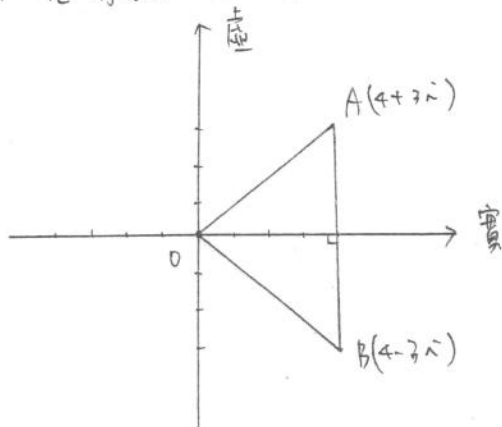


1. 整係數方程式有一根 $4+3i$, \Rightarrow 有另一根 $4-3i$

1. 876



$$\overline{AB} = 6, \text{ O 到 AB 的高} = 4$$

$$\therefore \triangle OAB \text{ 的面積} = \frac{1}{2} \times 6 \times 4 = 12$$

(3) *

2. $n(s) = C_2^{16} = \frac{16 \times 15}{2} = 120$

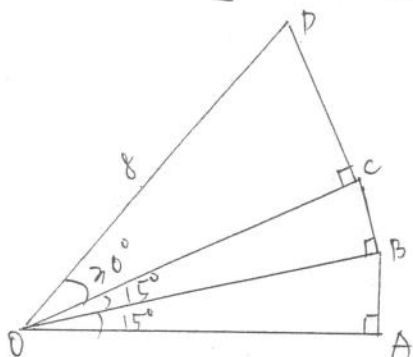
$$n(A) = C_2^{16} - C_1^4 \times C_2^4 = 120 - 24 = 96$$

$$\frac{96}{120} = \frac{4}{5}$$

↑ 全
↑ 2格在同一行

(5) *

3.



$$\because \overline{OD} = 8 \Rightarrow \overline{OC} = 8 \cos 30^\circ$$

$$\Rightarrow \overline{OB} = 8 \cos 30^\circ \cos 15^\circ$$

$$\Rightarrow \overline{AB} = 8 \cos 30^\circ \cos 15^\circ \sin 15^\circ$$

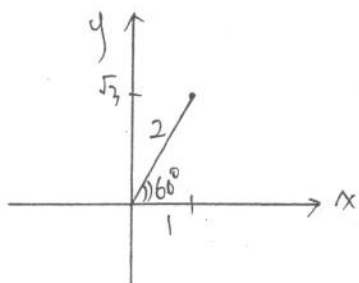
$$= 4 \cos 30^\circ (2 \sin 15^\circ \cos 15^\circ)$$

$$= 4 \cos 30^\circ \sin 30^\circ$$

$$= 2 \sin 60^\circ = \sqrt{3}$$

(4) *

4. $\sqrt{3} \cos \theta + \sin \theta = \sin \theta + \sqrt{3} \cos \theta = 2 \sin(\theta + 60^\circ) \approx \sqrt{2}$



$$\therefore 74 + 60^\circ = 134^\circ \text{ 假設}$$

(4) *

5. 以指數方式成長 每2小時成長為2倍, 即每小時 $\sqrt{2}$ 倍

3

=

3

:

$\sqrt{3}$

又 t 小時後 B 除以 A 約是 10.

95 樓測

$$\frac{(\sqrt[3]{3})^t}{(\sqrt{2})^t} = 10 \Rightarrow \left(\frac{\sqrt[3]{3}}{\sqrt{2}}\right)^t = 10$$

(未知數在指數位置 \Rightarrow 取 \log)

$$\log\left(\frac{\sqrt[3]{3}}{\sqrt{2}}\right)^t = \log 10 \Rightarrow t\left(\frac{1}{3}\log 3 - \frac{1}{2}\log 2\right) = 1$$

$$\Rightarrow (0.1590 - 0.1505)t = 1 \Rightarrow t = \frac{1}{0.0085} \approx 117$$

(5) #

6. 25 是 a, b 之最大公因數 $\therefore 25 | a, 25 | b$

3, 4, 14 都是 b, c 之公因數 $\therefore [3, 4, 14] | b, [3, 4, 14] | c$

注意是最小公倍數
而不是 $3 \times 4 \times 14$

$$84 | b, 84 | c$$

$$\Rightarrow 25 | a, [25, 84] | b, 84 | c$$

"
 2100

(1) $84 | c$ 無法推得 $56 | c$ (2) 由上述可得 $2100 | b$

(3) $a \leq 100$ 又 $25 | a \Rightarrow a = 25, 50, 75$

若 $a = 50 \Rightarrow (a, b) = 50 \rightarrow$

若 $a = 75 \Rightarrow (a, b) = 75 \rightarrow$

$$\therefore a = 25$$

$$(4) (a, b, c) | (a, b) \Rightarrow (a, b, c) | 25$$

$$(5) \begin{aligned} &25 | a \\ &2100 | b \Rightarrow [25, 2100, 84] | [a, b, c] \Rightarrow 25 \times 3 \times 4 \times 7 | [a, b, c] \\ &84 | c \end{aligned}$$

(2)(3)(4) #

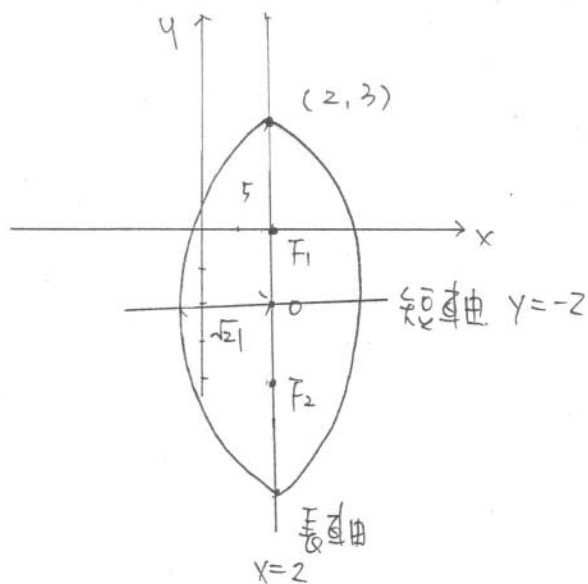
B

1. $\sqrt{(x-2)^2 + y^2} + \sqrt{(x-2)^2 + (y+4)^2} = 10$, (像橢圓定義式. 要檢查 $2a, 2c$ 關係)

設 $F_1(2,0), F_2(2,-4) \Rightarrow \overline{F_1F_2} = 4 < 10 = 2a$

\therefore 此圖形為橢圓, 焦點為 F_1, F_2 .. $a=5, c=2 \Rightarrow b = \sqrt{21}$

$(a^2 = b^2 + c^2)$



中心 $(2, -2)$

(4)(5) 可由右圖得知

(1)(3)(4)(5) #

8. 可設此數列 $\langle a_n \rangle$ 為 $4-2d, 4-d, 4, 4+d$

$\because 0 < 4-2d < 2 \Rightarrow -4 < -2d < -2 \Rightarrow 1 < d < 2$

$\Rightarrow \langle b_n \rangle$ 為 $2^{4-2d}, 2^{4-d}, 2^4, 2^{4+d}$

\therefore 不難發現 $\langle b_n \rangle$ 為等比數列且公比 = 4^d ($< 4^d < 16$)

(1) b_1, b_2, b_3, b_4 為等比數列

(2) $2^{4-2d} < 2^{4-d} \Rightarrow b_1 < b_2$

(3) $2^{4-d} > 2^2 = 4 \Rightarrow b_2 > 4$

(4) $2^{4+d} > 2^5 = 32 \Rightarrow b_4 > 32$

(5) $b_2 \times b_4 = 2^{4-d} \times 2^{4+d} = 2^8 = 256$

(1)(2)(3)(4)(5) #

9. 從選項中發現 $g(x) = x-a$ 的類型才在選工員

\therefore 設 $g(x) = x-a, f(x) = 3x^3 + bx^2 + 2x + d$
 甲生: $2x^3 + bx^2 + 2x + d$
 乙生: $3x^3 + bx^2 - 2x + d$

甲生算的餘式 $2a^3 + ba^2 + 2a + d$

乙生算的餘式 $3a^3 + ba^2 - 2a + d$

950字樣]

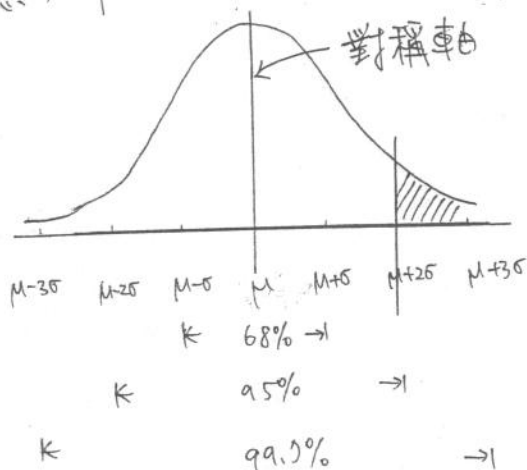
$\Rightarrow 2a^3 + ba^2 + 2a + d = 3a^3 + ba^2 - 2a + d$

$\Rightarrow -a^3 + 4a = 0 \Rightarrow a^3 - 4a = 0 \Rightarrow a(a^2 - 4) = 0 \Rightarrow a = 0 \text{ or } 2 \text{ or } -2$

$\therefore g(x) = x \text{ or } x - 2 \text{ or } x + 2$

(1) (3) (5) *

(0. (1)(2)
常態分佈: ① 平均 $\overset{M}{=} 55$ ② 標準差 $\overset{\sigma}{=} 12.5$



\therefore 平均在 55 公斤以上佔 50%

平均在 80 公斤以上佔 $\frac{100-95}{2} \%$
2.5%

從樣本就直接看直方圖

- (3) 中位數 = 50% \Rightarrow 小於 55 公斤
- (4) 第一四分位數 = 25% \Rightarrow 大於 45 公斤
- (5) 超過 80 公斤比例 > 超過 85 公斤比例 = 5%

(1) (2) (4) (5) *

(1. (1) 4 最佳分解為 $2 \times 2 \Rightarrow F(4) = \frac{2}{2} = 1$

(2) 24 最佳分解為 $4 \times 6 \Rightarrow F(24) = \frac{4}{6} = \frac{2}{3}$

(3) 27 最佳分解為 $3 \times 9 \Rightarrow F(27) = \frac{3}{9} = \frac{1}{3}$

(4) 若 n 是質數, n 只有唯一分解 $1 \times n \Rightarrow$ 最佳分解 $1 \times n \Rightarrow F(n) = \frac{1}{n}$

(5) 若 n 是完全平方數, \sqrt{n} 為正整數且最佳分解為 $\sqrt{n} \times \sqrt{n} \Rightarrow F(n) = \frac{\sqrt{n}}{\sqrt{n}} = 1$

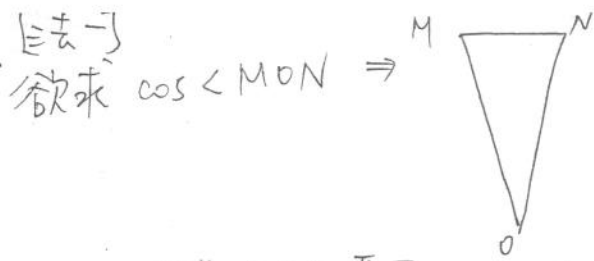
(1) (3) (4) (5) *

A. 男生 = $261 \times 2 + 249 \times 1 + 255 \times 1$, 女生 = $249 \times 1 + 255 \times 1 + 235 \times 2$

男生 : 女生 = $1026 : 974 \Rightarrow \frac{1026}{974} \approx 1.053 \Rightarrow 105 : 100$

(05) *
P4

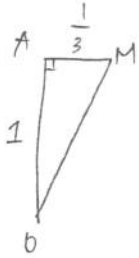
B. [法一]
欲求 $\cos \angle MON \Rightarrow$



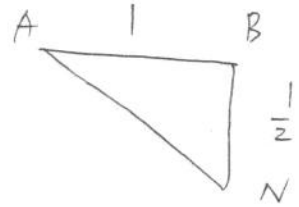
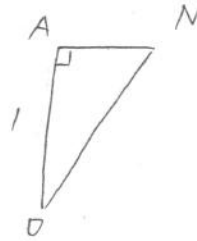
需要知道 \overline{MN} , \overline{MO} , \overline{NO} 長

10-8-14

\therefore 正方體沒說邊長，不妨假設邊長為 1.

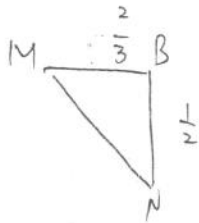


$$\Rightarrow \overline{OM} = \sqrt{\left(\frac{1}{3}\right)^2 + 1^2} = \frac{\sqrt{10}}{3}$$



$$\Downarrow \overline{AN} = \sqrt{1^2 + \left(\frac{1}{2}\right)^2} = \sqrt{\frac{5}{4}}$$

$$\Rightarrow \overline{ON} = \sqrt{1^2 + \left(\frac{\sqrt{5}}{2}\right)^2} = \frac{3}{2}$$

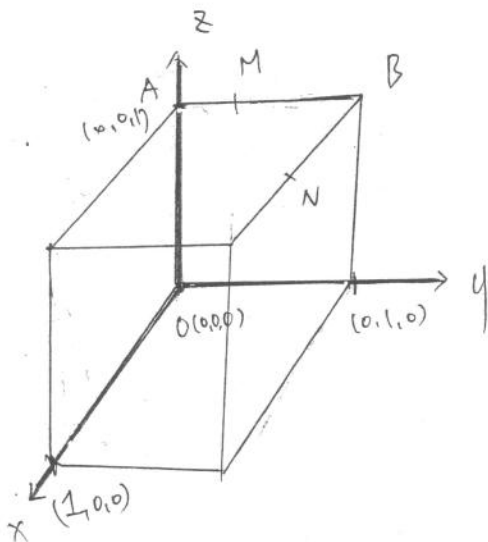


$$\Rightarrow \overline{MN} = \sqrt{\left(\frac{2}{3}\right)^2 + \left(\frac{1}{2}\right)^2} = \sqrt{\frac{4}{9} + \frac{1}{4}} = \sqrt{\frac{25}{36}} = \frac{5}{6}$$

$$\therefore \cos \angle MON = \frac{\overline{OM}^2 + \overline{ON}^2 - \overline{MN}^2}{2 \cdot \overline{OM} \cdot \overline{ON}} = \frac{\frac{10}{9} + \frac{9}{4} - \frac{25}{36}}{2 \cdot \frac{\sqrt{10}}{3} \cdot \frac{3}{2}} = \frac{\frac{46}{36}}{\sqrt{10}} = \frac{8}{3} \times \frac{\sqrt{10}}{10} = \frac{4\sqrt{10}}{15}$$

[法二]

坐標法



$$M(0, \frac{1}{3}, 1)$$

$$N(\frac{1}{2}, 1, 1)$$

$$O(0, 0, 0)$$

$$\cos \theta = \frac{\vec{OM} \cdot \vec{ON}}{|\vec{OM}| |\vec{ON}|} = \frac{\frac{1}{3} + 1}{\sqrt{\frac{1}{9} + 1} \sqrt{\frac{1}{4} + 1 + 1}} = \frac{\frac{4}{3}}{\frac{\sqrt{10}}{3} \times \frac{3}{2}} = \frac{8}{3\sqrt{10}} = \frac{4\sqrt{10}}{15}$$

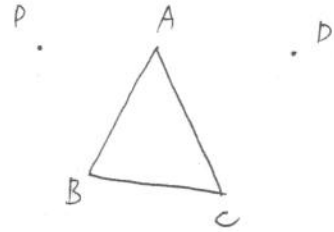
$$\frac{4\sqrt{10}}{15} *$$

C. 設 $A(-6, -2)$, $B(2, -1)$, $C(1, 2)$, D 為欲求之第四點
 四點為菱形 \Rightarrow 即為對角線互相垂直之平行四邊形。

\Rightarrow $\textcircled{1}$ $ABCD: D = (-6, -2) + (1, 2) - (2, -1) = (-7, 1)$

$\textcircled{2}$ $ADBC: D = (-6, -2) + (2, -1) - (1, 2) = (-5, -5)$

$\textcircled{3}$ $ABDC: D = (2, -1) + (1, 2) - (-6, -2) = (9, 3)$



$\textcircled{1}$ $\vec{AC} = (7, 4)$, $\vec{BD} = (-9, 2) \therefore \vec{AC} \not\perp \vec{BD}$ (不合)

$\textcircled{2}$ $\vec{AB} = (8, 1)$, $\vec{CD} = (-6, -1) \therefore \vec{AB} \not\perp \vec{CD}$ (不合)

$\textcircled{3}$ $\vec{AD} = (15, 5)$, $\vec{BC} = (-1, 3) \therefore \vec{AD} \perp \vec{BC}$

(9, 3) #

D. 設 ABCD 外接圓半徑 R .

此外接圓也是 $\triangle BCD$ 之外接圓, 由正弦定理知 $\frac{b}{\sin 30^\circ} = 2R$

$\triangle ABD$

$\frac{AD}{\sin 45^\circ} = 2R$

$\therefore \frac{b}{\sin 30^\circ} = \frac{AD}{\sin 45^\circ} \Rightarrow AD = \frac{b}{\frac{1}{2}} \times \frac{\sqrt{2}}{2} = 6\sqrt{2} = \sqrt{72}$

$\sqrt{72}$ #

E. 不可能買甲、乙, (沒有價格比甲、乙還低的鞋)

買 送

丙 2 (甲、乙)

丁 2

戊 2

己 5 (甲、乙、丙、丁、戊)

庚 5

辛 5

$\Rightarrow 2 \times 3 + 5 \times 3 = 21$

21 #

F.

體育類 + 新聞類 + 綜藝類: $2! \times 3! \times 4! = 288$

體育類 + 綜藝類 + 新聞類: $2! \times 4! \times 3! = 288$

> 576

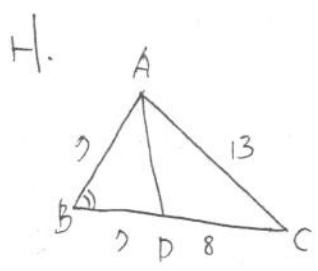
576 #

- G. 第1個圖所用白地磚個數: $3+2+3$ (一行一行加)
 2 : $3+2+3+(2+3)$
 3 : $3+2+3+(2+3)+(2+3)$
 ...

不難發現是首項 = 8, 公差 = 5 的等差數列

$\Rightarrow a_{95} = 8 + 5 \times 94 = 478$

478 #

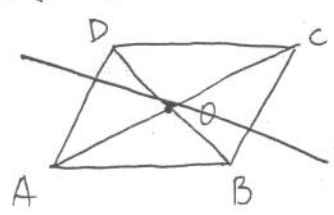


設 $AD = x$
 $\cos B = \frac{7^2 + 7^2 - x^2}{2 \cdot 7 \cdot 7} = \frac{7^2 + 13^2 - 13^2}{2 \cdot 7 \cdot 15}$
 (看 $\triangle ABD$) (看 $\triangle ABC$)

$\Rightarrow 15(49 + 49 - x^2) = 7(49 + 225 - 169) = 105 \times 7$
 $\Rightarrow 98 - x^2 = 49 \Rightarrow x^2 = 49 \Rightarrow x = \pm 7$

7 #

I. 請注意數據, 不難發現 ABCD 為平行四邊形



設 O 為平行四邊形 ABCD 之中心
 * 任意直線通過 O 必將 ABCD 面積平分

$\therefore y = m(x-1) + 4$ 也是通過 O

O 為 A.C 或 B.D 之中點 (5, 3), 代入直線

$\therefore 3 = m(-2) + 4 \Rightarrow m = \frac{1}{2}$

$\frac{1}{2}$ #