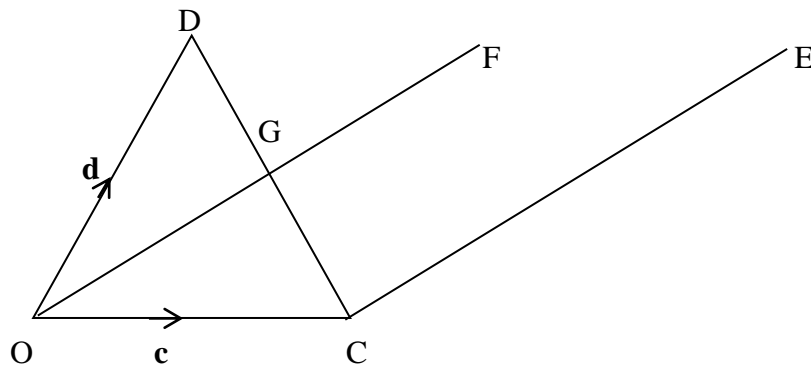


S4 MOCK 2 EXAMINATIONS 2006
425/2 MATHEMATICS
PAPER 2
TIME:

1. Without using tables or calculator, evaluate

$$\frac{7.621^2 - 2.379^2}{0.5242}$$
2. Find n if $\log_n 40 = 5$
3. Solve for x in $3x \div \frac{1}{81^{(1-x)}} = 1$
4. Find the interest earned when sh 450,000 is invested at 8% p.a. compound interest for 4 years.
5. There are 5 red and 4 white balls in a bag. Two balls are picked from the bag at random one after another without replacement. Find the probability that:
 - (a) both are white
 - (b) they are of different colours.
6. Solve the inequality and show the solution on a number line $-8 < \frac{3}{4}x - 2 \leq x - 3$
7. The translation T maps point $P^1(x, y)$ onto $p1(x - 4, y + 3)$
 - (a) find the image Q^1 of $Q(-1, -4)$
 - (b) find B if B^1 is $(-3, 5)$
8. From an equation whose solution set is $\left\{\frac{1}{2} - \frac{5}{4}\right\}$ in the form $ax^2 + bx + c = 0$ where a, b and c are integers.
9. Given that $Q \in \overline{PR}$ such that $PQ:QR = 3:2$, find the co-ordinates of Q if P is (2,5) and R is (7, -5)
10. Sets A and B are such that $n(A) = 12$, $n(B) = 10$, $n(A \cup B) = 18$ and $n(A^1 \cap B^1) = 5$. Find
 - (a) $n(\varepsilon)$ where ε is the universal set
 - (b) $n(A \cap B)$

11.



In the diagram above $\mathbf{Oc} = \mathbf{c}$, $\mathbf{OD} = \mathbf{d}$, $7\mathbf{DG} = 4\mathbf{DC}$ and $\mathbf{OG} : \mathbf{GF} = 5:2$

(a) Find in terms of \mathbf{c} and \mathbf{d}

- (i) \mathbf{DG}
- (ii) \mathbf{OG}
- (iii) \mathbf{OF}

(b) If $\mathbf{OE} = \frac{1}{5}(12\mathbf{c} - \mathbf{d})$ show that D, F and E are collinear.

12. (a) Copy and complete the following table if $y = 6 - x - 2x^2$ for $-3 \leq x \leq 3$

x	-3	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0	1.5	2.0	2.5	3.0
6	6	6	6	6	6	6	6	6	6	6	6	6	6
-x													
$-2x^2$													
y													

(b) Draw the graph of $y = 6 - x - 2x^2$ for $-3 \leq x \leq 3$ using your values in (a)

(c) Use your graph to find the roots of

- (i) $6 - x = 2x^2 = 0$
- (ii) $1 + x - 2x^2 = 0$

13. Given that $f(x) = \frac{4}{2x-3}$ and $g(x) = \frac{x}{x+1}$,

Find:

(a) the values of x for which $f(x) \times g(x) = 2^{2/3}$

(b) Find $g^{-1}(6)$

14. In a certain country, the monthly gross income has certain allowances deducted from it before it is subjected to taxation. The allowances are:

married man	Shs 250
unmarried	shs 15000
transport	shs 3,000 per day
insurance	shs 15000
electricity	shs 18000
medical	shs 480,000 per anum

Family allowance for 4 children: Shs 9000 for each child above 18 years, shs 12000 for each child below 18 but above 10 years and 15000 for each child below 10 years of gage .

Mukasa is a married man with 5 children 3 of them below 10, are aged 14 and the elder one 20 years old.

- (a) Find Mukasa's taxable income and the income tax he pays under the tax rates below given that he earns shs 960,000 monthly.

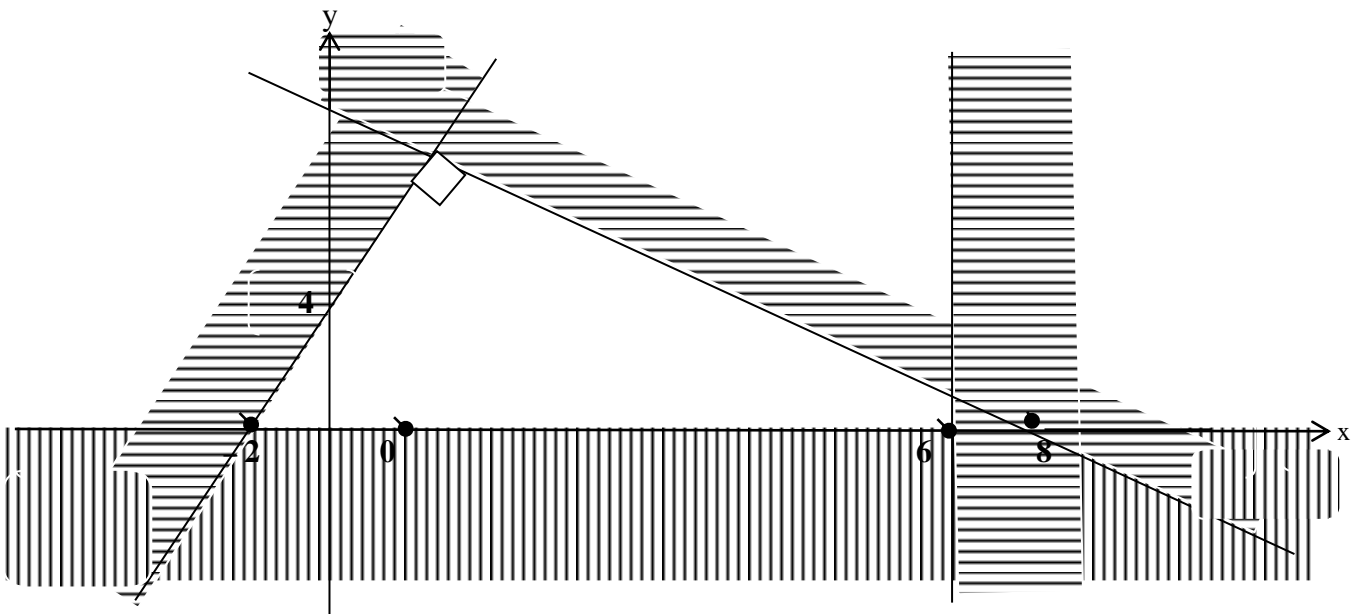
Taxable income	Rate %
0 – 200000	2%
200001 – 400000	10%
400001 – 600000	18%
600001 – 800000	26.5%
above 800000	35%

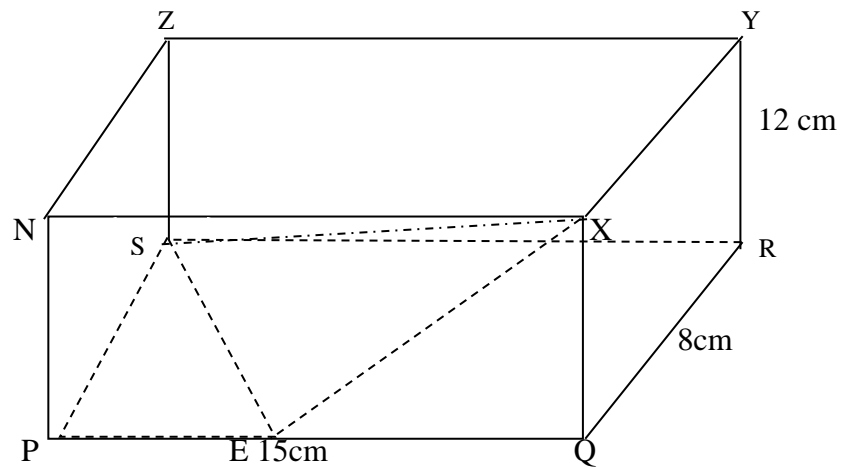
- (b) Express his income tax as a percentage of his gross monthly income.

15. Towns A and B are 300 km apart by road. At 7.00 a.m. Ojok leaves town A for town B driving a pick-up at a steady speed of 80 kmh^{-1} . After driving for 2 hours, the pick-up breaks down and he is forced to stop for half an hour after which he continues towards B at a reduced speed of 60 kmh^{-1} up to town B. One and a half hours after Ojok left town B, Kase leaves town B for town A driving at a constant speed non-stop all the way to A. Using a scale of 1 cm to 1 hour on the horizontal axis and 1 cm to 50 km on the vertical axis, draw the graph of both men's journeys on the same pair of axes, given that both reached their respective destinations at exactly the same time. Use your graph to find

- Kase's speed in kmh^{-1}
- When they met and how far this was from town A
- Their time of arrival.

16. Find all the inequalities that define the unshaded region in the diagram below.





The diagram above shows a cuboid PQRSWXYZ of sides 15cm by 8cm by 12 cm, E is a point on \overline{PQ} such that $5PE = 2 \overline{PQ}$. Find the:

- area of triangle ESX
- the angle between planes PSY and PQRS

END