

MATHEMATICS Exit Level

2010 Released Items

- 2 0 -1 1 x у 3 2 3 6 y у 4 8 8 6 6 5 2 С Α x x > -9 -8 -6 -5 -4 -3 -2 -1 0 2 3 4 5 6 7 89 -8 -7 -6 -1 0 1 4 5 6 7 8 9 1 -5 2 -1 -2 -7 -7 -8 -9, y y ▲ 9 8 6 6 4 2 B D x |x|≯ ≻ 0 5 6 7 8 9 4 5 6 8 9 2 -1 -2 -3 -4 -5 -5 -6 -7 -8
- 1 Which graph best represents the relationship shown in the table below?

 ${f 2}$ The table below shows the dollar value of an antique item over time.

Value of an Antique Item over Time

Year	Value (dollars)	
1960	2000	
1975	4000	
1990	6000	
2005	8000	

Based on the information in the table, what was the approximate value of this item in 1980?

- **A** \$4300
- **B** \$4700
- **C** \$5000
- **D** \$4500

3 Which of the following graphs does not represent y as a function of x?



1 Which of the following are the domain and range for the graph shown below?



- **B** $0 \le x \le 36$ $0.5 \le y \le 3.5$
- C 0.5 < x < 3.50 < y < 36
- $\begin{array}{ll} \mathbf{D} & 0.5 \leq x \leq 3.5 \\ & 0 \leq y \leq 36 \end{array}$

- 2 Walker is taking a strength-training class. He hopes to increase the number of pounds that he can lift by 25% in 6 weeks. If *x* represents the number of pounds Walker was able to lift at the time he started the class, which expression best represents the number of pounds he wants to be able to lift in 6 weeks?
 - **A** 6x + 0.25x
 - **B** x + 0.25x
 - C 6(x + 0.25x)
 - **D** x + 25x

- 3 If a rectangular poster has an area of $(2x^2 9x + 10)$ square units, which of the following could describe the dimensions of the poster?
 - **A** (2x-2) units by (x-5) units
 - **B** (2x-10) units by (x + 1) units
 - **C** (2x-5) units by (x-2) units
 - **D** (2x-1) units by (x-10) units

- 1 Which situation is best represented by the function f(x), where f(x) = 12x + 5?
 - **A** An office-supply store sells *x* boxes of ballpoint pens that contain a dozen pens per box for \$5 each.
 - **B** An Olympic swimmer trains by swimming 12 kilometers on each of x weekdays and 5 kilometers on each day of the weekend.
 - **C** An algebra quiz has *x* problems worth 12 points each plus 5 extra-credit problems worth 5 points each.
 - **D** A company sells *x* baseball caps for \$12 each and charges a \$5 shipping fee.

2 Mr. Czar wants to order some candy bars for the math team's annual fund-raiser. The graph below shows the total cost for an order of fewer than 5 boxes of candy bars, including the standard fee for shipping and handling.



Based on the graph, which of the following best describes this situation?

- A Each box of candy bars costs \$36.
- **B** Each box of candy bars costs \$20.
- C Each box of candy bars costs \$16.
- **D** Each box of candy bars costs \$12.

- 1 Each leg of an isosceles triangle is 9 inches longer than one-half the length of the base. If the perimeter of the isosceles triangle is 146 inches, what is the length of one leg of the isosceles triangle?
 - **A** 64 in.
 - **B** 41 in.
 - **C** 50 in.
 - **D** 82 in.

2 Which of the following best represents the solution to the system of linear equations shown below?

3x - 8y = -19

6x + 3y = 22

- 1 Which lists the functions of the form $y = ax^2$ in order from the narrowest to the widest graph?
 - **A** $y = -\frac{4}{7}x^2$, $y = \frac{6}{5}x^2$, $y = \frac{3}{4}x^2$, $y = -2x^2$
 - **B** $y = -2x^2$, $y = \frac{6}{5}x^2$, $y = \frac{3}{4}x^2$, $y = -\frac{4}{7}x^2$
 - **C** $y = \frac{6}{5}x^2$, $y = \frac{3}{4}x^2$, $y = -\frac{4}{7}x^2$, $y = -2x^2$
 - **D** $y = -\frac{4}{7}x^2$, $y = -2x^2$, $y = \frac{6}{5}x^2$, $y = \frac{3}{4}x^2$

- **3** What is the solution set for the equation $4n^2 9 = 23?$
 - **A** $\{-\sqrt{3.5}, \sqrt{3.5}\}$
 - **B** $\{-4\sqrt{2}, 4\sqrt{2}\}$
 - **C** $\{-2\sqrt{2}, 2\sqrt{2}\}$
 - $\mathbf{D} \quad \{-4, 4\}$

- 2 If the graph of a function of the form $y = ax^2 + c$ has a vertex located above the origin and opens downward, which of the following must be true about the values of *a* and *c* ?
 - $\mathbf{A} \quad a < 0 \text{ and } c > 0$
 - **B** a > 0 and c > 0
 - $\mathbf{C} \quad a < 0 \text{ and } c < 0$
 - **D** a > 0 and c < 0

1 The first 4 stages of a geometric pattern are shown below.



If each square represents 1 square unit, which expression can be used to determine the number of square units at Stage n?

A $(n+1)^2 - 3$

- **B** 2n 1
- $\mathbf{C} = \frac{n}{2}(n+1)$
- **D** 3(n-1)

2 Quadrilateral *QRST* is graphed on the coordinate grid below.



Which coordinates represent the vertices of a quadrilateral congruent to quadrilateral *QRST*?

- $\mathbf{A} \quad (-2,-2), \, (-4,\,1), \, (-7,\,0), \, (-7,-2)$
- $\mathbf{B}\quad(1,\,2),\,(-3,\,5),\,(-1,\,6),\,(1,\,6)$
- \mathbb{C} (3, 2), (0, -1), (1, -3), (3, -3)
- $\mathbf{D} \quad (0, -5), (-3, -2), (-5, -3), (-5, -5)$

1 Use the ruler on the Mathematics Chart to find the net of the square pyramid that has a base area of 2.25 square centimeters.









2 Which of the following best describes the graph of the system of equations shown below?

$$6x - 14y = -28$$

$$3y - 7x = -14$$

- **A** The lines are parallel.
- **B** The lines are the same.
- **C** The lines intersect but are not perpendicular.
- **D** The lines intersect and are perpendicular.

1 Trapezoid *LKNP* is shown below.



Which is closest to the area of trapezoid *LKNP*?

- **A** 276 in.²
- **B** 205 in. 2
- **C** 289 in. 2
- **D** 221 in. 2

2 Miguel has a cylinder with the dimensions shown below. The cylinder is filled to capacity with water.



If Miguel wants to pour all the water in this cylinder into 1 of the 4 rectangular prisms below without any water spilling out of the prism, which of the following prisms should he use?



3 The drawing below can be used to find *x*, the width of Pearl Pond at its widest point.



What is the value of *x*?

- A 34 meters
- **B** 36 meters
- C 45 meters
- **D** 22 meters

- 1 Paulo keeps 5 pens of either blue or black ink in his backpack. At the beginning of each class, Paulo randomly selects a pen from his backpack without looking and replaces it at the end of each class. If he has randomly selected a blue pen 39 times out of 100, which is the most likely number of blue pens in Paulo's backpack?
 - **A** 3
 - **B** 1
 - **C** 4
 - **D** 2

2 The table below shows the approximate area in square miles of 6 deserts.

Desert	Area (square miles)			
Gibson	120,000			
Gobi	500,000			
Great Sandy	150,000			
Mojave	15,000			
Nubian	100,000			
Sahara	3,500,000			

Approximate Area of Deserts

Which of the following conclusions is most accurate?

- A The Sahara is more than 25 times the size of the Great Sandy Desert.
- **B** The areas of the Gibson Desert and the Great Sandy Desert combined represent an area that is only about 8% of the area of the Sahara.
- **C** Two times the areas of the Great Sandy Desert and the Nubian Desert combined is more than the total area of the Gobi and the Mojave Desert combined.
- **D** Of the deserts listed in the table, the Sahara represents about 35% of the total area listed.

1 After track practice James and Raphael competed against each other in a 120-yard race. Raphael gave James a 10-yard head start. The table below shows the distances they had run after certain intervals of time.

120-Yard Race

Time (seconds)	0	1	2	3	4
James's Distance (yards)	10	20	30	40	50
Raphael's Distance (yards)	0	12	24	36	48

If both James and Raphael continued to run at the same rates for the rest of the race, which conclusion can be made based on the information in the table?

- A James was 10 yards behind when Raphael finished the race.
- **B** Raphael was 2 yards behind when James finished the race.
- **C** James and Raphael reached the finish line at the same time.
- ${\bf D}$ $\;$ Raphael ran the race at a constant rate of 10 yards per second.
- **2** And is learning about special right triangles. She claims that if a right triangle has side lengths that are integers, then the mean of the lengths of the shortest side and the longest side is equal to the length of the remaining side. Which of the following examples disproves Andi's claim?
 - A A triangle with side lengths of 39 units, 52 units, and 65 units
 - **B** A triangle with side lengths of 10 units, 24 units, and 26 units
 - C A triangle with side lengths of 18 units, 24 units, and 30 units
 - **D** A triangle with side lengths of 6 units, 8 units, and 10 units

ltem Number	Student Expectation	Correct Answer
OBJECTIVE 1	-	
1	A.1 (D)	D
2	A.1 (E)	В
3	A.1 (B)	А
OBJECTIVE 2		
1	A.2 (B)	D
2	A.3 (A)	В
3	A.4 (A)	С
OBJECTIVE 3		
1	A.5 (A)	D
2	A.6 (A)	С
OBJECTIVE 4		
1	A.7 (B)	В
2	A.8 (B)	D
OBJECTIVE 5		
1	A.9 (B)	В
2	A.9 (D)	А
3	A.10 (A)	С
OBJECTIVE 6		
1	G.5 (B)	С
2	G.10 (A)	А
OBJECTIVE 7		
1	G.6 (B)	В
2	G.7 (B)	С
OBJECTIVE 8		
1	G.8 (C)	В
2	G.8 (D)	D
3	G.11 (C)	С
OBJECTIVE 9		
1	8.11 (B)	D
2	8.13 (B)	В
OBJECTIVE 10		
1	8.14 (B)	А
2	8.16 (B)	В