Westminster International University in Tashkent

A set of entrance exams on

Mathematics

2008

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.

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March 2008

Question 1

Find x and y when $4x + 5y + 3z = -11$,
$5x + 4y + 4z = 3$,
and $z = 4$

Answer: x = and y =

Question 2

If $A = \dfrac{x - \dfrac{x - y}{1 - xy}}{1 - \dfrac{x(x - y)}{1 - xy}}$ and $B = \dfrac{y - \dfrac{9}{y} + 3}{y - 3 + \dfrac{y^2}{3}}$, find the value of AB.

Answer: AB =

Question 3

Umid started depositing £128 every day starting on January 1st, 2007, while Farukh deposited £1 on the first day of 2007, £2 on the second day, £3 on the third, and so on depositing £m on the m^{th} day of 2007.

a) What was the total amount (sum) deposited by each one by June 1st?

b) At what date of the year was the ***total*** deposited by Umid the same as the total deposited by Farukh?

Answer: a) On June 1st the total amount deposited by Umid was £…… ….., and by Farukh £
b) The date when both will have deposited the same total is 2007.

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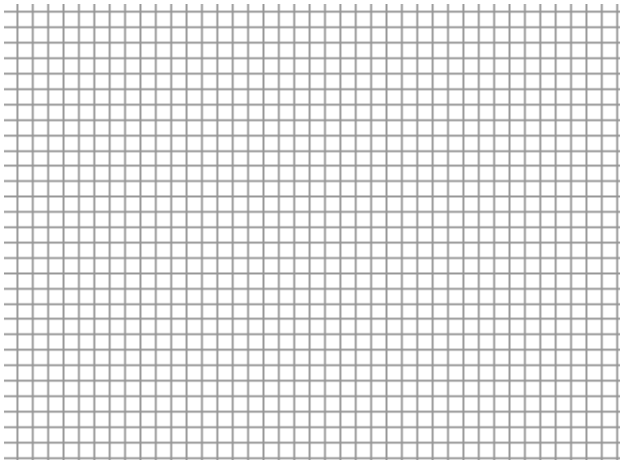
Question 4

Plot the graph of $y = x^2 - 5x + 6$ showing clearly the points where y meets the axes.



Question 5

Find the range of x for which $\frac{9x+2}{10} - \frac{10x-2}{9} \geq 2$

Answer:

Question 6

In an equilateral triangle ABC with AB = BC = CA = 4cm, the point D is the midpoint of BC and E is a point between D and C. If $AE^2 = 13EC^2$, calculate the area of the triangle AEC. ($\sqrt{3} = 1.732$)

Answer: the area of AEC is cm^2.

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April 2008

Question 1

Solve $(2 - 3x)(4 - \frac{5}{x}) = (3 - 2x)(6 - \frac{7}{x})$.

Answer: x =

Question 2

If A = 1000 – 999 + 998 – 997 + … + 4 – 3 + 2 – 1 and

B = $\left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{4}\right)\ldots\left(1 - \frac{1}{1000}\right)$, calculate the value of the product AB.

Answer: AB =

Question 3

A farmer had some boxes (more than one) each containing the same number of apples (at least five). If the total number of apples was 219, how many boxes did the farmer have and how many apples did each box contain?

Answer: He had ..... boxes, each containing ….. apples.

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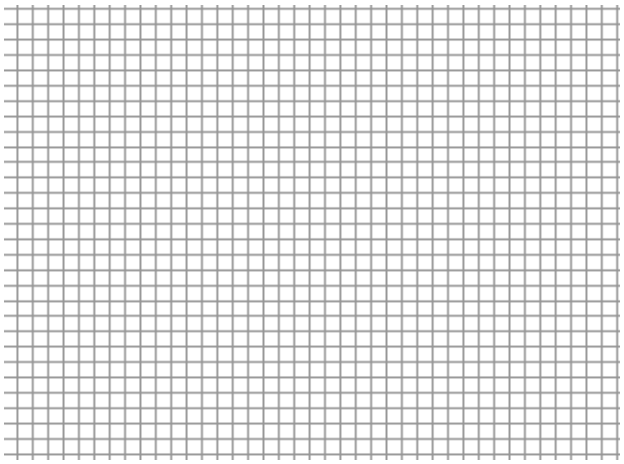
Question 4

Plot the graph of $y = (2x - 1)^2 + 1$ showing clearly the point where y takes its smallest possible value.



Question 5

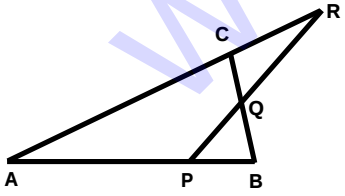
Find the sum of all the whole numbers less than 2008 whose last digit is 7.

Hint: 7 + 17 + 27....

Answer: The sum is

Question 6

In the figure below, AB = AC, BP = BQ and PA = PR. Find the value of Đ CAB to 2 decimal points.



Answer: Angle Đ CAB = ^{o}

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May 2008

Question 1

Solve the equation $\left(-\frac{x}{72}+\frac{1}{6}\right)(x^2-5x+6)=1.$

Answer: x = or or

Question 2

Find the value of A = $\dfrac{x^2-1}{2x^2-\dfrac{4x^2-1}{1+\dfrac{x}{x-1}}}-x$

Answer: A =

Question 3

A sum of money was divided between A, B and C. C got twice as much as A, and A and B together got £50. When A and C gave a fifth of their money to charity and B gave a tenth, £10 were collected. What was the original sum of money equal too?

Answer: £

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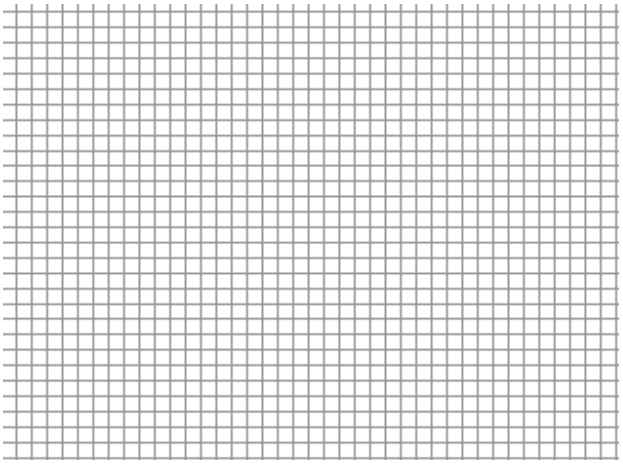
Question 4

Plot the lines $y = 3x + 2$ and $y = 6 - x$ showing clearly the point where they meet



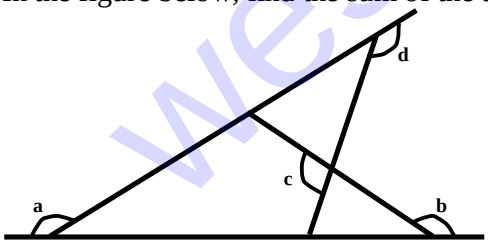
Question 5

Find the sum of all the numbers between 100 and 1000 that are divisible by 14

Answer: The sum is

Question 6

In the figure below, find the sum of the angles a, b, c and d.



Answer: a + b + c + d = ^{o}

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June 2008

Question 1

Solve $2(x^2-6) = 3(x-4)$

Answer: x = or

Question 2

If a and b are two numbers with $-3 \le a \le 4$, $\frac{1}{2} \le b \le 3$, find the largest and the least values of $\frac{a}{b}$.

Answer: Largest value is and smallest value is

Question 3

Anna decided to put 1 penny aside in January 1st 2008, 2 pennies in January 2nd 2008, 3 pennies in January 3rd 2008, and so on, saving one more penny every day of the year. How much money, in British pounds, will she have collected when the year ends?

One pound is 100 pennies: £1 = 100p

Answer: £

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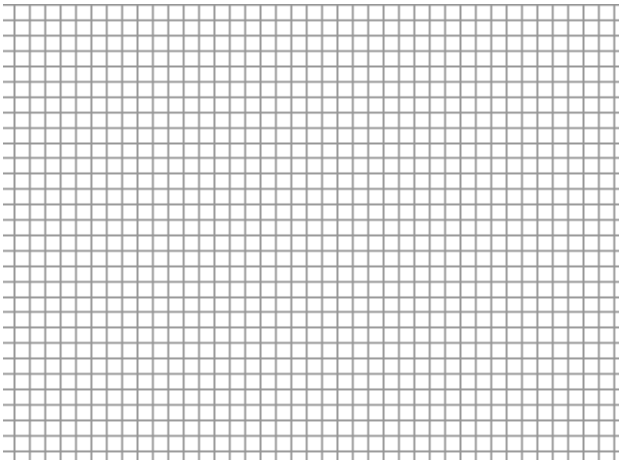
Question 4

Plot the lines $y = 3x + 2$ and $y = 6 - x$ showing clearly the point where they meet



Answer: The two lines meet at (,)

Question 5

If $x + \frac{1}{x} = 1$, find the value of $x^2 + \frac{1}{x^2}$

Answer:

Question 6

ABC is an isosceles triangle with AB=BC=10m and AC=12m. D is the midpoint of AC and E is a point between A and D with AE=1m. Find the area of triangle BED.

Answer: Area of triangle BED is

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July 2008

Question 1

Solve $5\sqrt{3x} - 1 = \sqrt{75x - 29}$.

Answer: x =

Question 2

Find N if 1 + 2 + 3 + 4 + ...+ N = 1275.

Remember: $10201 = 101^2$

Answer: N =

Question 3

A shop has 50 computer games to sell. If they sell them at £31.50 (thirty one and a half pounds) each they make a profit of 26%. How much will their total profit from the games be if they sell half the games at £31.50, 24 of the games at £26.50 and one game is never sold?

Note: Profit = buying price – selling price

Answer: They will make a profit of £

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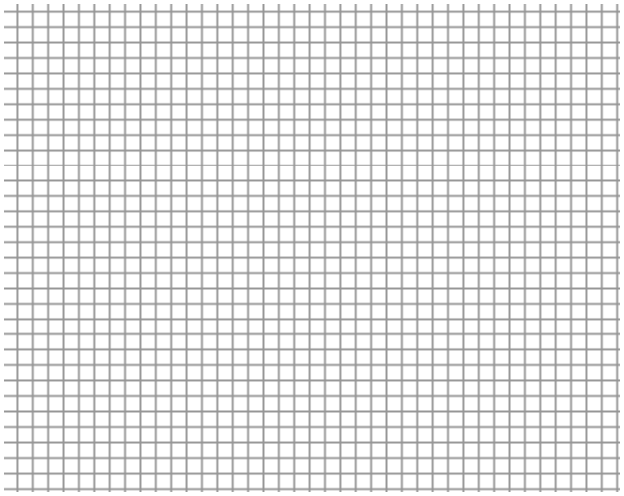
Question 4

Plot the curve y = (3x-9)(x+1) showing clearly the points where it meets the axes.



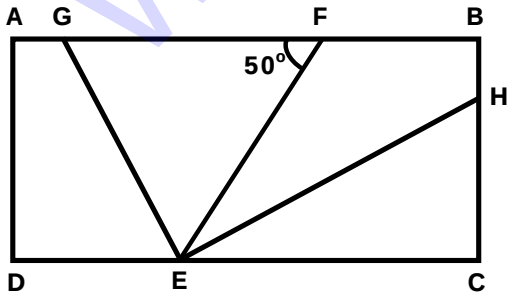
Question 5

If $A = 42\left\{\frac{4x-3y}{6} - \frac{3x-4y}{7}\right\} - 56\left\{\frac{3x-2y}{7} - \frac{2x-3y}{8}\right\}$ and $B = \frac{7}{y}$, find the value of AB

Answer: AB =

Question 6

In the figure bellow, ABCD is a parallelogram, $\angle AFE = 50^o$, $\angle FEG = \angle GED$, and $\angle FEH = \angle HEC$. Find angles $\angle EGF$ and $\angle EHB$.



Answer: $\angle EGF =$, $\angle EHB =$

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August 2008

Question 1

Solve $3^2 - (2x-5)^2 = 0$.

Answer: x = or x =

Question 2

Find the value of $A = 1 - \frac{a-1}{a+1} + 2\frac{a^2-a}{a^2-1}$

Answer: A =

Question 3

Farukh put 5 Sym in a box on 1st January 2000, then 10 Sym on 1st February 2000, 15 Sym on 1st March 2000, 20 Sym on 1st April 2000 and so on (increasing the amount by 5 Sym every month) until 1st of August 2008. How much money was in the box immediately after 1st August 2008?

Answer: Farukh's box had Sym

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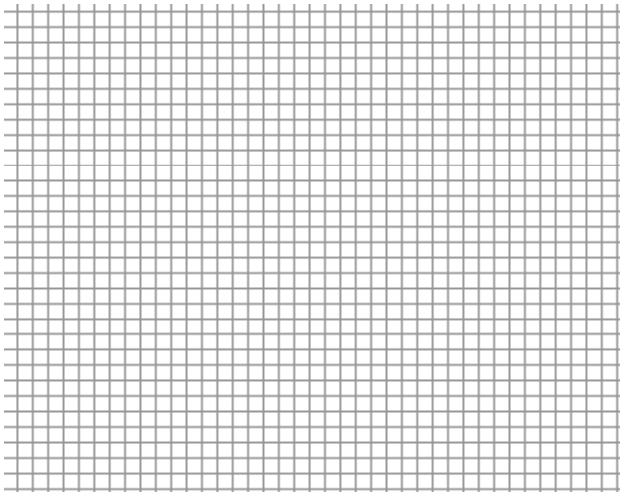
Question 4

Draw the lines $y = 2x$ and $y = 4 - 2x$, stating clearly the point where they meet.



Question 5

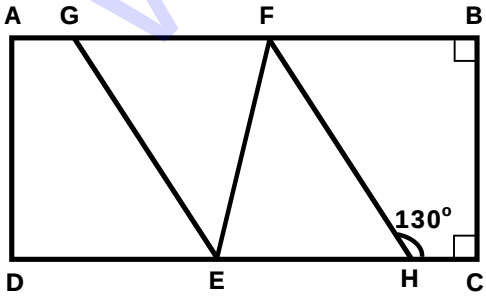
Zarina had 1,000,000 (One million) Uzbek Sym. She spent part of it to buy some goods and she put the rest in a bank that gives 7% interest per year.

One year later she received 28,000 Sym interest. How much money did she spend for the goods she bought?

Answer: She spent Sym on goods

Question 6

In the figure below, ABCD is a rectangle, $\angle FHC = 130^o$ and $\angle EFH = \angle HFB = \angle FGE$. Find angles $\angle BFH$ and $\angle FEG$.



Answer: $\angle BFH =$, $\angle FEG =$

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September 2008

Question 1

Solve $2x^2 - 7x - 15 = 0$.

Answer: x = or x =

Question 2

Evaluate $R = \frac{\sqrt{P}}{Q}$ when $P = 1.44 \times 10^{-6}$ and $Q = 4.8 \times 10^{-6}$.

Notation: $0.1 = 1/10 = 10^{-1}$

Answer: R =

Question 3

An apple and three bananas cost 170p. An apple and a two carrots cost 90p. Four bananas and two carrots cost 200p. How much does each cost?

p is a 'penny' [British money]

Answer: Apple costs , banana costs and carrot costs

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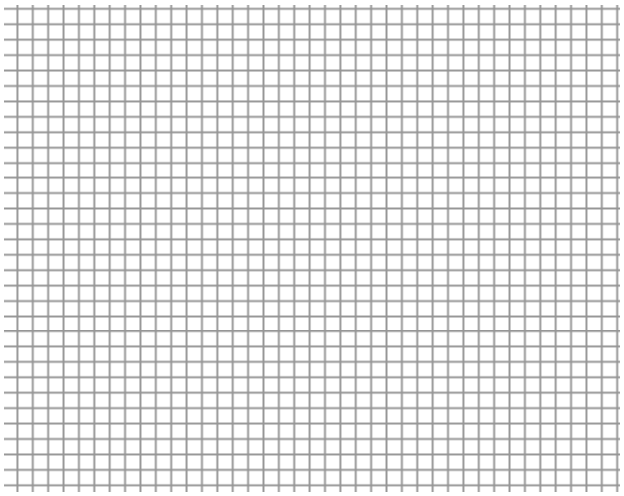
Question 4

Draw the curve represented by $y = 2x^2 - 7x - 15$ stating and showing clearly the point where the curve turns.



Question 5

Find the sum of all the even numbers between 130 and 850, excluding multiples of 3.

Note: even = divisible by 2

Answer: Sum is =

Question 6

ABCDEFGH is a regular octagon with AB = 2m. AD meets BF at X.
Find a) the angle $\angle$AXB, b) the angle $\angle$DAF, and c) the size of AX.

Answer: a) $\angle$AXB = ^{o}, b) $\angle$DAF = ^{o}, c) AX = m

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