

ENTRANCE TEST

MATHEMATICS

Test M1

Time allowed: 1 hour 20 minutes

ANSWER ALL QUESTIONS IN DETAIL, SHOWING ALL YOUR WORK ON THE SAME PAGE AS THE QUESTION. THE ANSWERS PROVIDED IN THE DRAFT PAGE OR IN SEPARATE SHEETS WILL NOT BE CONSIDERED.

NO BOOKS, NOTES, CALCULATORS OR ANY SORT OF ASSISTING MATERIAL ARE ALLOWED.

KITOB, DAFTAR, KALKULYATOR YOKI BOSHQA YORDAMCHI MATERIALLARDAN FOYDALANISH TAQIQLANADI.

ПОЛЬЗОВАНИЕ КНИГОЙ, ТЕТРАДЬЮ, КАЛЬКУЛЯТОРОМ ИЛИ ЛЮБЫМ ВСПОМОГАТЕЛЬНЫМ МАТЕРИАЛОМ ЗАПРЕЩАЕТСЯ.

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Application number:	
Signature:	

PLEASE DO NOT TURN OVER THIS PAGE UNTIL TOLD TO DO SO

Question 1.

In triangle ABC, an altitude is drawn from vertex C to the line containing AB. The length of this altitude is h and $h=AB$. Which of the following is true?

- I. $\triangle ABC$ could be a right triangle.
- II. Angle C cannot be a right angle.
- III. Angle C could be less than 45° .

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) none
- b) I, only
- c) I and II, only
- d) I and III, only
- e) I, II, and III

Total for page 5 marks

Question 2.

In one month, Alice-the-lawyer earns half of what her husband, Bill-the-artist, earns in a year (12 months). Together, the happy couple earns 168,000 dollars per year. What is Alice's monthly income in dollars?

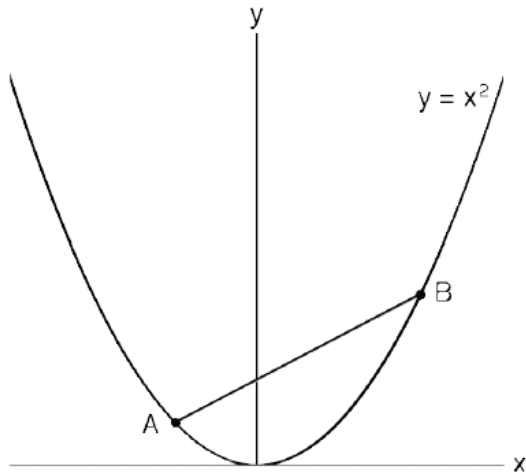
Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) 12,000
- b) 10,000
- c) 8,000
- d) 4,000
- e) 2,000

Total for page 5 marks

Question 3.



Point A is on the parabola $y = x^2$ and has coordinates $(-a/2, b)$. Point B is also on the parabola and has coordinates $(a, 4)$. What is the length of line segment AB?

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) $3\sqrt{2}$
- b) $4\sqrt{2}$
- c) $2\sqrt{3}$
- d) $\frac{5\sqrt{3}}{2}$
- e) $3\sqrt{3}$

Total for page 5 marks

Question 4.

Positive integer a has two different prime factors p and q ($p < q$) such that $a = pq$. Positive integer b is greater than a and the quotient a^2/b is an integer. How many possible values of b are there?

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) 2
- b) 3
- c) 4
- d) 5
- e) more than 5

Total for page 5 marks

Question 5.

If n is an integer, what is the remainder when $3x^{(2n+3)} - 4x^{(2n+2)} + 5x^{(2n+1)} - 8$ is divided by $(x + 1)$?

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) -20
- b) -10
- c) -4
- d) 0
- e) The remainder cannot be determined.

Total for page 5 marks

Question 6.

If $f(x) = \sqrt{2x + 3}$ and $g(x) = x^2$, for what value(s) of x does $f(g(x)) = g(f(x))$?
(please approximate when needed)

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) -0.55
- b) 1.46
- c) 5.45
- d) -0.55 and 5.45
- e) 1.46 and 6.46

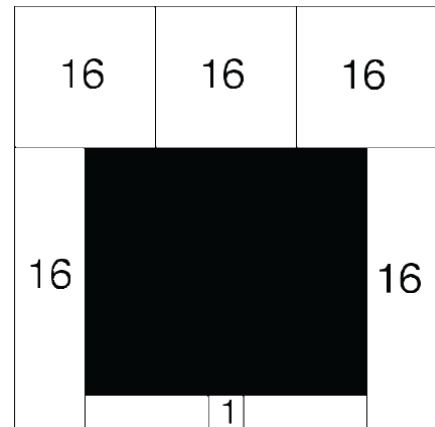
Total for page 5 marks

Question 7.

A large square contains three squares with areas of 16, two rectangles with areas of 16, and one square with an area of

What is the area of the shaded region?

Answer without the detailed solutions will not be marked. Provide the detailed solution below:



Circle the correct answer:

- a) 42
- b) 49
- c) 56
- d) 63
- e) 64

Total for page 5 marks

Question 8.

Solve the non-linear equation:

$$x^2 + 3x - 18 + 4\sqrt{x^2 + 3x - 6} = 0$$

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

- a) $x=-5$ and $x=2$
- b) $x= -6$ and $x=0$
- c) $x=5$
- d) $x=2$
- e) $x=-5$

Total for page 5 marks

Question 9.

If $f(x) = ax^2 + bx + c$ and $f(1) = 3$ and $f(-1) = 3$, what will $a + c$ be equal to?

Answer without the detailed solutions will not be marked. Provide the detailed solution below:

Circle the correct answer:

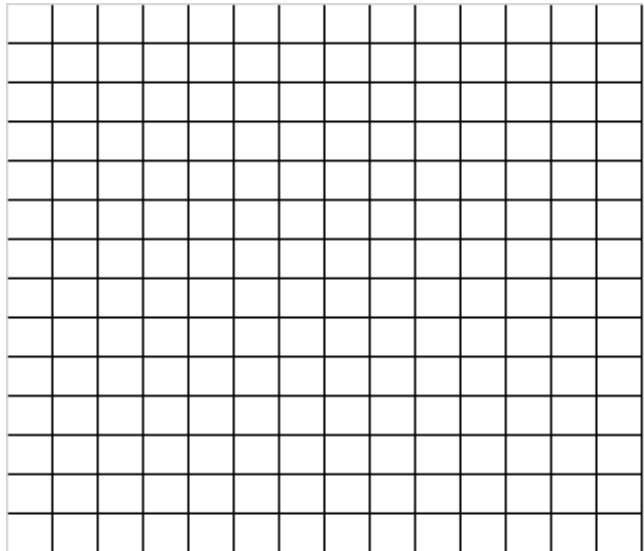
- a) -3
- b) 0
- c) 2
- d) 3
- e) 6

Total for page 5 marks

Question 10.

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.

Answer without the detailed solutions will not be marked. Provide the detailed solution below:



Circle the correct answer:

- a) Area=2
- b) Area=4
- c) Area=6
- d) Area=12
- e) Area = 24

Total for page 5 marks

END OF TEST
TOTAL FOR TEST 50 MARKS

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