EmSAT Math Achieve (General Track)

Total Time for Test: 50 questions: 1.5 hours

EMSAT Math (GT) is a computer-based exam and has 3 major sections – Algebra, Geometry, and Statistics. Test Sections, questions, and options are randomized. Items consist of multiple choice, fill-in-the-blank, and drag to blank items. Sections and subsections of the test are timed by the computer. Test takers can see how much time they have throughout the exam.

Part 1: Algebra

- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems
- Perform arithmetic operations on polynomials
- Create equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Build a function that models a relationship between two quantities
- Build new functions from existing functions
- Use linear models and solve problems
- Interpret expressions for functions in terms of the situation they model
- Extend the properties of exponents to rational exponents
- Reason quantitatively and use units to solve problems

Sample Question 1
Answer: 10, 11, 12

What are three positive consecutive integers when product of the first and second is 2 more than 9 times the third?

ماهي الثلاث أعداد الموجبة والمتعاقبة عندما يكون حاصل ضرب الرقم الأول والثاني هو 2 أكبر من 9 مرات من الرقم الثالث؟

First Integer: [ ] الرقم الأول

Second Integer: [ ] الرقم الثاني

Third Integer: [ ] الرقم الثالث

Sample Question 2
Answer: B

For which value of m is the following expression undefined?

من القيم التالية، ما العبارة التي تعتبر فيها قيمة m غير معرفة؟

$$\frac{15m^2n}{3-m}$$

A. | 1 |

B. | 3 |

C. | -3 |

D. | 0 |

Sample Question 3
Answer: -15, -15

Solve the following system of equations for x and y.

حل المعادلتين الآتيتين لتوجد قيمة كل من x وy.

$$\frac{5}{6}x - \frac{1}{2}y = -5$$

$$-\frac{1}{5}x + \frac{1}{3}y = -2$$

$x=$ [ ]

$y=$ [ ]

Sample Question 4
Answer: A

Simplify.   بسِّط

$$\frac{y-x}{x^2-y^2}$$

A.
$$\frac{-1}{x+y}$$

B.
$$\frac{-1}{x-y}$$

C.
$$\frac{1}{x-y}$$

D.
$$\frac{1}{x+y}$$

Sample Question 5
Answer: B

What is the sum of $\sqrt{27}$ and $\sqrt{108}$?   ماهو حاصل جمع $\sqrt{27}$ و $\sqrt{108}$ ؟

A.
$$\sqrt{135}$$

B.
$$9\sqrt{3}$$

C.
$$3\sqrt{3}$$

D.
$$4\sqrt{27}$$

Part 2: Geometry

- Experiment with transformations in the plane
- Understand congruence in terms of rigid motions
- Use geometric theorems
- Understand similarity in terms of similarity transformations

- Solve problems involving right triangles
- Understand and apply theorems about circles
- Explain volume formulas and use them to solve problems
- Visualize relationships between two-dimensional and three-dimensional objects

Sample Question 1

Answer: C

A rhombus has diagonals with lengths 16 and 30.

What is the length of a side of the rhombus?

لدى معين أقطار أطوالها 16 و 30.

ماهو طول أحد أضلاع المعين؟

A. $16\sqrt{2}$

B. $15\sqrt{2}$

C. 17

D. 34

Sample Question 2
Answer: A

Identify the image of point $(4, -2)$ after a
dilation of 3.
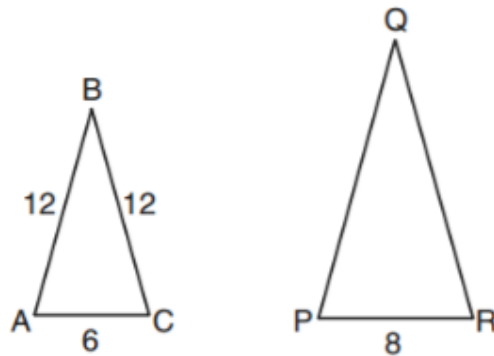
عرف صورة الأزواج المرتبة (4, −2) بعد التمدد
بـ 3.

A. $(12, -6)$

B. $(7, 1)$

C. $(1, -5)$

D. $\left(\dfrac{4}{3}, -\dfrac{2}{3}\right)$

Sample Question 3
Answer: 40

The two triangles below are similar.
What is the perimeter of △PQR?

يعتبر المثلثين أدناه متطابقين.
ماهو محيط المثلث △PQR ؟

Perimeter of △ PQR [ ]   محيط △ PQR

A company makes aluminum boxes in the shape of a box with a half-cylinder top.

The company will make 1857 boxes this week.

If each box has the dimensions shown below, how many square meters of aluminum will be needed to make these boxes?

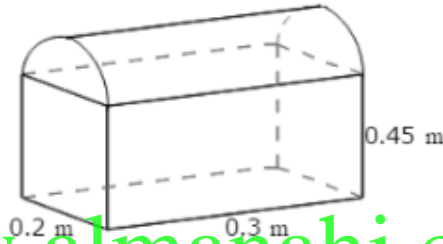Use 3.14 for π.

Round your answer to the nearest square meter.

تقوم شركة بصناعة صناديق من الألمنيوم بشكل صندوق له قمة ذات شكل نصف اسطواني.

ستصنع الشركة 1857 صندوق في هذا الأسبوع.

اذا كان لدى الصندوق أبعاد كما هو موضح بالشكل أدناه، ماهي المساحة الإجمالية لألواح الألمنيوم بالمتر المربع، التي ستحتاجها الشركة لصناعة الصناديق؟
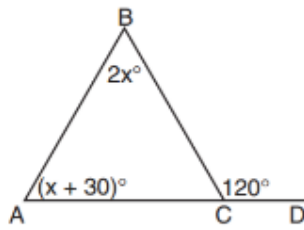
استخدم 3.14 لـ π

قرب اجابتك لأقرب متر مربع.

0.45 m

0.2 m

0.3 m

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Total area of aluminum sheets needed: [   ]   الكمية المطلوبة من الألمنيوم:

Solve for x.

أوجد قيمة X

x= ☐

Part 3: Statistics

• Summarize, represent, and interpret data on a single count or measurement variable • Summarize, represent, and interpret data on two categorical and quantitative variables • Interpret linear models • Understand and evaluate random processes underlying statistical experiments	• Make inferences and justify conclusions from sample surveys, experiments and observational studies • Understand independence and conditional probability and use them to interpret data • Calculate expected values and use them to solve problems • Use probability to evaluate outcomes of decisions

Sample Question 1

Answer: C

Aisha calculated the area of a piece of paper to be 50.27 cm^2.

The actual area of the paper is 55.42 cm^2.

What is the margin of error in calculating the area?

حسبت عائشة مساحة قطعة من الورق أنها 50.27 cm^2.

إلا أن المساحة الحقيقية لهذه الورقة هي 55.42 cm^2.

ماهي درجة الانحراف النسبي في حساب هذه المساحة؟

A. 0.102

B. 0.103

C. 0.093

D. 0.092

Sample Question 2

Answer: D

A frequency table of temperatures is created from an experiment in science class.

تم تكوين جدول تكراري لدرجات الحرارة من تجربة في صف العلوم.

Interval	0-9	10-19	20-29	30-39	الفترة (الحرارة)
Frequency	7	5	6	13	التكرار

Which interval contains the median temperature?

ما هي الفترة التي تحتوي على وسيط درجة الحرارة ؟

A. $30 - 39$

B. $0 - 9$

C. $10 - 19$

D. www.almanahj.com

Sample Question 3

Answer: $\dfrac{3}{7}$

A number is selected at random from the set below.

تم اختيار رقم عشوائياً من المجموعة الموضحة أدناه.

What is probability that the number is even?

ماهي احتمالية أن يكون الرقم المُختار زوجي؟

$$\{-3, -2, -1, 0, 1, 2, 3\}$$

$$p = \dfrac{\boxed{}}{\boxed{}}$$

Sample Question 4
Answer: D

There is a $\frac{3}{5}$ probability of rain on Sunday.	هناك احتمالية $\frac{3}{5}$ لسقوط المطر يوم الأحد.
The probability that it will rain on both Sunday and Monday is $\frac{3}{10}$.	واحتمالية سقوطه يومي الأحد والاثنين هي $\frac{3}{10}$.
If it rains on Sunday, what is the probability that it will rain on Monday?	إذا كانت ستمطر يوم الأحد، ما احتمالية أنها ستمطر يوم الاثنين؟

A.

$$\frac{9}{10}$$

B.

$$\frac{9}{50}$$

C.

$$\frac{3}{10}$$

D.

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$$\frac{}{2}$$

Sample Question 5
Answer: 74

| Dina has scored 78, 59, 95, and 74 on her last four tests. | حصلت دينا على الدرجات 78، 59، 95، 74 في آخر أربعة اختبارات لها. |
| What score does she need on her next test so that her average is 76? | ماهي الدرجة التي تحتاجها في اختبارها القادم ليصبح متوسطها الحسابي 76؟ |

Required score: [   ]   الدرجة المطلوبة