



Westminster International University in Tashkent

A set of entrance tests for contract

Mathematics

2009

Time allowed: One hour ten minutes

Answer all questions.

It is advised that you work quickly and that you leave behind questions that are taking you too long to answer.

You should only bring in writing material (pens, pencils, erasers, rulers).

No calculators are allowed.

All your rough calculations have to be presented. Answers with no evidence of calculations will not score any marks.

Use the blank pages of the exam paper to do your rough work.

Nothing should be removed from the exam room.

February 14, 2009

M38

Question 1

Solve $(x^2 + 4x - 4)^2 - (x^2 - 4x - 4)^2 = 0$.

Answer: $x = \quad$, $x = \quad$ or $x = \quad$

Question 2

Find the value of $A - B + 3A^2 - B^2 + AB$ when $A = \frac{2}{3}$, $B = -\frac{1}{3}$.

Answer: The value is =

Question 3

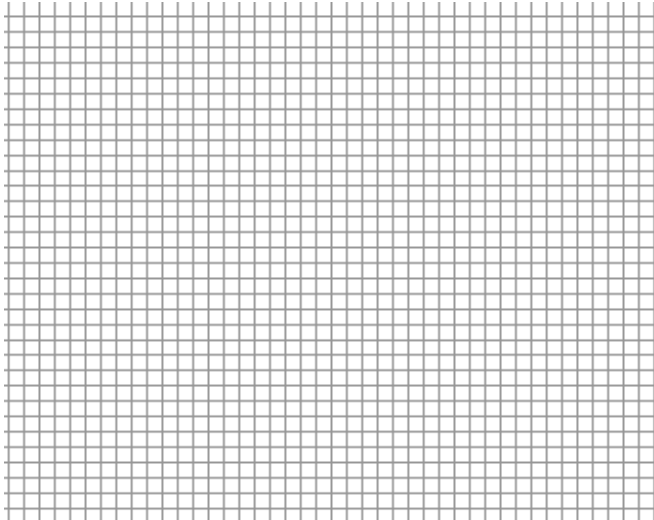
An egg dealer bought a number of eggs at 60p for 6, and five times that number for 900p for 100. He sold them all at 72p per 6 eggs and made a profit of 1020p. How many eggs did he buy?

p is a 'penny' [British money]

Answer: He bought \quad eggs

Question 4

Draw the curve represented by $y = x^2 + 4x - 21$ stating and showing clearly the point where the curve turns and the points where it meets the axes.



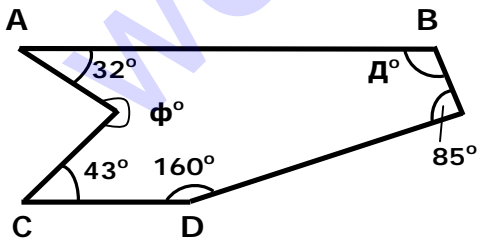
Question 5

The 3rd and the 20th term of an Arithmetic Progression are 7 and 58. Find the 50th term.

Answer: The 50th term is =

Question 6

Line AB is parallel to line CD. Find the value of ϕ and d .



Answer: $d = \quad^\circ$, $\phi = \quad^\circ$

March 11, 2009

M39

Question 1

Solve $(x^2 + \frac{x}{2} - 10)^2 - (x^2 - \frac{x}{2} - 8)^2 = 0$.

Answer: $x =$, $x =$ or $x =$

Question 2

Solve $\frac{x}{4} - \frac{8}{x} - \frac{7}{8} - \frac{3x}{4} = 15 - \frac{x}{64}$.

Answer: $x =$

Question 3

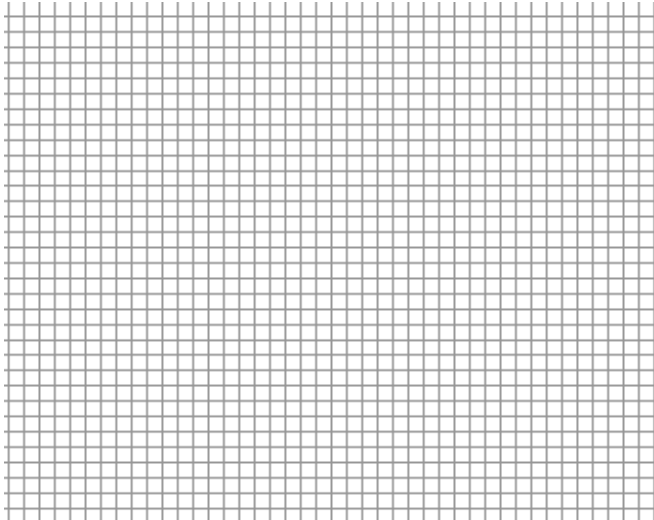
A group of friends paid £42 for 3 pizzas, 4 hamburgers and 1 cheeseburger. Another group paid £58 for 2 pizzas, 8 hamburgers, 1 salad and 2 cheeseburgers using the same price list. Fill in the price list below.

£ is a British 'pound'

West Foods	
Price List	
Salad	£2
Hamburger	£
Cheeseburger	£6
Pizza	£

Question 4

Draw the curve represented by $y = 2x^2 - 8x + 9$ for $x \geq 0$, stating and showing clearly the point where the curve turns.



Question 5

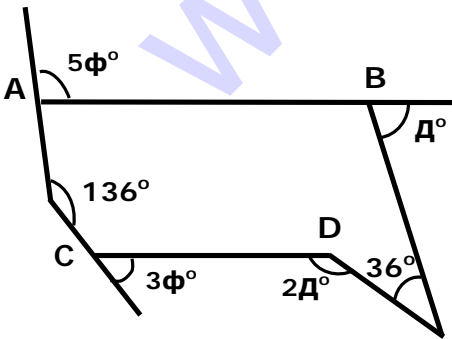
Anna added consecutive even numbers starting from 2 and reached a total of 62,750 (sixty two thousand seven hundred and fifty). How many numbers did she manage to add?

Note: even = divisible by 2

Answer: She added together _____ numbers

Question 6

AB is parallel to CD. Find the value of Δ and ϕ .



Answer: $\Delta =$ _____[°]
and $\phi =$ _____[°]

April 8, 2009

M40

Question 1

Solve $x^3 - x^2 - 20x = 0$.

Answer: $x =$, $x =$ or $x =$

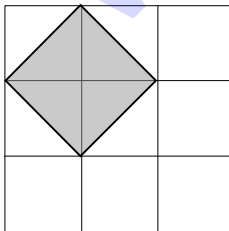
Question 2

Simplify $A = \frac{a^2 - a - 20}{25a - a^3} \cdot \frac{a^2 - a - 2}{(a - 2)(a + 4)} \cdot \frac{a + 1}{a^2 + 5a}$

Answer: $A =$

Question 3

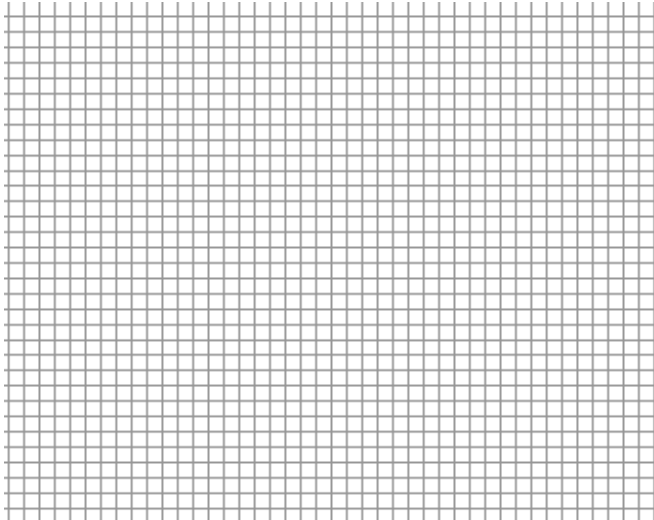
A 30x30 metre garden is split into 9 equal squares as shown. The shaded areas are planted with flowers, at a cost of 10,000 Uzbek soom per square metre. The white areas are cleaned up every month at a cost of 1,000 Uzbek soom per square metre. If planting happens only once a year, and cleaning every month, what is the yearly cost of keeping the garden?



Answer: The garden costs _____ soom per year

Question 4

Draw the lines $y = 3x + 4$ and $y = 4x + 3$ showing clearly the point where they meet and work out the area of the triangle formed between these two lines and the x-axis.

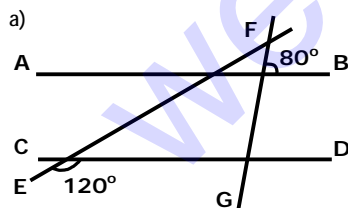


Answer: Area is

Question 5

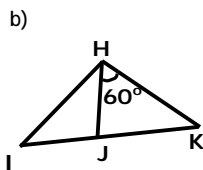
A person is employed at a salary of £18,000 (eighteen thousand pounds) per year, to be increased by £1,800 a year at the end of each year. He saves one quarter of his salary every year. Find the total saved at the end of 10 years.

Answer: He saved £



Question 6

Find a) the angle $\angle EFG$ if AB parallel to CD ,
and b) the angle $\angle IHK$ if $HI = HK$, $HJ = JI$ and $\angle JHK = 60^\circ$.



Answer: a) $\angle EFG =$ $^\circ$ and b) $\angle IHK =$ $^\circ$

May 13, 2009

M41

Question 1

Solve the system $X(Y-1) = 8$

$$Y(X-1) = 9.$$

Answer: $(X,Y) =$ and

Question 2

Find X, Y and Z if a) $\log_{10}X = 1 + \log_{10}7$; b) $\log_{10}Y = 2 - \log_{10}4$; c) $\log_{10}\sqrt{Z} = 3$ Answer: $X =$, $Y =$, $Z =$

Question 3

The table below shows the number of telephones assembled by three factory workers each day for a week. The workers are paid 90p each for the first 20 telephones they assemble each day and 120p for each telephone they assemble above 20 each day. a) find the most productive day that week and b) calculate the salary of Mrs Brown that week.

	Mon	Tue	Wed	Thu	Fri
Mrs Brown	35	38	34	39	42
Mr Green	37	42	41	44	-
Mrs Blue	34	40	42	38	38
Total					

assembled = made; put together

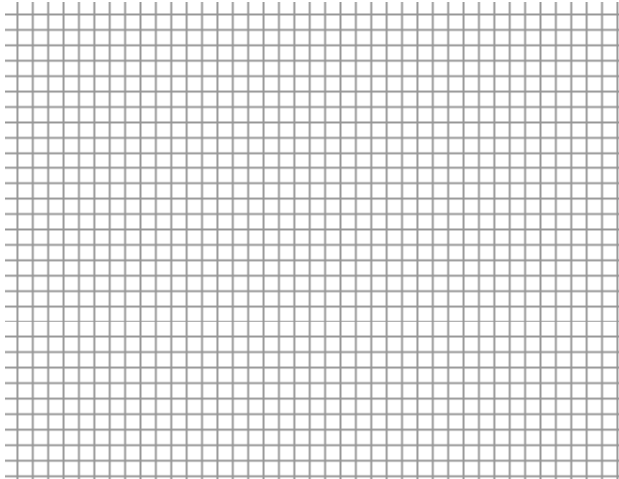
p = 'penny'. 100p = £1 (one pound)

Answer: a) Most productive day was
b) Mrs Brown's salary was

Question 4

Fill in the table below and use it to draw the graph of $y = x^2 - 4x + 3$, for $-1 \leq x \leq 4$, clearly showing the point where the curve turns.

x	-1	0	1	2	3	4
y						



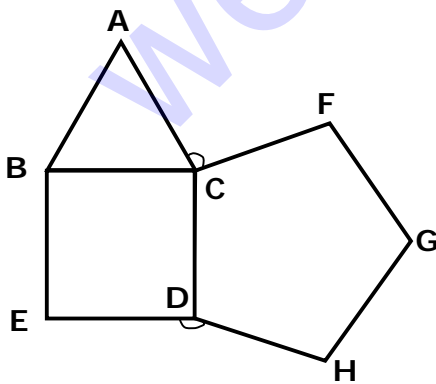
Question 5

Three numbers are in Arithmetic Progression. Their sum is 12 and the sum of their squares is 66. Find the three numbers

Answer: The three numbers are , , and

Question 6

In the figure below all sides are equal (ABC is an equilateral triangle, BCDE is a square and CFGHD a regular pentagon). Find the angles $\angle ACF$ and $\angle EDH$, as marked in the figure.



Answer: $\angle ACF =$ and $\angle EDH =$

June 10, 2009

M42

Question 1


Find A if a) $2^A \cdot 4^{2A-1} = 8^A$ and b) $(\sqrt{3})^A = \frac{1}{27^{2A-1}}$.

Answer: a) A = b) A =

Question 2

If $\frac{a}{b} = \frac{11}{5}$ find B = $\frac{3a - 5b}{a + 5b}$

Answer: B =

Question 3 

A team of 4 workers assemble front brakes for Volvo cars. Their salary is made up of £300 per week per person plus a bonus. This bonus is as follows: For the first 150 brakes in a day the team receives 40p per brake; any brakes they make above this per day and they receive 45p per brake. The team splits the bonus equally among them.

This week they produced

	Mon	Tue	Wed	Thu	Fri
	330	375	354	387	352

brakes. What was the salary each took home this week?

assemble = make; put together

bonus = extra

salary = payment for work

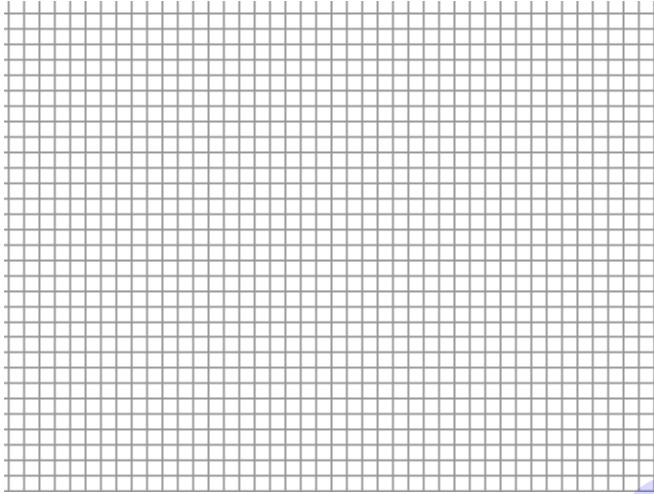
p = 'penny'. 100p = £1 (one pound)

Answer: Each team member made £ this week

Question 4

Fill in the table below and use it to draw the graph of $y = x^2 - 2x - 8$, for $-3 \leq x \leq 5$, clearly showing the point where the curve turns.

x	-2	-1	0	1	2	3	4
y							



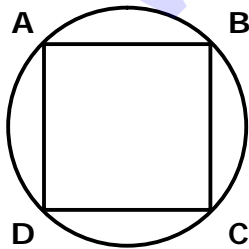
Question 5

The sum of 11 terms of an arithmetic progression is 22 and the common difference is $\frac{3}{5}$. Find the first term.

Answer: The first term of this A.P. is

Question 6

A circular piece of gold of radius 7cm is worth £308 (Three hundred and eight pounds). A piece equal to the inscribed square ABCD is taken out. Assuming the value of the piece is proportionate to its weight, find the value of the remaining gold. (Assume $\pi = \frac{22}{7}$)



Area of circle is πR^2

Answer: Value is = £

August 12, 2009

M44

Question 1

Find x if $x = \frac{2}{x+1}$

Answer: $x =$ and

Question 2

If $D = A - (B - C) - 2[A + C - 3[-2(B - 1)]] + 4\left(\frac{A}{2} - \frac{3}{2}B\right)$,

a) simplify D as much as possible and b) find the value of D when $A = 6$, $B = 7$ and $C = 8$

Answer: a) $D =$, b) $D =$

Question 3 b

A dealer was selling a bicycle at a 5% profit when she realised that if she had bought it at 10% less and sold it at the same price she would have made \$15 profit. How much did she buy the bicycle for?

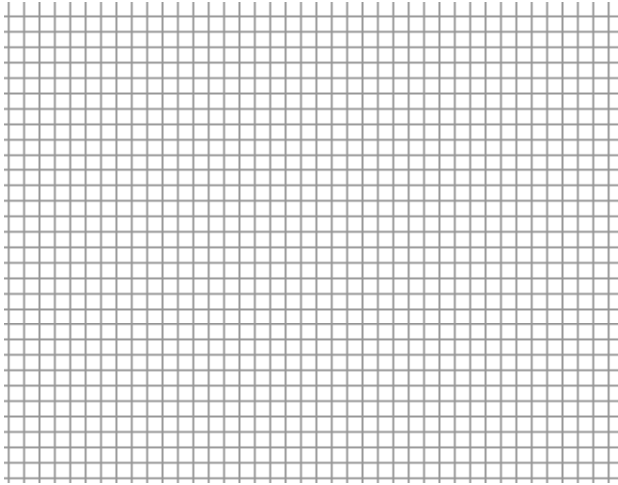
profit = selling price – buying price

\$ = US dollar

Answer: She bought the bicycle for \$

Question 4

Draw the graph of $y = x^2 + x - 2$, clearly showing the points where the curve meets the axes and the point where it turns.



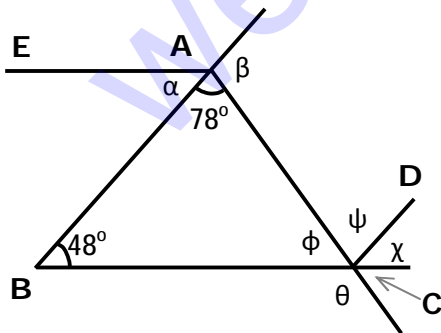
Question 5

Ishmael decided to put in a box one Uzbek soum the first day, two soum the second day, three soum the third day and so on, increasing by one soum the amount he set aside every day. If he started collecting on January 1st 2009, how much money will he have in the box at the end of August 2009?

Answer: He will have _____ soum

Question 6

Find the angles marked α , β , θ , ϕ , χ and ψ in the diagram below, where AE is parallel to BC and CD is parallel to BA



Answer: $\alpha =$, $\beta =$, $\theta =$,

$\phi =$, $\chi =$ and $\psi =$

September 9, 2009

M45

Question 1

Find x if $2(x^2 + 10) = x(x + 9)$ Answer: $x =$ and

Question 2

If $v = \sqrt{(a - 3b)}$ and $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$, find u when $a = 1110$, $b = -398$ and $f = 12$.Answer: $u =$

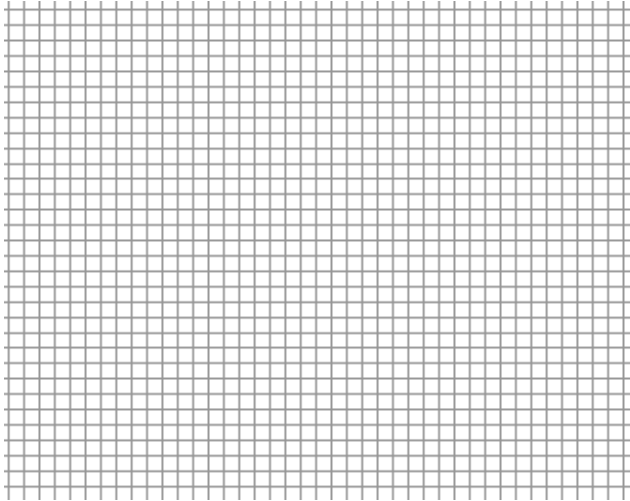
Question 3

I have two sisters. I am three times older than one of my sisters and six years older than the other sister. If one of my sisters is half the age of the other sister, how old am I?

Answer: I am years old

Question 4

Draw on the same diagram the lines $y = 2x$ and $y = x + 2$ for $x > 0$, clearly showing the point where they intersect, and find the area of the triangle formed between these lines and the y-axis.



Question 5

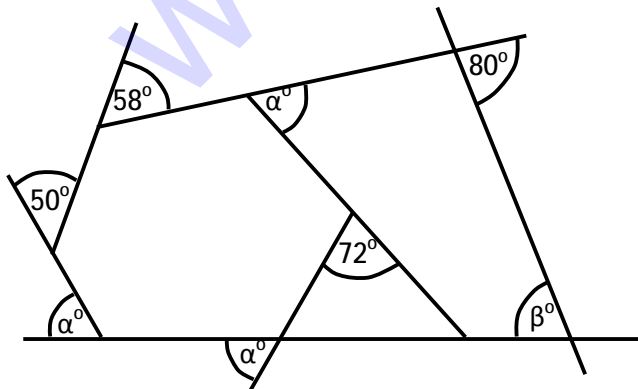
Find A if

$$A = 1 - 2 + 3 - 4 + 5 - 6 + \dots + 2007 - 2008 + 2009$$

Answer: A =

Question 6

Find the angles marked α and β in the diagram below.



Answer: $\alpha =$ and $\beta =$