text{cm})$		
ΔACE 的面積		
$= \sqrt{30(30-15)(30-25)(30-20)}$	1M	
$= 150\,(\text{cm}^2)$	1A	

---------(5)

解			分	備註
10.	(a)	$C = a + bn$ ，其中 a 及 b 均為非零的常數。	1A	
		代入 $n = 4000$ ， $C = 152000$		
		得 $152000 = a + 4000b$ ------(1)	1M	給任何一項代入
		代入 $n = 6000$ ， $C = 222000$		
		得 $222000 = a + 6000b$ ------(2)		
		解 (1) 及 (2) 兩式，得 $a = 12000$ ， $b = 35$ 。	1A	給兩項均正確
		設出版了 m 本書籍。		
		則 $\frac{12000 + 35m}{m} = 40$		
		$m = 2400$	1A	
		∴ 出版了 2400 本書籍		
			---------(4)	
	(b)	總成本 $= \$(12000 + 35 \times 5000)$		
		$= \$187000$		
		書籍全部售出後的總收入		
		$= \$42 \times 5000$		
		$= \$210000$		
		$> \$187000$	1M	
		∴ 不同意該宣稱。	1A	必須顯示理由
		每本的成本		
		$= \$(\frac{12000 + 35 \times 5000}{5000})$		
		$= \$37.4$		
		$< \$42$	1M	
		∴ 不同意該宣稱。	1A	必須顯示理由
			---------(2)	
11.	(a)	X 點的坐標 $= (6, 8)$	1A	或 $X = (6, 8)$ 或 $X(6, 8)$
		C 的半徑 $= 13$	1A	接受 $r = 13$
			---------(2)	
	(b)	$L: 3x - 4y - 11 = 0$		
		L 的斜率 $= \frac{3}{4}$		接受 $m_L = \frac{3}{4}$ 或 $m = \frac{3}{4}$
		Γ 的斜率 $= -\frac{4}{3}$		接受 $m_\Gamma = -\frac{4}{3}$
		留意， Γ 過圓心 $X(6, 8)$ 。		
		Γ 的方程為 $\frac{y - 8}{x - 6} = -\frac{4}{3}$	1M	或等價
		即 $4x + 3y - 48 = 0$		
		$H = (12, 0)$ ， $K = (0, 16)$	1A	給兩項均正確
		ΔOHK 的面積 $= \frac{12 \times 16}{2} = 96$		
		$\frac{1}{4}$ 圓 C 的面積 $= \frac{1}{4} \times \pi \times 13^2$		
		≈ 132.7322896		
		> 96	1M	
		故該宣稱正確。	1A	
			---------(4)	

解	分	備註
12. (a) 由中位數為 2.5，得		
$9+a=b+c+5$	1M	
$a=b+c-4$ ……(*)		
又 $a+b+9=28$	1A	
$b=19-a$		
代入 (*)，得 $2a=15+c$		
但 $a>10$ ， $3<c<8$ ，又 a、b 及 c 為正整數，		
故 $a=11$ ， $b=8$ ， $c=7$ 。	1A	
	---------(3)	
(b) 原有的平均值		
$=\frac{1\times9+2\times11+3\times8+4\times7+5\times5}{9+11+8+7+5}$		
$=2.7$	1A	
當報團人數為 2 及 3 時，會有最小的標準差。	1M	給任何一項
標準差 ≈1.299965114		
≈1.30	1A	
當報團人數為 1 及 5 時，會有最大的標準差。		
標準差 ≈1.367753011		
≈1.37	1A	
	---------(4)	

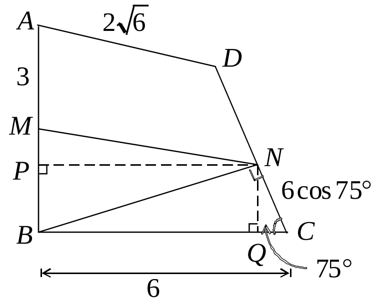
解	分	備註
13.		
		
(a) $\frac{x}{x+h}=\frac{10}{15}$	1M	或 $\frac{x}{h}=\frac{10}{15-10}$
$15x=10x+10h$		
$5x=10h$		
$x=2h$		
因圓柱體與平截頭體的容量相等，		
故 $\pi\cdot 10^2(31-h)=\frac{1}{3}\pi\cdot 15^2(3h)-\frac{1}{3}\pi\cdot 10^2(2h)$	1M	
$3100-100h=\frac{1}{3}(675h-200h)$		
$9300-300h=475h$		
$h=12$	1A	
平截頭體的容量		
$=\pi\cdot 10^2(31-h)$		
$=1900\pi\ (\text{cm}^3)$	1A	接受答案準確至 5970 cm^3
平截頭體的容量 $=\frac{1}{3}\pi\cdot 15^2(36)-\frac{1}{3}\pi\cdot 10^2(24)$ $=1900\pi\ (\text{cm}^3)$	1A	接受答案準確至 5970 cm^3
	---------(4)	
(b) 設水在圓柱體內的深度為 H cm。		
$0.007\times 10^6-1900\pi=100\pi H$	1M	或 $0.007\times 10^6-5969.026042$ $=314.1592654H$
$H\approx 3.281692033$		
水的深度 $\approx 3.281692033+12$		
$=15.281692033$		
<15.5	1M	
故該宣稱不正確。	1A	
	---------(3)	

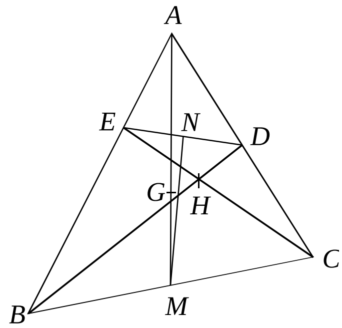
解	分	備註
14. (a) $\because\ \mathrm{p}(-2)=\mathrm{p}(3)=0$		
$\therefore\ \mathrm{p}(x)$ 有因式 $x+2$ 及 $x-3$ 。	1A	
由於 $\mathrm{p}(x)$ 是一個次數為 3 的多項式，		
故設 $\mathrm{p}(x)=(x+2)(x-3)(ax+b)$ ，其中 a 、 b 為常數。	1M+1A	
$\mathrm{p}(1)=-6(a+b)=-18$	1M	給任何一項
$a+b=3\quad\cdots\cdots(1)$		
$\mathrm{p}(2)=-4(2a+b)=-20$		
$2a+b=5\quad\cdots\cdots(2)$		
解 (1)、(2) 兩式，得 $a=2$ ， $b=1$ 。	1A	給兩項均正確
$\therefore\ \mathrm{p}(x)=(x+2)(x-3)(2x+1)$		$\mathrm{p}(x)=2x^3-x^2-13x-6$
設 $\mathrm{p}(x)=ax^3+bx^2+cx+d$ ，其中 a 、 b、c、d 為常數。		
$\mathrm{p}(-2)=-8a+4b-2c+d=0$	1M+1A	給任何一項
$\mathrm{p}(3)=27a+9b+3c+d=0$		
$\mathrm{p}(1)=a+b+c+d=-18$		
$\mathrm{p}(2)=8a+4b+2c+d=-20$		
解以上四式，		
得 $a=2$ ， $b=-1$ ， $c=-13$ ， $d=-6$ 。	1M+1A +1A	1M 給消去任一未知元 1A 給任何一項正確 1A 給四項全對
	---------(5)	
(b) $\mathrm{p}(x)=3x-9$		
$(x+2)(x-3)(2x+1)=3(x-3)$		
$(x-3)[(x+2)(2x+1)-3]=0$	1M	給公因式 $(x-3)$
$(x-3)(2x^2+5x-1)=0$	1A	
$\therefore\ x=3$ 或 $x=\dfrac{-5\pm\sqrt{33}}{4}$	1A	
由於 $x=\dfrac{-5\pm\sqrt{33}}{4}$ 不是有理數，		
因此， $\mathrm{p}(x)=3x-9$ 只有一個有理數根。	1A	必須顯示理由
$\mathrm{p}(x)=3x-9$		
$2x^3-x^2-13x-6=3x-9$	1A	
$2x^3-x^2-16x+3=0$		
$(x-3)(2x^2+5x-1)=0$	1M	給因式 $x-3$
$\therefore\ x=3$ 或 $x=\dfrac{-5\pm\sqrt{33}}{4}$	1A	
由於 $x=\dfrac{-5\pm\sqrt{33}}{4}$ 不是有理數，		
因此， $\mathrm{p}(x)=3x-9$ 只有一個有理數根。	1A	必須顯示理由
	---------(4)	

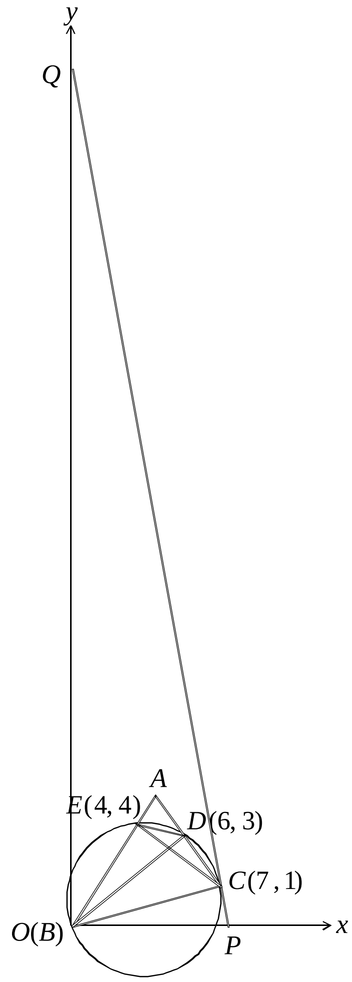
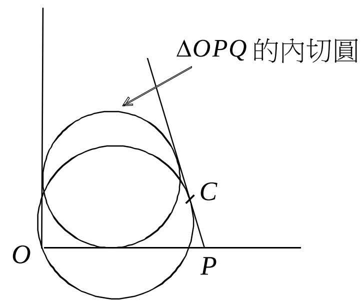
解	分	備註
15. 新的平均值 $=38\times110\%+8=49.8$ (分)		
新的標準差 $=10\times110\%=11$ (分)		
設小麗的分數為 x 分，		
則其新的標準分		
$=\dfrac{x(110\%)+8-49.8}{11}$	1M	
$=\dfrac{1.1x-41.8}{11}$		
$=\dfrac{x-38}{10}$		
$=-0.1$	1A	
<0		
因此，不同意該宣稱 。	1A	
設小麗原有的分數為 x 分，		
則 $\dfrac{x-38}{10}=-0.1$		
$x=37$		
小麗的新的標準分為		
$\dfrac{37(110\%)+8-49.8}{11}$	1M	
$=-0.1$	1A	
<0		
因此，不同意該宣稱 。	1A	
	---------(3)	
16. (a) 所求概率		
$=\dfrac{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5+C_3^4C_3^4C_1^5}{C_7^{13}}$	1M	給分子任何兩項對
$=\dfrac{38}{143}$	1A	接受答案準確至 0.266
所求概率		
$=\dfrac{4}{13}\times\dfrac{4}{12}\times\dfrac{5}{11}\times\dfrac{4}{10}\times\dfrac{3}{9}\times\dfrac{2}{8}\times\dfrac{1}{7}\times P_2^7$ $+\dfrac{4}{13}\times\dfrac{3}{12}\times\dfrac{4}{11}\times\dfrac{3}{10}\times\dfrac{5}{9}\times\dfrac{4}{8}\times\dfrac{3}{7}\times\dfrac{P_4^7}{2\times2}$ $+\dfrac{4}{13}\times\dfrac{3}{12}\times\dfrac{2}{11}\times\dfrac{4}{10}\times\dfrac{3}{9}\times\dfrac{2}{8}\times\dfrac{5}{7}\times\dfrac{P_6^7}{6\times6}$	1M	給任何一項對
$=\dfrac{38}{143}$	1A	接受答案準確至 0.266
	---------(2)	
(b) 所求概率		
$=\dfrac{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5}{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5+C_3^4C_3^4C_1^5}$	1M	給分子或分母全對
$=\dfrac{47}{57}$	1A	接受答案準確至 0.825
	---------(2)	

解	分	備註
17. (a) 設數列的公比為 r，		
則 $8r^{6-1}=1944$	1M	
$r^5=243$		
$r=3$	1A	
∴ 公比 $=3$		
數列的公比		
$=\sqrt[5]{\frac{1944}{8}}$	1M	
$=3$	1A	
	---------(2)	
(b) $\frac{8(3^n-1)}{3-1}>100\,000\,000$	1M	
$3^n>25\,000\,001$		
$n\log 3>\log 25\,000\,001$	1M	
$n>\frac{\log 25\,000\,001}{\log 3}$		
≈ 15.50536672		
∴ n 的最小值為 16。	1A	
	---------(3)	
18. (a) $f(x)=-\frac{1}{2}x^2+\frac{1}{4}x+1$		
$=-\frac{1}{2}(x^2-\frac{1}{2}x)+1$		
$=-\frac{1}{2}(x^2-\frac{1}{2}x+\frac{1}{16}-\frac{1}{16})+1$	1M	
$=-\frac{1}{2}(x-\frac{1}{4})^2+\frac{33}{32}$		
圖像的頂點的坐標為 $(\frac{1}{4},\frac{33}{32})$	1A	
	--------(2)	
(b) $-\frac{1}{2}x^2+\frac{1}{4}x+1=c$		
$2x^2-x+4c-4=0$		
$x=\frac{1\pm\sqrt{1-8(4c-4)}}{4}$		
$=\frac{1\pm\sqrt{33-32c}}{4}$		
$PQ=\frac{1+\sqrt{33-32c}}{4}-\frac{1-\sqrt{33-32c}}{4}$	1M	
$=\frac{\sqrt{33-32c}}{2}$		
∴ $\frac{\sqrt{33-32c}}{2}=\frac{1}{2}c$	1M	
$33-32c=c^2$		
$c^2+32c-33=0$		
$(c+33)(c-1)=0$		
$c=-33$ (捨) 或 $c=1$	1A	
	--------(3)	

解	分	備註
19. (a) $\angle ADC = 360° - 90° - 2 \times 75° = 120°$		
在 ΔADC 中，		
$AC^2 = (2\sqrt{6})^2 + (2\sqrt{6})^2 - 2(2\sqrt{6})(2\sqrt{6})\cos 120°$	1M	或 $AC = 2(2\sqrt{6}\sin 60°) = 6\sqrt{2}$
$AC^2 = 72$		
在 $rt.\Delta ABC$ 中		
$2AB^2 = AC^2$		
$AB^2 = 36$		
$AB = 6$ (cm)	1A	
	--------(2)	
(b) (i) 設 M 為 AB 的中點。		
$VM = 6\sin 60°$		
$= 3\sqrt{3}$		
$MA = 3$		
在 ΔAMD 中，		
$MD^2 = 3^2 + (2\sqrt{6})^2 - 2(3)(2\sqrt{6})\cos 75°$	1M	
$= 33 - 12\sqrt{6}\cos 75°$		$MD^2 \approx 25.39230485$
在 $rt.\Delta VMD$ 中		
$VD^2 = VM^2 + MD^2$		
$= (3\sqrt{3})^2 + 33 - 12\sqrt{6}\cos 75°$		
$VD \approx 7.238252886$		
≈ 7.24 (cm)	1A	
(ii) $CN = 6\cos 75°$		
≈ 1.552914271		
$VC = \sqrt{6^2 + 6^2} = 6\sqrt{2}$		
設 N' 為由 V 到 CD 的垂足。		
在 ΔVCD 中，		
$\cos \angle VCD \approx \dfrac{(6\sqrt{2})^2 + (2\sqrt{6})^2 - 7.238252886^2}{2(6\sqrt{2})(2\sqrt{6})}$	1M	
≈ 0.524519052		
$CN' = 6\sqrt{2}\cos \angle VCD$		
$\approx 6\sqrt{2}(0.524519052)$	1M	
≈ 4.450691742		
$\therefore$ $CN \neq CN'$		
$\therefore$ N 不是由 V 到 CD 的垂足。		
即 $\angle VNB$ 不是平面 VCD 與平面 $ABCD$ 的交角。		
因此，該宣稱不正確。	1A	

解	分	備註
由 N 作 $NP \perp AB$ 及 $NQ \perp BC$ 。 $PN = BC - QC$ $= 6 - 6\cos 75° \cos 75°$ $MP = MB - PB$ $= 3 - 6\cos 75° \sin 75°$ 在 rt.ΔMPN 中 $MN = \sqrt{PN^2 + MP^2}$ $= \sqrt{(6 - 6\cos 75° \cos 75°)^2 + (3 - 6\cos 75° \sin 75°)^2}$ ≈ 5.795554958 在 rt.ΔVMN 中 $VN = \sqrt{VM^2 + MN^2}$ $= \sqrt{(3\sqrt{3})^2 + 5.795554958^2}$ ≈ 7.783858765 在 ΔVNC 中， $VN^2 + NC^2 = 7.783858765^2 + (6\cos 75°)^2$ ≈ 63.00000001 又 $VC^2 = (6\sqrt{2})^2 = 72$ $\therefore$ $VN^2 + NC^2 \neq VC^2$ $\therefore$ $\angle VNC$ 不是直角。 即 $\angle VNB$ 不是平面 VCD 與平面 $ABCD$ 的交角。 因此，該宣稱不正確。	1M 1M 1A	
	---------(5)	

解	分	備註
20. (a) (i) ∵ H 為垂心 ∴ $\angle BDC=\angle BEC=90^\circ$ ∴ B、C、D 及 E 四點共圓 (同弓形內的圓周角的逆定理或 同弧上的圓周角的逆定理) ∵ $\angle BDC=90^\circ$ ∴ BC 為圓的直徑 (半圓上的圓周角的逆定理或 直徑所對的圓周角的逆定理) 由於 G 為 ΔABC 的形心， 故 AM 為邊 BC 上的中線。 即 M 為 BC 的中點。 因此，M 為圓 $BCDE$ 的圓心。		
評分標準：		
情況 1　附有正確理由的任何正確證明。	3	
情況 2　未附有正確理由的任何正確證明。	2	
情況 3　附有一正確理由和一正確步驟之未完整的證明。	1	
(ii) ∵ ME、MD 為圓的半徑， ∴ $ME=MD$ ∴ ΔMED 為一等腰三角形。 但 N 為底 ED 的中點， ∴ $MN\perp ED$ 因此，該宣稱正確。	1A ---------(4)	
(b) (i) ED 的斜率 $=\frac{3-4}{6-4}=-\frac{1}{2}$ MN 的斜率 $=2$ 又 $N=(5,\frac{7}{2})$ $MN:\frac{y-\frac{7}{2}}{x-5}=2$	1M	
即 $4x-2y-13=0$ 與 $x-7y=0$ 聯立， 得 $M=(\frac{7}{2},\frac{1}{2})$ $MD=\sqrt{(6-\frac{7}{2})^2+(3-\frac{1}{2})^2}$ $=\frac{5\sqrt{2}}{2}$		或 $ME=\sqrt{(4-\frac{7}{2})^2+(4-\frac{1}{2})^2}$ $=\frac{5\sqrt{2}}{2}$
圓 $BCDE$ 的方程為 $(x-\frac{7}{2})^2+(y-\frac{1}{2})^2=\frac{25}{2}$	1M	
即 $x^2+y^2-7x-y=0$ 代入 $x=7y$，得 $49y^2+y^2-49y-y=0$ $y^2-y=0$ $y=0$ (捨) 或 $y=1$ ∴ C 點坐標為 $(7,1)$	1A	

解	分	備註
(ii) 切線的斜率 $=-7$ 切線方程為 $\frac{y-1}{x-7}=-7$	1M	
即 $7x+y-50=0$ P、Q 兩點的坐標分別為 $(\frac{50}{7},0)$ 及 $(0,50)$ $PQ=\sqrt{(\frac{50}{7}-0)^2+(0-50)^2}$ $=\frac{250\sqrt{2}}{7}$ $C(7,1)$ 設 ΔOPQ 內切圓的半徑為 r，		
則 $\frac{1}{2}(\frac{50}{7}+50+\frac{250\sqrt{2}}{7})r=\frac{1}{2}\times\frac{50}{7}\times 50$	1M+1A	
$r=\frac{2500}{400+250\sqrt{2}}$ $=\frac{50}{8+5\sqrt{2}}$ $\quad (=\frac{200-125\sqrt{2}}{7})$ ≈ 3.317614958 ≈ 3.32	1A ---------(7)	

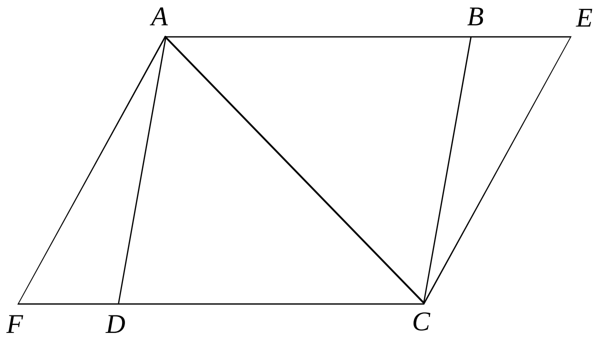
Paper 1

Solution	Marks	Remarks
1. $\dfrac{(x^4y^{-3})^2}{x^{-4}y^7}$		
$=\dfrac{x^8y^{-6}}{x^{-4}y^7}$	1M	for $(ab)^m=a^mb^m$ or $(a^m)^n=a^{mn}$
$=\dfrac{x^{8+4}}{y^{7+6}}$	1M	for $\dfrac{1}{c^{-p}}=c^p$ or $\dfrac{c^p}{c^q}=c^{p-q}$
$=\dfrac{x^{12}}{y^{13}}$	1A	or $c^{-p}=\dfrac{1}{c^p}$ or $\dfrac{c^p}{c^q}=\dfrac{1}{c^{q-p}}$
	---------(3)	
2. $t(2s-r)=4(s-5t)$		
$2ts-tr=4s-20t$	1M	for expanding one side correctly
$2ts-4s=tr-20t$	1M	for putting s on one side
$(2t-4)s=tr-20t$		
$s=\dfrac{tr-20t}{2t-4}$	1A	for $s=\dfrac{20t-tr}{4-2t}$ or equivalent
	---------(3)	
3. (a) $2p^2+pq-6q^2$		
$=(2p-3q)(p+2q)$	1A	
(b) $2p^2+pq-6q^2+9q-6p$		
$=(2p-3q)(p+2q)+3(3q-2p)$	1M	for using the result of (a)
$=(2p-3q)(p+2q-3)$	1A	or equivalent
	---------(3)	
4. (a) The price of the toy for Andy to purchase it		
$=\$28\div 20\%$	1M	
$=\$140$	1A	
(b) The price of the toy for Calvin to purchase it		
$=\$(140+28)\times(1-25\%)$	1M	for $\$P\times(1-25\%)$
$=\$168\times 75\%$		
$=\$126$	1A	
	---------(4)	

	Solution	Marks	Remarks
5.	Let $5k$ and $4k$ be the numbers of girls and boys respectively , where k is a non-zero constants .	1A	
	Then , $5k+72=2(4k)$	1M	
	$3k=72$		
	$k=24$	1A	
	There are 120 girls and 96 boys .		
	The difference of the number of girls and the number of boys		
	$=120-96$		
	$=24$	1A	
	Let n be the number of girls , then the number of boys is $\frac{4}{5}n$.	1A	
	$n+72=2(\frac{4}{5}n)$	1M	
	$\frac{3}{5}n=72$		
	$n=120$	1A	
	The difference of the number of girls and the number of boys		
	$=120-\frac{4}{5}\times120$		or $120\times\frac{1}{5}$
	$=24$	1A	
	Let n be the number of boys , then the number of girls is $\frac{5}{4}n$.	1A	
	$\frac{5}{4}n+72=2n$	1M	
	$\frac{3}{4}n=72$		
	$n=96$	1A	
	The difference of the number of girls and the number of boys		
	$=96\times\frac{5}{4}-96$		or $96\times\frac{1}{4}$
	$=24$	1A	
		---------(4)	
6.	(a) $\frac{1-4x}{2}\geq 9$		
	$1-4x\geq18$		
	$-4x\geq17$	1M	
	$x\leq-\frac{17}{4}$	1A	
	From $5-x<0$, $x>5$		
	Thus , the solution of (*) is $x\leq-\frac{17}{4}$ or $x>5$.	1A	or equivalent
	(b) -5	1A	
		---------(4)	

		Solution	Marks	Remarks
7.	(a)	The coordinates of P' are $(5\,,4)$.	1A	or $P'=(5\,,4)$ or $P'(5\,,4)$
	(b)	The coordinates of Q' are $(4-k\,,-8)$.	1A	or $Q'=(4-k\,,-8)$ or $Q'(4-k\,,-8)$
		Since $P'OQ'$ is a straight line ,		
		$\frac{4-0}{5-0}=\frac{-8-0}{4-k-0}$	1M	or equivalent
		$4(4-k)=-40$		
		$4k=56$		
		$k=14$	1A	
		The coordinates of Q' are $(4-k\,,-8)$.	1A	
		Since $P'OQ'$ is a straight line ,		
		$\sqrt{(5-0)^2+(4-0)^2}+\sqrt{(4-k-0)^2+(-8-0)^2}=\sqrt{(5-4+k)^2+(4+8)^2}$	1M	or equivalent
		$\sqrt{41}+\sqrt{k^2-8k+80}=\sqrt{145+2k+k^2}$		
		$41+2\sqrt{41}\cdot\sqrt{k^2-8k+80}+k^2-8k+80=145+2k+k^2$		
		$2\sqrt{41}\cdot\sqrt{k^2-8k+80}=10k+24$		
		$164(k^2-8k+80)=100k^2+480k+576$		
		$64k^2-1792k+12544=0$		
		$k^2-28k+196=0$		
		$k=14$	1A	
			---------(4)	
8.	(a)	The sum of the scores of the 18 students is 1266 .		
		$50+a+80+b=70.2\times20-1266$	1M	or equivalent
		$a+b=8 \quad \cdots\cdots(1)$		
		And $80+b-(50+a)=34$	1A	or $b-a+30=34$
		$b-a=4 \quad \cdots\cdots(2)$		
		Solving (1) and (2) , we get $a=2$ and $b=6$.	1A	for both correct
	(b)	The required probability $=\frac{6}{20}$	1M	
		$=\frac{3}{10}$	1A	
			---------(5)	

Solution	Marks	Remarks
9.		



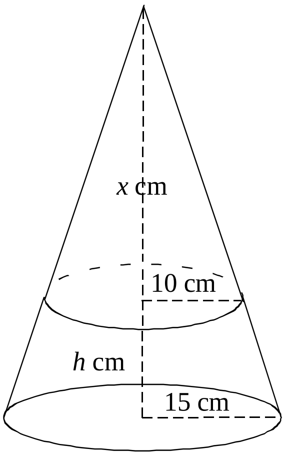
(a) $\because\ AB = CD$ (opp. sides of parallelogram)
$BE = DF$ (given)
$\therefore\ AB + BE = CD + DF$
i.e. $AE = CF$
In ΔACE and ΔCAF ,
$\because\ AE = CF$ (proved)
$AC = CA$ (common side)
$\angle EAC = \angle FCA$ (alt. $\angle$ s, $AB // DC$)
$\therefore\ \Delta ACE \cong \Delta CAF$ (SAS)

Marking Scheme :	
Case 1 Any correct proof with correct reasons .	3
Case 2 Any correct proof without reasons .	2
Case 3 Incomplete proof with any one correct step and one reason .	1

Solution	Marks	Remarks
(b) Form (a) , $CE = AF = 20\text{cm}$		
$\because\ \angle ACB = \angle ABC$		
$\therefore\ AB = AC = 15\text{cm}$		
$AE = 15\text{cm} + 10\text{cm} = 25\text{cm}$		
$\because\ AC^2 + CE^2 = 15^2 + 20^2$		
$= 625 = AE^2$		
$\therefore\ \angle ACE = 90°$	1M	f.t.
The area of $\Delta ACE = \dfrac{15\times 20}{2} = 150\,(\text{cm}^2)$	1A	
The semi-perimeter of $\Delta ACE = \dfrac{15+25+20}{2} = 30\,(\text{cm})$		
The area of ΔACE		
$= \sqrt{30(30-15)(30-25)(30-20)}$	1M	
$= 150\,(\text{cm}^2)$	1A	
	---------(5)	

		Solution	Marks	Remarks
10.	(a)	Let $C = a + bn$, where a and b are non-zero constants .	1A	
		Sub. $n = 4000$ and $C = 152000$,		
		we have $152000 = a + 4000b$ ------(1)	1M	for either substitution
		Sub. $n = 6000$ and $C = 222000$,		
		we have $222000 = a + 6000b$ ------(2)		
		Solving (1) and (2) , we get $a = 12000$ and $b = 35$.	1A	for both correct
		Let m be the number of books that are published ,		
		then $\frac{12000 + 35m}{m} = 40$		
		$m = 2400$	1A	
		Thus , 2400 books are published .		
			---------(4)	
	(b)	Total publishing cost $= \$(12000 + 35 \times 5000)$		
		$= \$187000$		
		Total income when all the published books are sold		
		$= \$42 \times 5000$		
		$= \$210000$		
		$> \$187000$	1M	
		Thus , the claim is disagreed .	1A	f.t.
		The publishing cost per book		
		$= \$(\frac{12000 + 35 \times 5000}{5000})$		
		$= \$37.4$		
		$< \$42$	1M	
		Thus , the claim is disagreed .	1A	f.t.
			---------(2)	
11.	(a)	The coordinates of point $X = (6, 8)$	1A	or $X = (6, 8)$ or $X(6, 8)$
		The radius of $C = 13$	1A	accept $r = 13$
			---------(2)	
	(b)	$L: 3x - 4y - 11 = 0$		
		The slope of $L = \frac{3}{4}$		accept $m_L = \frac{3}{4}$ or $m = \frac{3}{4}$
		The slope of $\Gamma = -\frac{4}{3}$		accept $m_\Gamma = -\frac{4}{3}$
		Note that , Γ passes through the centre $X(6, 8)$.		
		The equation of Γ is $\frac{y - 8}{x - 6} = -\frac{4}{3}$	1M	or equivalent
		i.e. $4x + 3y - 48 = 0$		
		$H = (12, 0)$, $K = (0, 16)$	1A	for both correct
		The area of $\Delta OHK = \frac{12 \times 16}{2} = 96$		
		$\frac{1}{4}$ of the area of circle $C = \frac{1}{4} \times \pi \times 13^2$		
		≈ 132.7322896		
		> 96	1M	
		Thus , the claim is correct .	1A	
			---------(4)	

Solution			Marks	Remarks
12.	(a)	Note that the median is 2.5 ,		
		$9+a=b+c+5$	1M	
		$a=b+c-4$ ……(*)		
		Also note that $a+b+9=28$	1A	
		$b=19-a$		
		Sub. into (*) , we have $2a=15+c$		
		But $a>10$, $3<c<8$ and a , b and c are integers .		
		Thus , $a=11$, $b=8$ and $c=7$.	1A	
			---------(3)	
	(b)	The original mean		
		$=\frac{1\times 9+2\times 11+3\times 8+4\times 7+5\times 5}{9+11+8+7+5}$		
		$=2.7$	1A	
		When the numbers of group members of these two groups are 2 and 3 ,	1M	either one
		the least value of the standard deviation ≈ 1.299965114		
		≈ 1.30	1A	
		When the numbers of group members of these two groups are 1 and 5 ,		
		the greatest value of the standard deviation ≈ 1.367753011		
		≈ 1.37	1A	
			---------(4)	

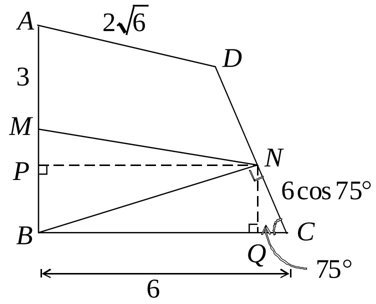
Solution	Marks	Remarks
13. 		
(a) Let h cm be the height of the frustum and x cm be the height of the removed upper cone of the frustum .		
$\frac{x}{x+h}=\frac{10}{15}$	1M	or $\frac{x}{h}=\frac{10}{15-10}$
$15x=10x+10h$		
$5x=10h$		
$x=2h$		
Since the capacities of the cylinder and the frustum are the same , we have		
$\pi\cdot 10^2(31-h)=\frac{1}{3}\pi\cdot 15^2(3h)-\frac{1}{3}\pi\cdot 10^2(2h)$	1M	
$3100-100h=\frac{1}{3}(675h-200h)$		
$9300-300h=475h$		
$h=12$	1A	
The capacity of the frustum		
$=\pi\cdot 10^2(31-h)$		
$=1900\pi$ (cm^3)	1A	r.t. 5970 cm^3
The capacity of the frustum $=\frac{1}{3}\pi\cdot 15^2(36)-\frac{1}{3}\pi\cdot 10^2(24)$ $=1900\pi$ (cm^3)	1A	r.t. 5970 cm^3
	---------(4)	
(b) Let H cm be the depth of water in the cylinder .		
$0.007\times 10^6-1900\pi=100\pi H$	1M	or $0.007\times 10^6-5969.026042$ $=314.1592654H$
$H\approx 3.281692033$		
Depth of water $\approx 3.281692033+12$		
$=15.281692033$		
<15.5	1M	
Thus , the claim is incorrect .	1A	
	---------(3)	

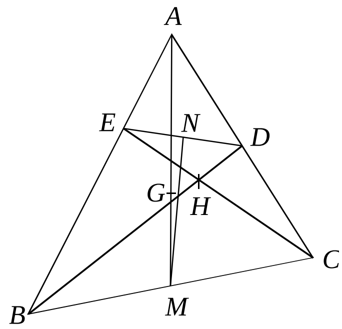
	Solution	Marks	Remarks
14. (a)	$\because\ p(-2)=p(3)=0$ $\therefore\ x+2$ and $x-3$ are the factor of $p(x)$.	1A	
	Since $p(x)$ is a polynomial with the degree of 3 , Let $p(x)=(x+2)(x-3)(ax+b)$, where a and b are non-zero constants .	1M+1A	
	$p(1)=-6(a+b)=-18$ $a+b=3 \quad \cdots\cdots(1)$ $p(2)=-4(2a+b)=-20$ $2a+b=5 \quad \cdots\cdots(2)$	1M	either one
	Solving (1) and (2) , we get $a=2$ and $b=1$ $\therefore\ p(x)=(x+2)(x-3)(2x+1)$	1A	for both correct $p(x)=2x^3-x^2-13x-6$
	Let $p(x)=ax^3+bx^2+cx+d$, where a , b , c and d are constants . $p(-2)=-8a+4b-2c+d=0$ $p(3)=27a+9b+3c+d=0$ $p(1)=a+b+c+d=-18$ $p(2)=8a+4b+2c+d=-20$	1M+1A	either one
	Solving these four equations , we get $a=2$, $b=-1$, $c=-13$ and $d=-6$	1M+1A+1A	1M for eliminating any one unknown 1A for any one term correct 1A for all correct
		---------(5)	
(b)	$p(x)=3x-9$ $(x+2)(x-3)(2x+1)=3(x-3)$ $(x-3)[(x+2)(2x+1)-3]=0$	1M	for common factor $(x-3)$
	$(x-3)(2x^2+5x-1)=0$	1A	
	$\therefore\ x=3$ or $x=\dfrac{-5\pm\sqrt{33}}{4}$	1A	
	Note that $x=\dfrac{-5\pm\sqrt{33}}{4}$ are not rational numbers. Thus , there is only one rational root of the equation $p(x)=3x-9$.	1A	f.t.
	$p(x)=3x-9$ $2x^3-x^2-13x-6=3x-9$	1A	
	$2x^3-x^2-16x+3=0$ $(x-3)(2x^2+5x-1)=0$	1M	for factor $x-3$
	$\therefore\ x=3$ or $x=\dfrac{-5\pm\sqrt{33}}{4}$	1A	
	Note that $x=\dfrac{-5\pm\sqrt{33}}{4}$ are not rational numbers. Thus , there is only one rational root of the equation $p(x)=3x-9$.	1A	f.t.
		---------(4)	

Solution	Marks	Remarks
15. The new mean $=38\times110\%+8=49.8$ (marks) The new standard deviation $=10\times110\%=11$ (marks) Let x marks be the original score of Kelly . The new standard score of Kelly $=\dfrac{x(110\%)+8-49.8}{11}$ $=\dfrac{1.1x-41.8}{11}$ $=\dfrac{x-38}{10}$ $=-0.1$ <0 Thus , the claim is disagreed .	1M 1A 1A	
Let x marks be the original score of Kelly , then $\dfrac{x-38}{10}=-0.1$ $x=37$ The new standard score of Kelly $=\dfrac{37(110\%)+8-49.8}{11}$ $=-0.1$ <0 Thus , the claim is disagreed .	1M 1A 1A	
	---------(3)	
16. (a) The required probability $=\dfrac{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5+C_3^4C_3^4C_1^5}{C_7^{13}}$ $=\dfrac{38}{143}$	1M 1A	at least two terms correct in numerator r.t. 0.266
The required probability $=\dfrac{4}{13}\times\dfrac{4}{12}\times\dfrac{5}{11}\times\dfrac{4}{10}\times\dfrac{3}{9}\times\dfrac{2}{8}\times\dfrac{1}{7}\times P_2^7$ $+\dfrac{4}{13}\times\dfrac{3}{12}\times\dfrac{4}{11}\times\dfrac{3}{10}\times\dfrac{5}{9}\times\dfrac{4}{8}\times\dfrac{3}{7}\times\dfrac{P_4^7}{2\times2}$ $+\dfrac{4}{13}\times\dfrac{3}{12}\times\dfrac{2}{11}\times\dfrac{4}{10}\times\dfrac{3}{9}\times\dfrac{2}{8}\times\dfrac{5}{7}\times\dfrac{P_6^7}{6\times6}$ $=\dfrac{38}{143}$	1M 1A	for any one term correct r.t. 0.266
	---------(2)	
(b) The required probability $=\dfrac{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5}{C_1^4C_1^4C_5^5+C_2^4C_2^4C_3^5+C_3^4C_3^4C_1^5}$ $=\dfrac{47}{57}$	1M 1A	for correct numerator or denominator r.t. 0.825
	---------(2)	

		Solution	Marks	Remarks
17.	(a)	Let r be the common ratio of the sequence .		
		Then $8r^{6-1}=1944$	1M	
		$r^5=243$		
		$r=3$	1A	
		$\therefore$ The common ratio of the sequence $=3$		
		the common ratio of the sequence		
		$=\sqrt[5]{\dfrac{1944}{8}}$	1M	
		$=3$	1A	
			---------(2)	
	(b)	$\dfrac{8(3^n-1)}{3-1}>100\,000\,000$	1M	
		$3^n>25\,000\,001$		
		$n\log 3>\log 25\,000\,001$	1M	
		$n>\dfrac{\log 25\,000\,001}{\log 3}$		
		≈ 15.50536672		
		$\therefore$ The least value of n is 16 .	1A	
			---------(3)	
18.	(a)	$f(x)=-\dfrac{1}{2}x^2+\dfrac{1}{4}x+1$		
		$=-\dfrac{1}{2}(x^2-\dfrac{1}{2}x)+1$		
		$=-\dfrac{1}{2}(x^2-\dfrac{1}{2}x+\dfrac{1}{16}-\dfrac{1}{16})+1$	1M	
		$=-\dfrac{1}{2}(x-\dfrac{1}{4})^2+\dfrac{33}{32}$		
		The coordinates of the vertex of the graph are $(\dfrac{1}{4},\dfrac{33}{32})$.	1A	
			--------(2)	
	(b)	$-\dfrac{1}{2}x^2+\dfrac{1}{4}x+1=c$		
		$2x^2-x+4c-4=0$		
		$x=\dfrac{1\pm\sqrt{1-8(4c-4)}}{4}=\dfrac{1\pm\sqrt{33-32c}}{4}$		
		$PQ=\dfrac{1+\sqrt{33-32c}}{4}-\dfrac{1-\sqrt{33-32c}}{4}$	1M	
		$=\dfrac{\sqrt{33-32c}}{2}$		
		$\therefore\ \dfrac{\sqrt{33-32c}}{2}=\dfrac{1}{2}c$	1M	
		$33-32c=c^2$		
		$c^2+32c-33=0$		
		$(c+33)(c-1)=0$		
		$c=-33$ (rejected) or $c=1$	1A	
			--------(3)	

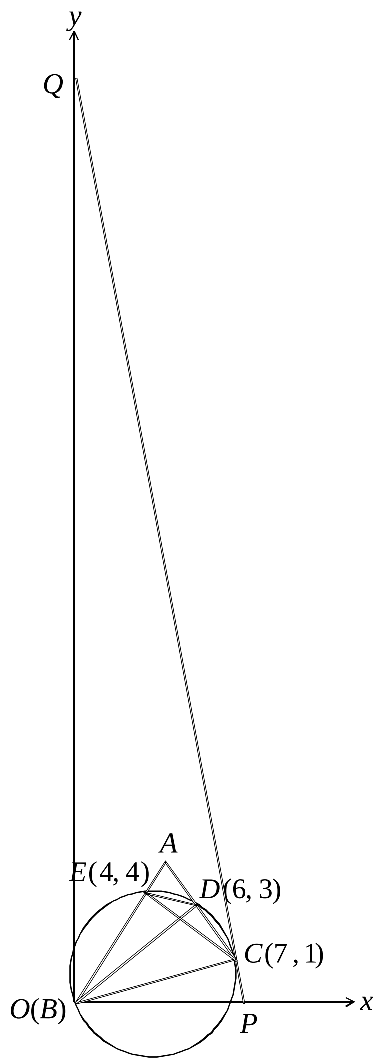
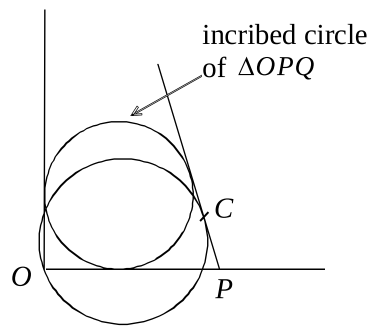
		Solution	Marks	Remarks
19.	(a)	$\angle ADC = 360° - 90° - 2\times 75° = 120°$		
		In ΔADC ,		
		$AC^2 = (2\sqrt{6})^2 + (2\sqrt{6})^2 - 2(2\sqrt{6})(2\sqrt{6})\cos 120°$	1M	or $AC = 2(2\sqrt{6}\sin 60°) = 6\sqrt{2}$
		$AC^2 = 72$		
		In rt.ΔABC ,		
		$2AB^2 = AC^2$		
		$AB^2 = 36$		
		$AB = 6$ cm	1A	
			--------(2)	
	(b)	(i) Let M be the mid-point of AB .		
		$VM = 6\sin 60°$		
		$= 3\sqrt{3}$		
		$MA = 3$		
		In ΔAMD ,		
		$MD^2 = 3^2 + (2\sqrt{6})^2 - 2(3)(2\sqrt{6})\cos 75°$	1M	
		$= 33 - 12\sqrt{6}\cos 75°$		$MD^2 \approx 25.39230485$
		In rt.ΔVMD ,		
		$VD^2 = VM^2 + MD^2$		
		$= (3\sqrt{3})^2 + 33 - 12\sqrt{6}\cos 75°$		
		$VD \approx 7.238252886$		
		≈ 7.24 cm	1A	
		(ii) $CN = 6\cos 75°$		
		≈ 1.552914271		
		$VC = \sqrt{6^2 + 6^2} = 6\sqrt{2}$		
		Let N' be the foot of the perpendicular from V to CD .		
		In ΔVCD ,		
		$\cos\angle VCD \approx \dfrac{(6\sqrt{2})^2 + (2\sqrt{6})^2 - 7.238252886^2}{2(6\sqrt{2})(2\sqrt{6})}$	1M	
		≈ 0.524519052		
		$CN' = 6\sqrt{2}\cos\angle VCD$		
		$\approx 6\sqrt{2}(0.524519052)$	1M	
		≈ 4.450691742		
		$\therefore$ $CN \neq CN'$		
		$\therefore$ N is not the foot of the perpendicular from V to CD .		
		That is $\angle VNB$ is not the angle between the face VCD and the face $ABCD$.		
		Thus , the claim is incorrect .	1A	

Solution	Marks	Remarks
Construct $NP \perp AB$ and $NQ \perp BC$. $PN = BC - QC$ $= 6 - 6\cos 75^\circ \cos 75^\circ$ $MP = MB - PB$ $= 3 - 6\cos 75^\circ \sin 75^\circ$ In rt.ΔMPN , $MN = \sqrt{PN^2 + MP^2}$		
$= \sqrt{(6 - 6\cos 75^\circ \cos 75^\circ)^2 + (3 - 6\cos 75^\circ \sin 75^\circ)^2}$	1M	
≈ 5.795554958 In rt.ΔVMN , $VN = \sqrt{VM^2 + MN^2}$ $= \sqrt{(3\sqrt{3})^2 + 5.795554958^2}$ ≈ 7.783858765 In ΔVNC , $VN^2 + NC^2 = 7.783858765^2 + (6\cos 75^\circ)^2$ ≈ 63.00000001 Also, $VC^2 = (6\sqrt{2})^2 = 72$		
$\therefore$ $VN^2 + NC^2 \neq VC^2$	1M	
$\therefore$ $\angle VNC$ is not a right angle . That is $\angle VNB$ is not the angle between the face VCD and the face $ABCD$.		
Thus , the claim is incorrect .	1A	
	---------(5)	

Solution	Marks	Remarks
20. (a) (i) $\because$ H is the orthocenter $\therefore$ $\angle BDC = \angle BEC = 90^\circ$ $\therefore$ B, C, D and E are concyclic (converse of $\angle$s in the same segment) $\because$ $\angle BDC = 90^\circ$ $\therefore$ BC is a diameter of the circle (converse of $\angle$ in semi-circle) Since G is the centroid of ΔABC, AM is the median of BC. That is M is the mid-point of BC. Thus, M is the centre of the circle $BCDE$.		

Marking Scheme :	
Case 1 Any correct proof with correct reasons .	3
Case 2 Any correct proof without reasons .	2
Case 3 Incomplete proof with any one correct step and one reason .	1

Solution	Marks	Remarks
(ii) $\because$ ME and MD are radii of the circle $\therefore$ $ME = MD$ $\therefore$ ΔMED is an isosceles triangle But N is the mid-point of the base ED $\therefore$ $MN \perp ED$ Thus, the claim is correct .	1A ---------(4)	
(b) (i) The slope of $ED = \dfrac{3-4}{6-4} = -\dfrac{1}{2}$ The slope of $MN = 2$ And $N = (5, \dfrac{7}{2})$		
The equation of MN is $\dfrac{y-\frac{7}{2}}{x-5} = 2$ i.e. $4x - 2y - 13 = 0$ Solving with $x - 7y = 0$, we get $M = (\dfrac{7}{2}, \dfrac{1}{2})$	1M	
$MD = \sqrt{(6-\frac{7}{2})^2 + (3-\frac{1}{2})^2}$ $= \dfrac{5\sqrt{2}}{2}$		or $ME = \sqrt{(4-\frac{7}{2})^2 + (4-\frac{1}{2})^2}$ $= \dfrac{5\sqrt{2}}{2}$
The equation of the circle $BCDE$ is $(x-\frac{7}{2})^2 + (y-\frac{1}{2})^2 = \dfrac{25}{2}$	1M	
i.e. $x^2 + y^2 - 7x - y = 0$ sub. $x = 7y$ $49y^2 + y^2 - 49y - y = 0$ $y^2 - y = 0$ $y = 0$ (rejected) or $y = 1$ $\therefore$ The coordinates of point C are $(7, 1)$.	1A	

Solution	Marks	Remarks
(ii) The slope of the tangent $=-7$		
The equation of the tangent is $\frac{y-1}{x-7}=-7$	1M	
i.e. $7x+y-50=0$		
The coordinates of points P and Q are $(\frac{50}{7}, 0)$ and $(0, 50)$ respectively		
$PQ=\sqrt{(\frac{50}{7}-0)^2+(0-50)^2}$ $=\frac{250\sqrt{2}}{7}$		
Let r be the radius of the inscribed circle of ΔOPQ.		
Then $\frac{1}{2}(\frac{50}{7}+50+\frac{250\sqrt{2}}{7})r=\frac{1}{2}\times\frac{50}{7}\times 50$	1M+1A	
$r=\frac{2500}{400+250\sqrt{2}}$ $=\frac{50}{8+5\sqrt{2}}$ $(=\frac{200-125\sqrt{2}}{7})$ ≈ 3.317614958		
≈ 3.32	1A	
$\therefore$ The radius of the inscribed circle of ΔOPQ is 3.32.		
	---------(7)	

學友社　2016／2017 年香港模擬文憑試

數學科 試卷二

答案

題號	答案	題號	答案
1.	B	26.	A
2.	C	27.	A
3.	B	28.	C
4.	C	29.	B
5.	D	30.	A
6.	B	31	C
7.	A	32	A
8.	A	33	D
9.	D	34	C
10.	A	35	D
11.	D	36	B
12.	C	37	D
13.	C	38	C
14.	A	39	D
15.	D	40	B
16.	B	41	B
17.	A	42	C
18.	D	43	C
19.	D	44	A
20.	C	45	A
21.	B		
22.	C		
23.	D		
24.	D		
25.	D		