牛津數學科DSE試題分析座談會2019

必修部分 卷二

講者: 吳玉景老師
聖若瑟書院

HKDSE Mathematics (CORE) Paper 2

Time Allowed	1 hour 15 minutes
No. of Questions	45
Average time spent on each question	1 min 40 sec (= 100 sec)

Some Statistics

		Number of Questions		
CORE Paper 2	Section	Number & Algebra	Measures, Shape & Space	Data Handling
2015	A	14	12	4
	B	7	5	3
2016	A	14	13	3
	B	6	5	4
2017	A	14	13	3
	B	7	4	4
2018	A	13	14	3
	B	7	4	4
2019	**A**	**14**	**13**	**3**
	B	**6**	**5**	**4**

Easy... or Easy to Get *Wrong* ?

DSE 2019 Q1

1. $(a-b)(a^2+ab-b^2)=$

   A. $(a-b)^3$.

   B. a^3-b^3.

   C. $a^3-2ab^2+b^3$.

   D. $a^3-2a^2b+2ab^2+b^3$.

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Not familiar with the identity, careless...

No common factors, EXPAND it!!!

Easy... or Easy to Get *Wrong* ?

DSE 2019 Q4

4. If α and β are constants such that $(x-8)(x+\alpha)-6=(x-9)^2+\beta$, then $\beta=$

A. -26.

B. -10.

C. -7.

D. -6.

Expand + Compare coefficients

Why not put $x = 8$???

Put $x = 8$, we have

$$0\times(x+\alpha)-6=(8-9)^2+\beta$$

$$\beta=-7$$

DSE 2017 Q8

If m and n are constants such that $4x^2 + m(x+1) + 28 = mx(x+3) + n(x-4)$, then $n =$

A. -8.

B. -7.

C. 4.

D. 16.

Put $x = 4$, we have

$64 + 5m + 28 = 28m + n \times 0$

$m = 4$

Put $x = 0$, then

$0 + 4 + 28 = 0 - 4n$

$n = -8$

Easy... or Easy to Get *Wrong* ?

DSE 2019 Q10

10. Which of the following statements about the graph of $y = (3 - x)(x + 2) - 6$ is/are true?

I. The graph opens downwards.
II. The graph passes through the point $(1, 10)$.
III. The x-intercepts of the graph are -2 and 3.

A. I only
B. II only
C. I and III only
D. II and III only

$$y = ax^2 + bx + c$$

$a \rightarrow$ *open upwards/downwards*

$c \rightarrow$ *y-intercept*

$x = \frac{-b}{2a} \rightarrow$ *axis of symmetry*

$\rightarrow$ *vertex* $(\frac{-b}{2a}, \underline{???})$

Easy... or Easy to Get *Wrong* ?

DSE 2019 Q29

29. Which of the following can be obtained from any box-and-whisker diagram?

I. Range
II. Standard deviation
III. Inter-quartile range

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

2 extreme data

Q_1 lower quartile

Q_2 median

Q_3 upper quartile

Range = diff of 2 extreme data

Inter-quartile range = $Q_3 - Q_1$

Easy... or Easy to Get *Wrong* ?

DSE 2019 Q41

41. If ΔABC is a right-angled triangle with $\angle ABC = 90°$, which of the following is/are true?

I. The orthocentre of ΔABC lies on AC.

II. The centroid of ΔABC lies inside ΔABC.

III. The in-centre of ΔABC lies outside ΔABC.

A. I only

B. II only

C. I and III only

D. II and III only

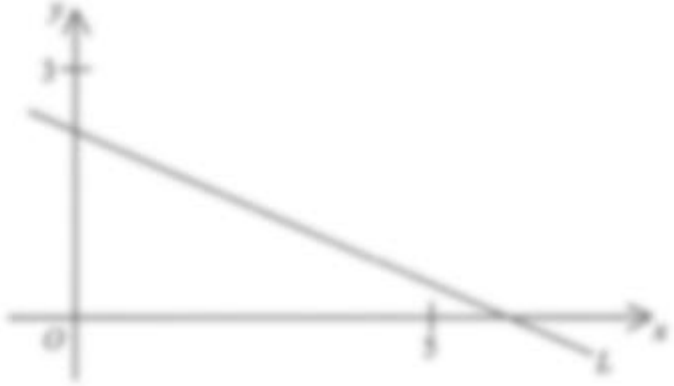
Not really difficult, but…

DSE 2019 Q23

23. In the figure, the equation of the straight line L is $ax + by + 15 = 0$. Which of the following are true?

I. $a > b$
II. $a > -3$
III. $b > -5$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III



$ax + by + 15 = 0$

$$y = \frac{-a}{b}x - \frac{15}{b}$$

Check the slope, x- and y-intercepts…

Slope: $-1 < \frac{-a}{b} < 0$ $\quad a < 0, b < 0$ ➔ $a > b$

x-intercept $= \frac{-15}{a} > 5$ $\quad a > -3$

y-intercept $= \frac{-15}{b} < 3$ $\quad b < -5$

Not really difficult, but...

DSE 2019 Q32

32. If $\frac{3}{3\log x - 2} + 7 = \frac{2}{2\log x + 1}$, then $\log \frac{1}{x} =$

A. -3 or 2.

B. -2 or 3.

C. $\frac{-1}{3}$ or $\frac{1}{2}$.

D. $\frac{-1}{2}$ or $\frac{1}{3}$.

$$\frac{3}{3\log x - 2} + 7 = \frac{2}{2\log x + 1}$$

$$\frac{21\log x - 11}{3\log x - 2} = \frac{2}{2\log x + 1}$$

$$42(\log x)^2 - \log x - 11 = 6 \log x - 4$$

$$6(\log x)^2 - \log x - 1 = 0$$

$$(2\log x - 1)(3 \log x + 1) = 0$$

$$\log x = \frac{1}{2} \quad \text{or} \quad \log x = \frac{-1}{3}$$

Strive for 5**

DSE 2019 Q16

16. In the figure, $ABCD$ is a parallelogram and $AEFG$ is a square. It is given that $BE : EF : FC = 2 : 7 : 3$. BD cuts AE and FG at the points X and Y respectively. If the area of ΔABX is $24\ cm^2$, then the area of the quadrilateral $CDYF$ is

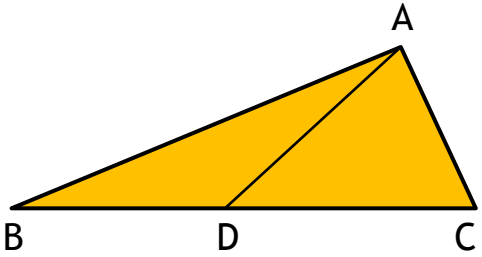
A. $54\ cm^2$.

B. $77\ cm^2$.

C. $81\ cm^2$.

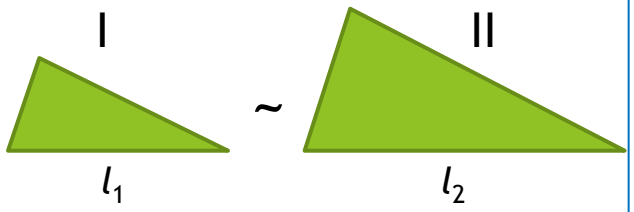
D. $87\ cm^2$.

Basic Requirement 1



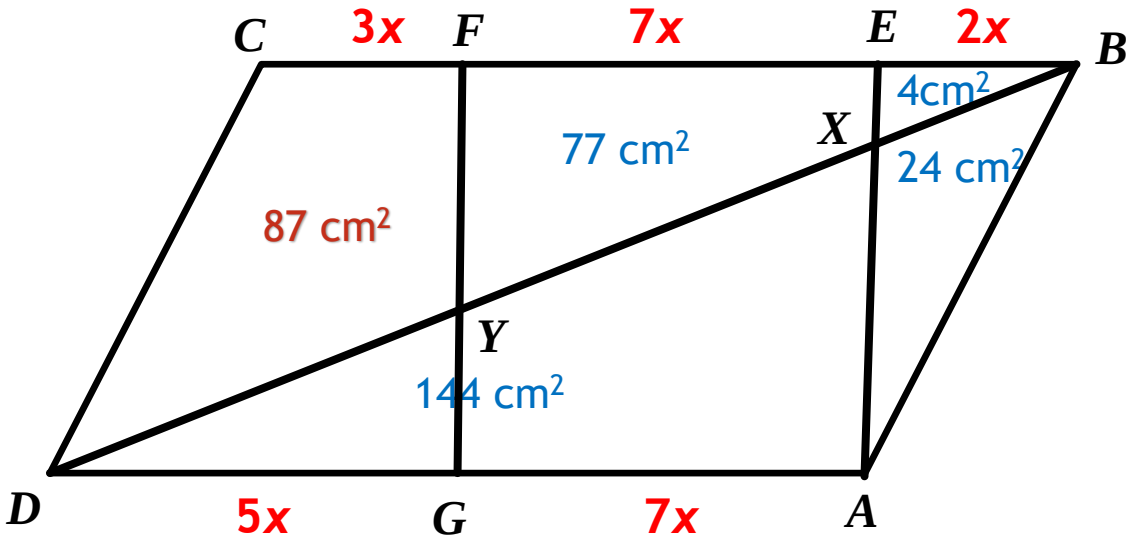
$$\frac{Area\ of\ \Delta ABD}{Area\ of\ \Delta ADC} = \frac{BD}{DC}$$

Basic Requirement 2



$$\frac{Area\ of\ \mathrm{I}}{Area\ of\ \mathrm{II}} = \left(\frac{l_1}{l_2}\right)^2$$

Strive for 5**



ΔBEX ~ ΔDAX ➔ BX : DX = 1:6

Area of ΔAXD = 6×24 = 144 cm²

⋮

Strive for 5**

DSE 2019 Q31

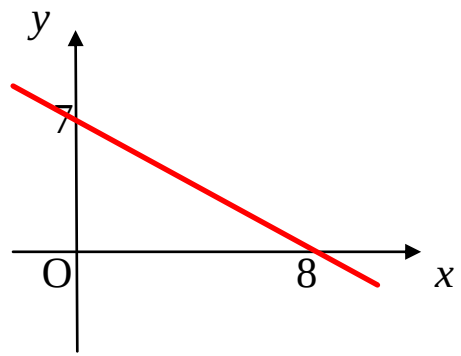
31. It is given that $\log_9 y$ is a linear function of $\log_3 x$. The intercepts on the vertical axis and on the horizontal axis of the graph of the linear function are 7 and 8 respectively. Which of the following must be true?

A. $x^8 y^7 = 3^{56}$

B. $x^7 y^8 = 3^{56}$

C. $x^7 y^8 = 3^{56}$

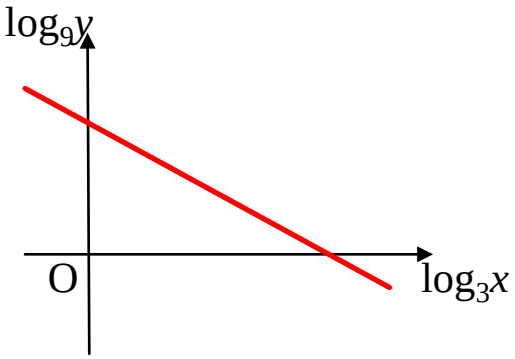
D. $x^8 y^7 = 3^{56}$



Equation of the line is:

$7x + 8y - 56 = 0$.

But for this question…



The equation of the line is:

$$7 \log_3 x + 8 \log_9 y - 56 = 0.$$

Strive for 5**

DSE 2019 Q31

31. It is given that $\log_3 y$ is a linear function of $\log_9 x$. The intercepts on the vertical axis and on the horizontal axis of the graph of the linear function are 7 and 8 respectively. Which of the following must be true?

A. $x^7y^4 = 3^{56}$

B. $x^7y^4 = 3^{56}$

C. $x^7y^4 = 3^{56}$

D. $x^7y^4 = 3^{56}$

$$7\log_3 x + 8\log_9 y - 56 = 0$$

$$\log_3 x^7 + \log_9 y^8 = 56$$

$$\log_3 x^7 + \frac{log_3 y^8}{log_3 9} = 56$$

$$2\log_3 x^7 + \log_3 y^8 = 112$$

$$\log_3 x^{14} + \log_3 y^8 = 112$$

$$x^{14}y^8 = 3^{112}$$

So, $x^7y^4 = 3^{56}$

DSE 2014 Q.11

The width and the length of a thin rectangular metal sheet are measured as 8 cm and 10 cm correct to the nearest cm respectively. Let x cm^2 be the actual area of the metal sheet. Find the range of values of x.

A. $71.25 \leq x < 89.25$

B. $71.25 < x \leq 89.25$

C. $79.5 \leq x < 80.5$

D. $79.5 < x \leq 80.5$

7.5 cm $\leq$ actual width < 8.5 cm

9.5 cm $\leq$ actual length < 10.5 cm

Then, what's the answer???

CE 2008 Q.49

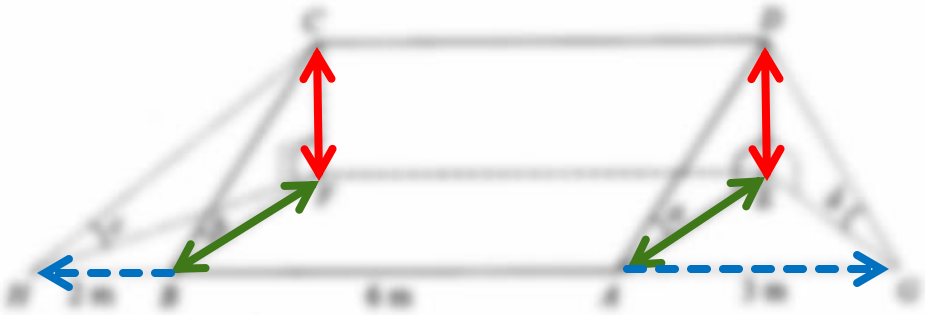
The figure shows a right prism $ABCDEF$ with a right-angled triangle as the cross-section. A, B, E and F lie on the horizontal ground. G and H are two points on the horizontal ground so that G, A, B and H are collinear. It is given that $AB = 6$ m, $AG = 3$ m and $BH = 2$ m. If $\angle DAE = a$, $\angle CBF = b$, $\angle CHF = c$ and $\angle DGE = d$, which of the following must be true?

A. $a < d < c$

B. $c < a < d$

C. $c < d < b$

D. $d < c < b$



CE 2006 Q.48

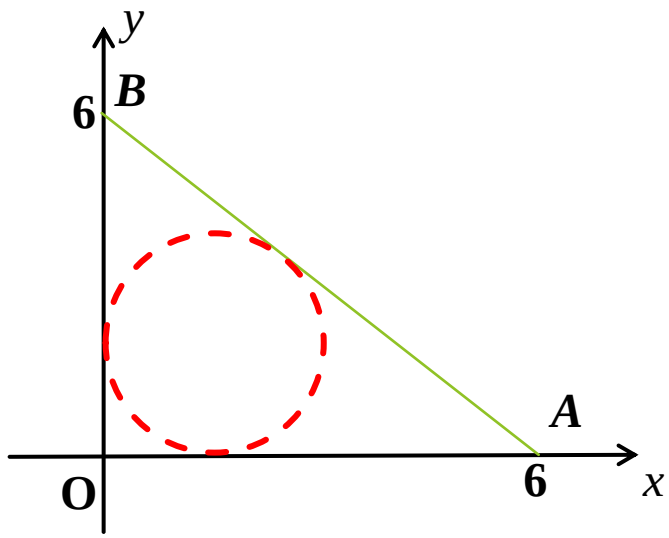
Let O be the origin. If the coordinates of the points A and B are $(6, 0)$ and $(0, 6)$ respectively, then the coordinates of the in-centre of ΔABO are

A. $(0, 0)$. ✘

B. $(2, 2)$. ← Centroid

C. $(3, 3)$. ✘

D. $(6-3\sqrt{2}, 6-3\sqrt{2})$.



CE 2008 Q.52

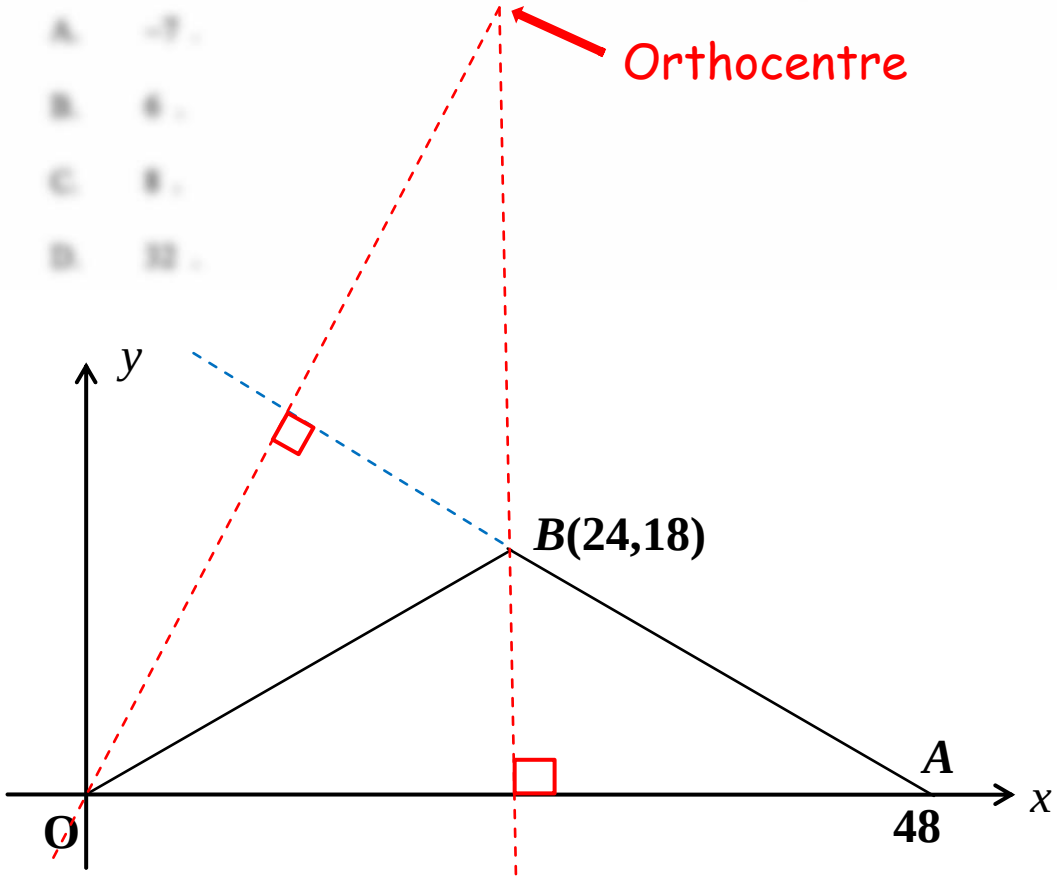
Let O be the origin. If the coordinates of the points A and B are $(48, 0)$ and $(24, 18)$ respectively, then the y-coordinate of the orthocentre of $\triangle ABO$ is

A. -7 .

B. 6 .

C. 8 .

D. 32 .



THANK YOU