# Arizona's Instrument to Measure Standards (AIMS HS)

# Mathematics

## Released Items

September 7, 2010

As part of Superintendent Tom Horne's ongoing efforts to improve the communication of academic expectations, the Arizona Department of Education is releasing High School writing, reading, and mathematics items to the public. This release is intended to provide students, parents, teachers, and the community with specific examples of the types of skills being assessed on the AIMS tests. The release is divided into a writing/reading form and a mathematics form, similar to the AIMS test.

Included in this release is a previous prompt and directions used in the AIMS assessments. Following the writing prompt are two reading passages, directions, and the items associated with each passage in the form of a mini-test. These passages and items are from the 2004, 2005, 2006, and 2009 AIMS administrations. The final section will contain the individual items with the correct answers and statistical information about each item.

The mathematics section consists of a mini-test with thirty items from the 2005 through 2009 AIMS administrations, followed by the individual items and their statistics.

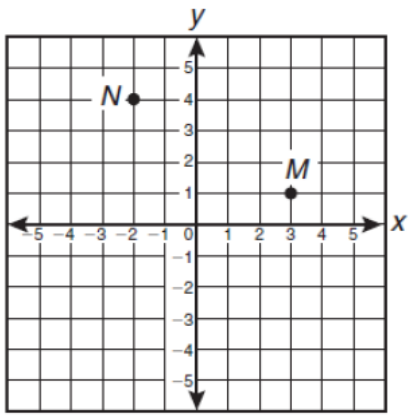
The statistical information includes the:

1) Item identification number.
2) Correct answer.
3) Response probability (P-Value), which represents the percentage of students who answered the question correctly.
4) Rasch difficulty, which measures the difficulty of the item on a scale in which -3 indicates a very easy item and +3 indicates an extremely difficult item.
5) Point Biserial Correlation, which expresses the relationship between how students score on this item and how they score on the test as a whole. The higher the Point Biserial value, the greater the correlation between the scores for the item and the scores for the rest of the test.
6) Performance objective as the item aligns to the 2003 Reading Standard and the 2008 Mathematics Standard.
7) Distractor analysis, which shows the percentage of responses for each answer option.

The items are reproductions of the actual items as they appeared on the AIMS tests. If you have any questions, please contact Frank Brashear, Director of Test & Item Development, at (602) 542-5031.

# MATHEMATICS

**1** What is the distance between points $M$ (3, 1) and $N$ (−2, 4) on the graph below?




**A** $\sqrt{10}$

**B** $\sqrt{26}$

**C** $\sqrt{34}$

**D** $\sqrt{50}$

**2** Which set of numbers represents an infinite set?

**A** {natural numbers}

**B** {integers between 5 and 20}

**C** {1, 2, 3}

**D** $\left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}\right\}$

**3** Earth's mean temperature is 59°F, and it is $9.3 \times 10^7$ miles from the sun. Mars' mean temperature is −85°F, and it is $141.6 \times 10^6$ miles from the sun. Which matrix represents these data?

**A**

| | Temp. | Distance |
|---|---|---|
| Earth | 59 | $9.3 \times 10^7$ |
| Mars | −85 | $141.6 \times 10^6$ |

**B**

| | Temp. | Distance |
|---|---|---|
| Earth | 59 | $141.6 \times 10^6$ |
| Mars | −85 | $9.3 \times 10^7$ |

**C**

| | Temp. | Distance |
|---|---|---|
| Earth | −85 | $9.3 \times 10^7$ |
| Mars | 59 | $141.6 \times 10^6$ |

**D**

| | Temp. | Distance |
|---|---|---|
| Earth | −85 | $141.6 \times 10^6$ |
| Mars | 59 | $9.3 \times 10^7$ |

Go On

**4** Which statement has a true converse?

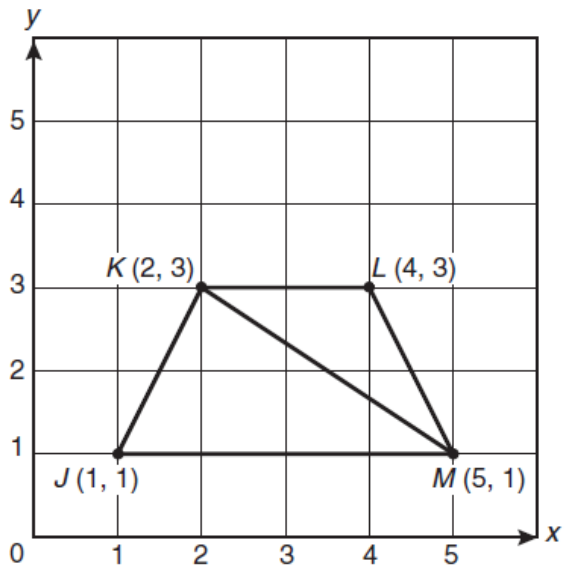
**A** If a quadrilateral is a square, then it is a rectangle.

**B** If two angles are vertical angles, then they are congruent.

**C** If two angles form a linear pair, then they are supplementary.

**D** If an angle is a right angle, then it measures exactly $90^0$.

**5** Trapezoid *JKLM* is shown below.




What is the length of $\overline{KM}$ ?

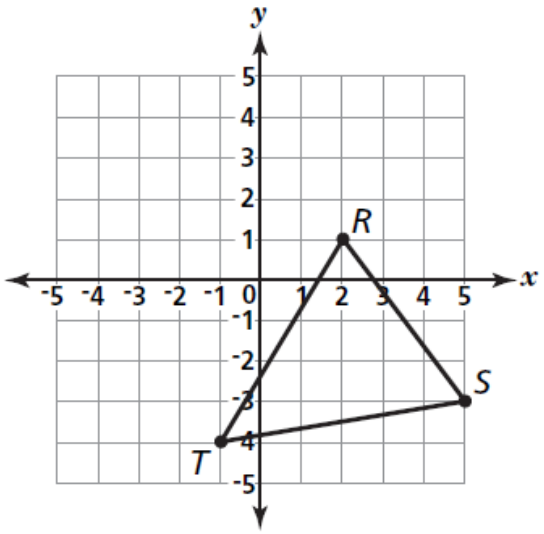
**A** $\sqrt{5}$

**B** $\sqrt{13}$

**C** $\sqrt{65}$

**D** $\sqrt{73}$

**6** Study $\triangle RST$ on the grid below.




When $\triangle RST$ is translated 4 units down, what are the apparent coordinates of $T'$ ?

**A** $(-8, -1)$

**B** $(-4, -1)$

**C** $(-1, -8)$

**D** $(0, -4)$

**7** The coach wants to introduce each of the starting players at Tuesday's game. In how many different orders can each of the 5 starting players be introduced?

**A** 120

**B** 25

**C** 15

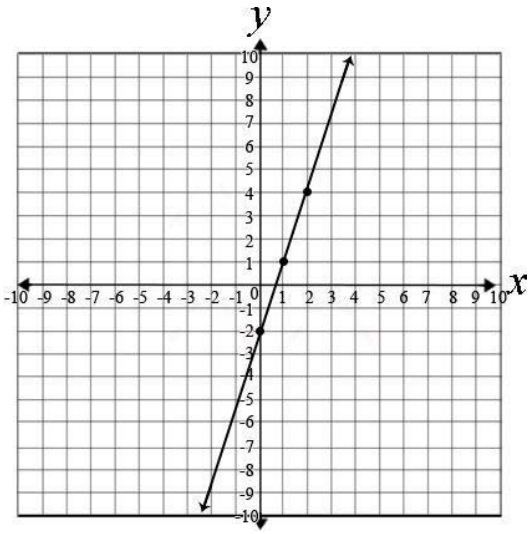
**D** 5

Go On

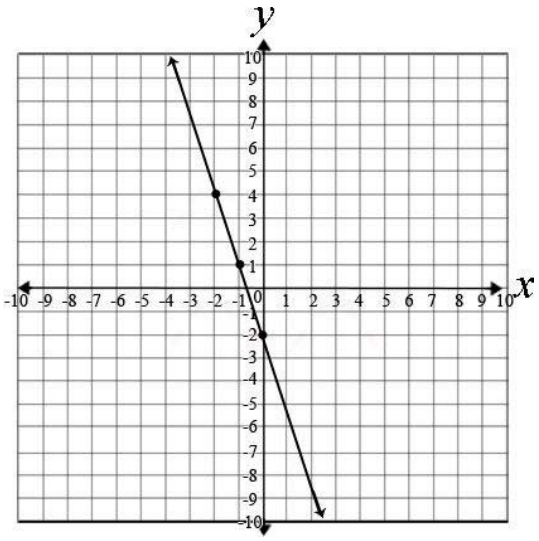
**8** Which could be the graph of the equation below?

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

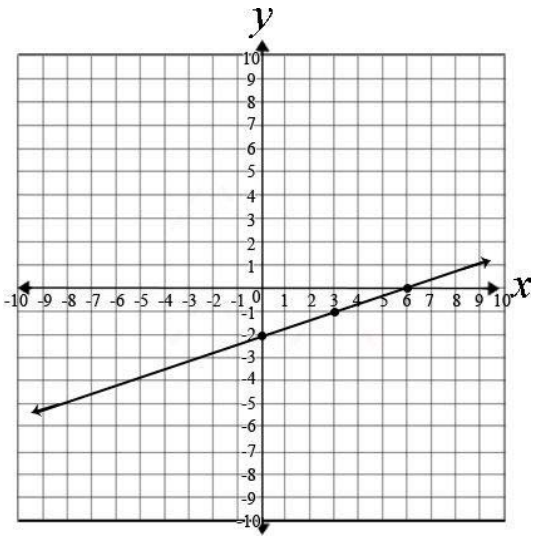
A



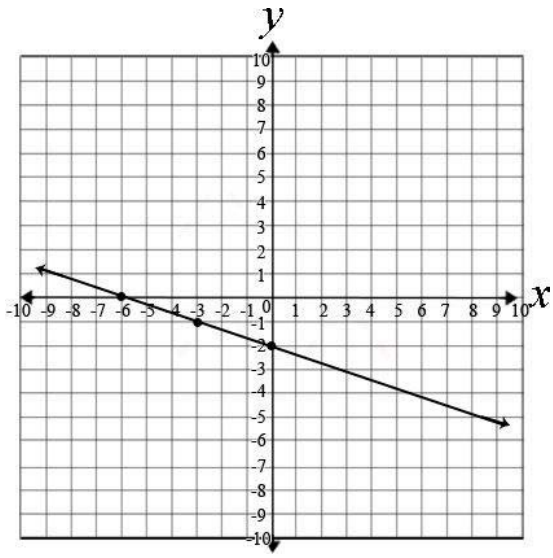

C




B




D




Go On

**9** Which equation represents the data in the table?

| $n$ | $C$ |
|---|---|
| 10 | 70 |
| 20 | 100 |
| 30 | 130 |
| 40 | 160 |

**A** $C = 3n + 40$

**B** $C = -3n - 40$

**C** $C = 3n - 100$

**D** $C = -3n + 100$

**10** Which expression is the $n$th term of the quadratic sequence shown in the table below?

| Term No. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Value | 1 | 4 | 9 | 16 | 25 |

**A** $n^2$

**B** $2n^2$

**C** $n^2 + 3$

**D** $2n^2 + 2$

**11** A committee consisting of 5 teachers will be chosen from a staff of 25 teachers. To find the number of different possible 5-teacher committees, which should be used?

**A** combination, because the order is important.

**B** permutation, because the order is important.

**C** combination, because the order is not important.

**D** permutation, because the order is not important.

**12** Bob created a number pattern beginning with 3. He created the next term by doubling the previous term and subtracting 1. The first 5 terms of the number pattern are shown below.

3, 5, 9, 17, 33, . . .

What is the 7th term in Bob's number pattern?

**A** 51

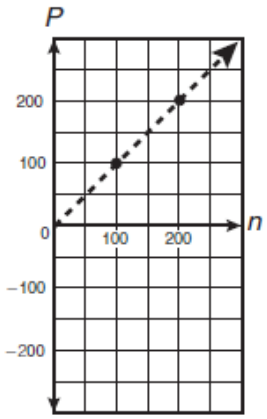
**B** 65

**C** 129

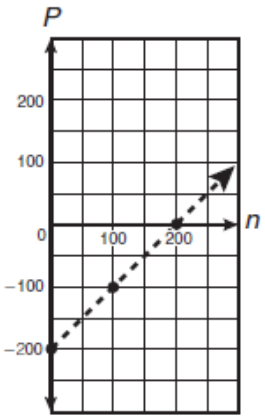
**D** 257

*Go On*

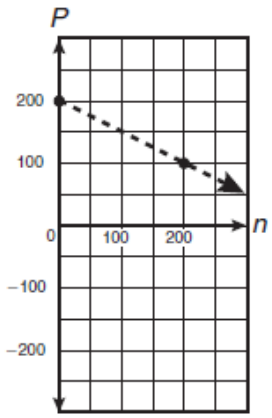
**13** Student council members plan to sell shaved-ice cones to raise funds. They will spend $200.00 for supplies and will charge $1.00 for each shaved-ice cone. Which graph represents *P*, their profit, as a function of *n*, the number of cones sold?



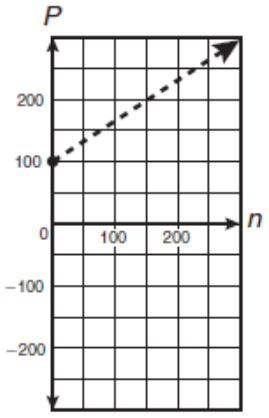

**A**




**C**



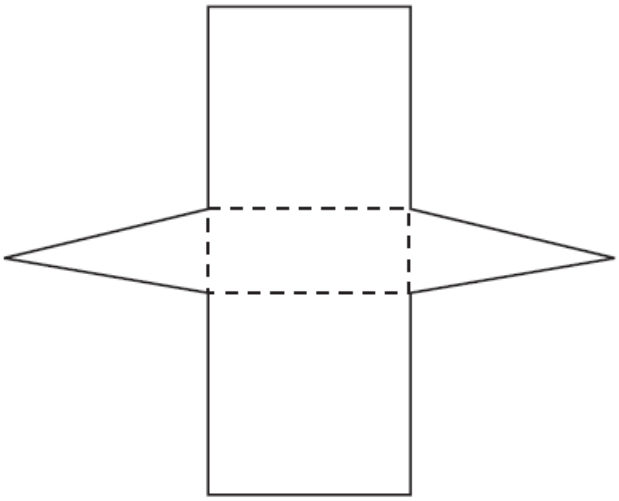

**B**

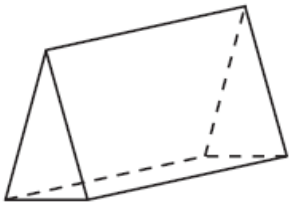



**D**

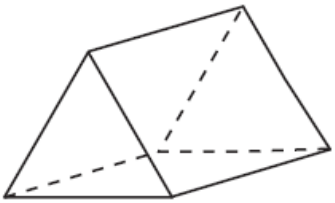
Go On

**14** Which 3-dimensional object can be formed by folding the net along the dashed segments and taping the edges?

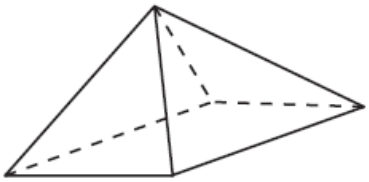




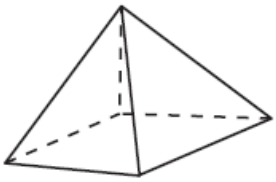
**A**



**C**



**B**



**D**

*Go On*

**15** What is the value of the expression below when $a = -4$ and $b = 3$?

$$a^2 + |ab|$$

**A** $-4$

**B** $-28$

**C** $4$

**D** $28$

**16** A polygon has been rotated about the origin. Which statement must be true?

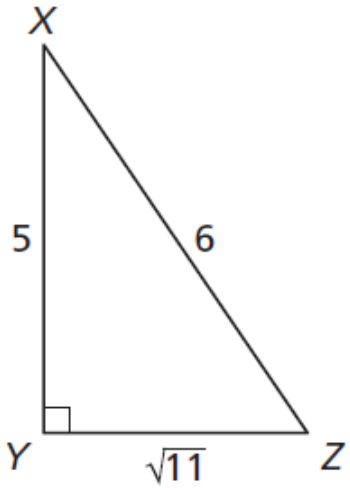
**A** The lengths of the sides are doubled.

**B** The area of the polygon did not change.

**C** The coordinates of the vertices did not change.

**D** The area of the polygon is 4 Times its original area.

**17** Study the triangle below.




What is the cosine of $\angle X$?

**A** $\frac{5}{6}$

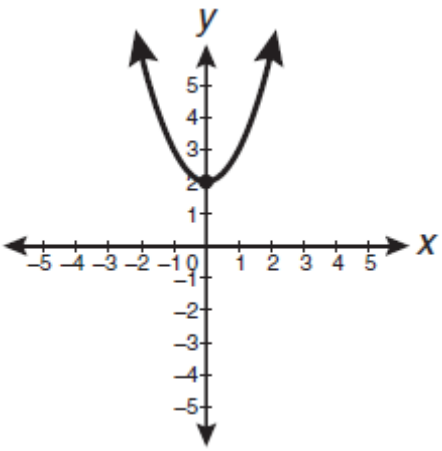
**B** $\frac{\sqrt{11}}{6}$

**C** $\frac{\sqrt{11}}{5}$

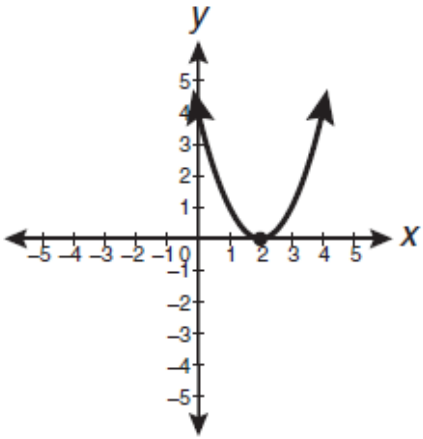
**D** $\frac{6}{5}$

Go On

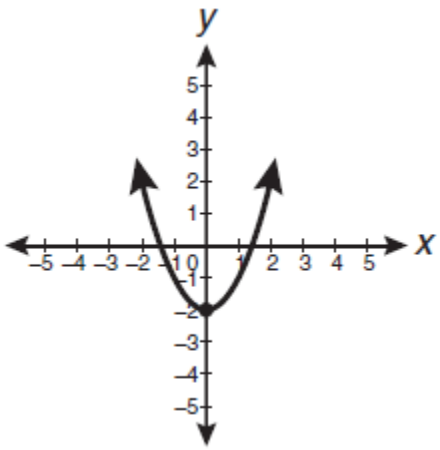
**18** Which is the graph of $y = x^2 + 2$?



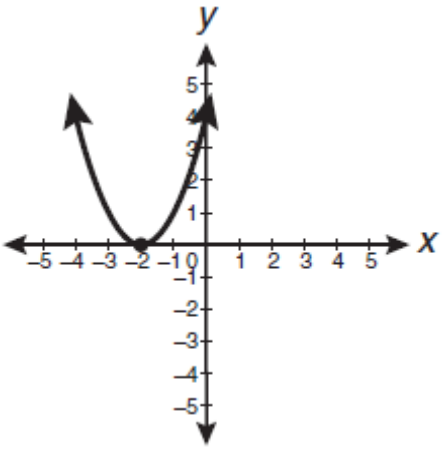

**A**




**C**



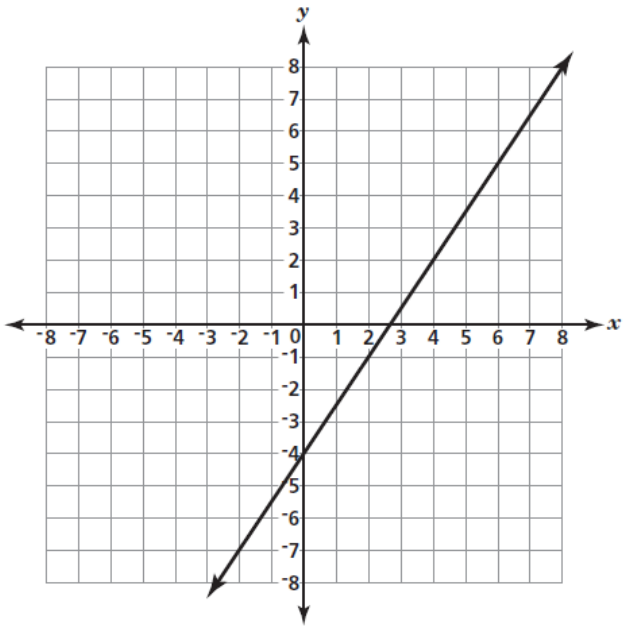

**B**



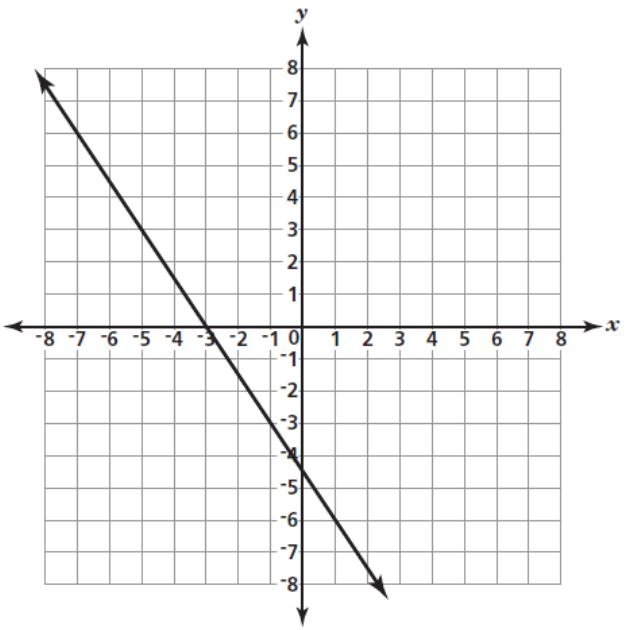

**D**

Go On

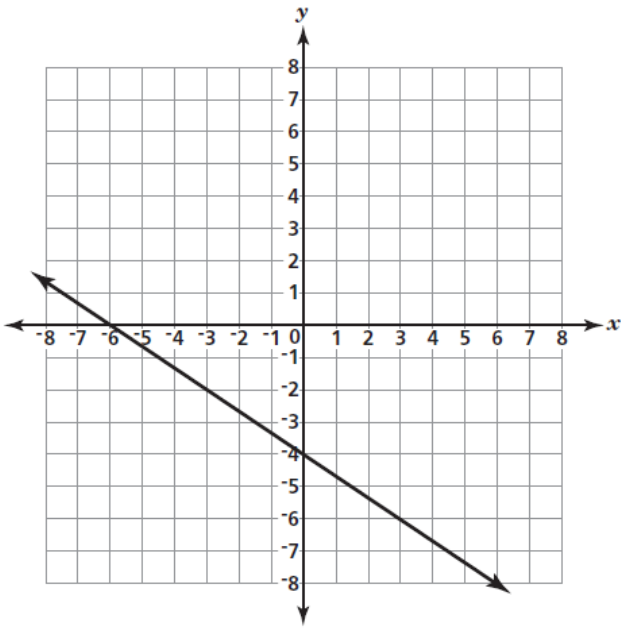
**19** Which is the apparent graph of $y = \frac{2}{3}x - 4$?



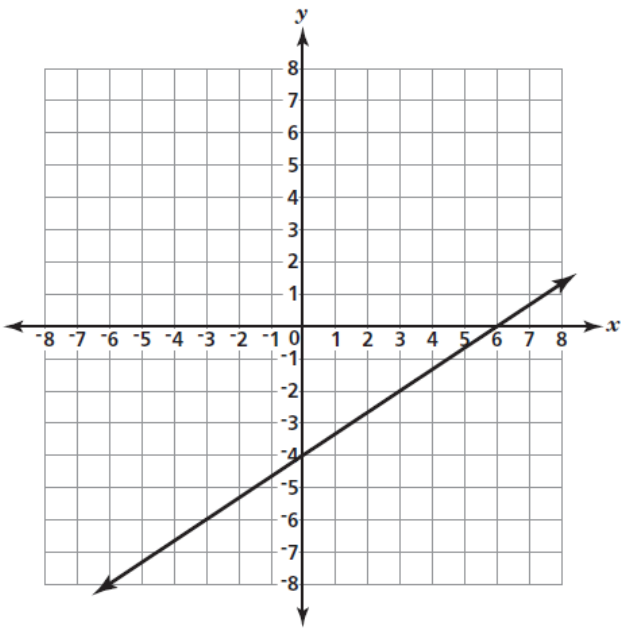

**A**




**C**




**B**




**D**

Go On

**20** The formula for the lateral area of a pyramid is $A = \frac{1}{2}pl$. What is $p$ in terms of $A$ and $l$?

**A** $p = \frac{2A}{l}$

**B** $p = A - \frac{1}{2}l$

**C** $p = 2A - l$

**D** $p = \frac{1}{2}Al$

**21** The rule for a particular number pattern is to multiply the immediately preceding term by 2 and then add 1. The first four terms of this number pattern are given below.

$$-2, -3, -5, -9, \ldots$$

What is the 6th term of the number pattern?

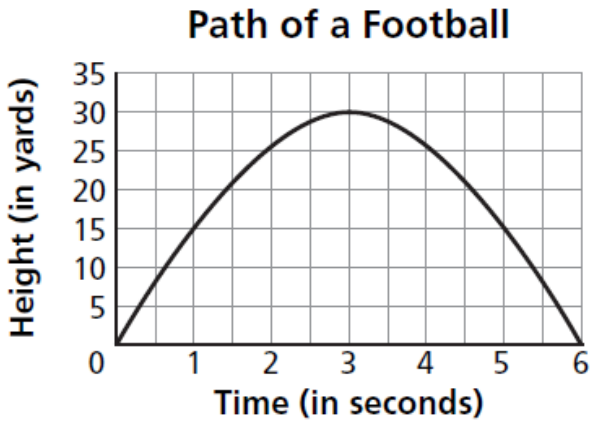
**A** −35

**B** −33

**C** −18

**D** −17

**22** The graph below shows the path of a football that was kicked during a game.




What was the maximum height of the football during the kick?

**A** 3 yards

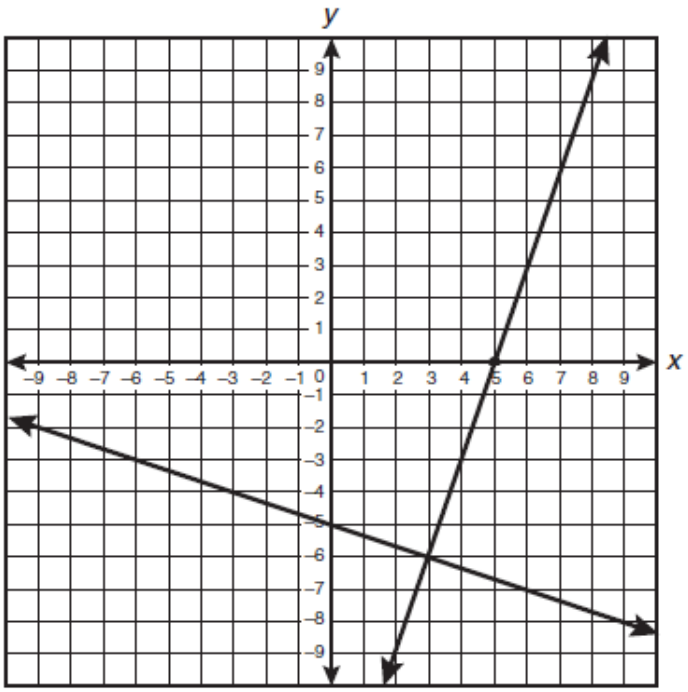
**B** 6 yards

**C** 30 yards

**D** 35 yards

Go On

**23** What is the apparent solution to the system of equations graphed below?




**A** (−6, 3)

**B** (0, −5)

**C** (3, −6)

**D** (5, 0)

**24** Three transformations will be performed on triangle *ABC*. Which set of transformations will always produce a congruent triangle?

**A** dilation, rotation, translation

**B** reflection, dilation, translation

**C** rotation, reflection, dilation

**D** rotation, translation, reflection

Go On

**25** The stem-and-leaf plot below shows test scores for 25 students.

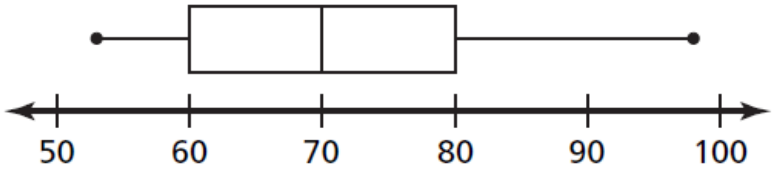
**Test Scores**

| Stem | Leaf |
|---|---|
| 5 | 3 5 7 |
| 6 | 2 4 6 8 9 |
| 7 | 1 3 3 5 5 5 6 7 8 |
| 8 | 1 1 3 5 8 |
| 9 | 1 2 8 |

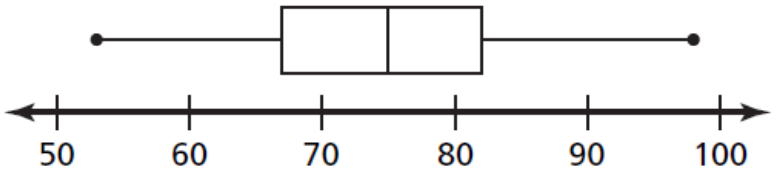
| KEY |
|---|
| 5\|3 = 53 |

Which box-and-whisker plot **correctly** displays the data in the stem-and-leaf plot?

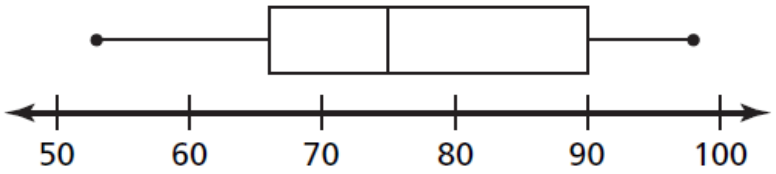
A



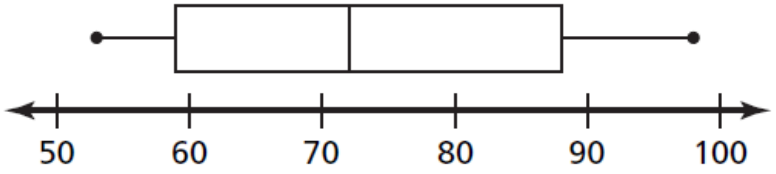

B




C




D




*Go On*

**26** Study the proportion below.

$$\frac{-2}{x-7} = \frac{5}{x+21}$$

What value of $x$ makes the proportion true?

**A** $-4$

**B** $-1$

**C** 11

**D** 13

**27** A teacher must select 2 students from a list of 4 students. How many distinct groups of 2 students are possible?

**A** 4

**B** 6

**C** 8

**D** 12

**28** Study the quadratic equation below.

$$2x^2 + 3x - 20 = 0$$

Which of the following shows two solutions to the equation?

**A** 4 and $-\frac{5}{2}$

**B** 2 and $-5$

**C** $-4$ and $\frac{5}{2}$

**D** 5 and $-2$

**29** Which of the following does **not** show a close approximation?

**A** $\sqrt{18} \approx 4.2$

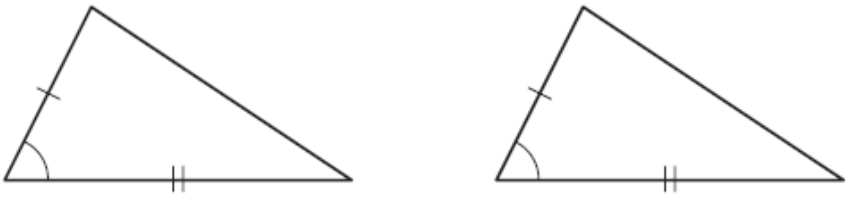
**B** $\sqrt{23} \approx 11.5$

**C** $\sqrt{62} \approx 7.9$

**D** $\sqrt{80} \approx 8.9$

*Go On*

**30** Jan proved that the two triangles below are congruent.



Which postulate did Jan use for her proof?

**A** SSS (Side-Side-Side)

**B** SAS (Side-Angle-Side)

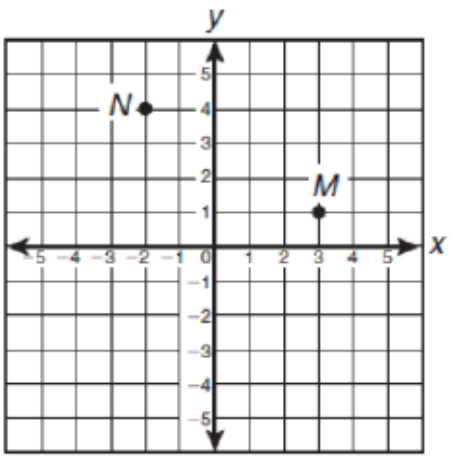
**C** AAS (Angle-Angle-Side)

**D** ASA (Angle-Side-Angle)

**Stop**

# Mathematics Item Data

**1** What is the distance between points $M$ (3, 1) and $N$ (−2, 4) on the graph below?




**A** $\sqrt{10}$

**B** $\sqrt{26}$

**C** $\sqrt{34}$

**D** $\sqrt{50}$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3140900** | **C** | **0.51** | **0.4443** | **0.50** | **26** | **18** | **51** | **4** |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 3**

**2** Which set of numbers represents an infinite set?

**A** {natural numbers}

**B** {integers between 5 and 20}

**C** {1, 2, 3}

**D** $\left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}\right\}$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3140638** | **A** | **0.62** | **-0.0790** | **0.39** | **62** | **10** | **15** | **13** |

2008 Mathematics Standard Alignment is **Strand 1** – **Concept 1** – **Performance Objective 2**

**3** Earth's mean temperature is 59°F, and it is $9.3 \times 10^7$ miles from the sun. Mars' mean temperature is −85°F, and it is $141.6 \times 10^6$ miles from the sun. Which matrix represents these data?

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**C**

| | Temp. | Distance |
|---|---|---|
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**D**

| | Temp. | Distance |
|---|---|---|
| Earth | −85 | $141.6 \times 10^6$ |
| Mars | 59 | $9.3 \times 10^7$ |

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3140643** | **A** | **0.91** | **-1.8684** | **0.34** | **91** | **3** | **4** | **2** |

2008 Mathematics Standard Alignment is **Strand 2** – **Concept 1** – **Performance Objective 3**

**4** Which statement has a true converse?

**A** If a quadrilateral is a square, then it is a rectangle.

**B** If two angles are vertical angles, then they are congruent.

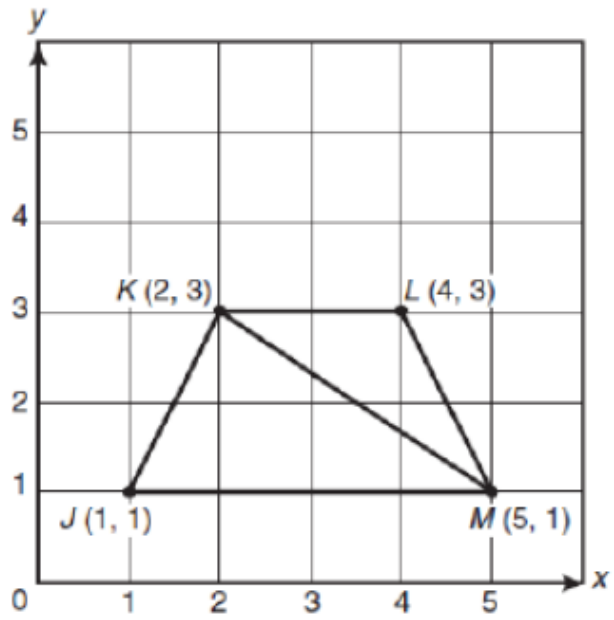
**C** If two angles form a linear pair, then they are supplementary.

**D** If an angle is a right angle, then it measures exactly $90^0$.

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3140717** | **D** | **0.72** | **-0.6735** | **0.29** | **9** | **11** | **8** | **72** |

2008 Mathematics Standard Alignment is **Strand 5** – **Concept 2** – **Performance Objective 9**

**5** Trapezoid *JKLM* is shown below.




What is the length of $\overline{KM}$ ?

**A** $\sqrt{5}$

**B** $\sqrt{13}$

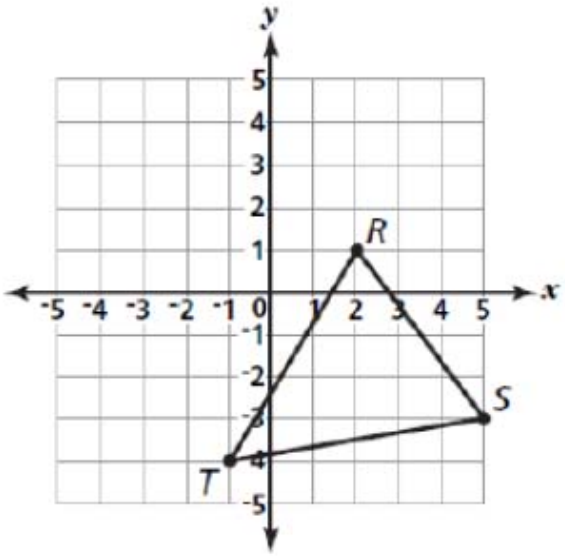
**C** $\sqrt{65}$

**D** $\sqrt{73}$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3290355** | **B** | **0.57** | **0.7002** | **0.39** | **29** | **57** | **11** | **3** |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 3**

**6** Study $\triangle RST$ on the grid below.




When $\triangle RST$ is translated 4 units down, what are the apparent coordinates of $T'$?

**A** $(-8, -1)$

**B** $(-4, -1)$

**C** $(-1, -8)$

**D** $(0, -4)$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3501098 | C | 0.64 | 0.3635 | 0.47 | 18 | 15 | 64 | 3 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 2 – Performance Objective 2**

**7** The coach wants to introduce each of the starting players at Tuesday's game. In how many different orders can each of the 5 starting players be introduced?

**A** 120

**B** 25

**C** 15

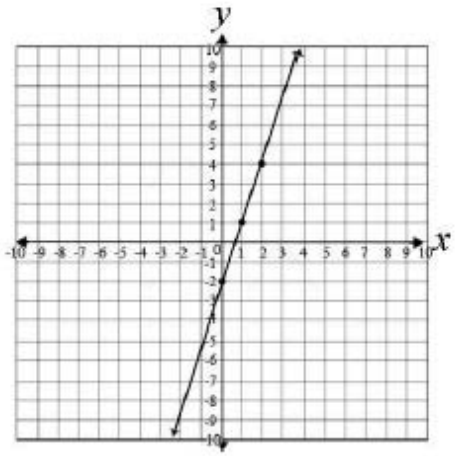
**D** 5

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3140794** | **A** | **0.37** | **1.7913** | **0.43** | **37** | **48** | **8** | **7** |

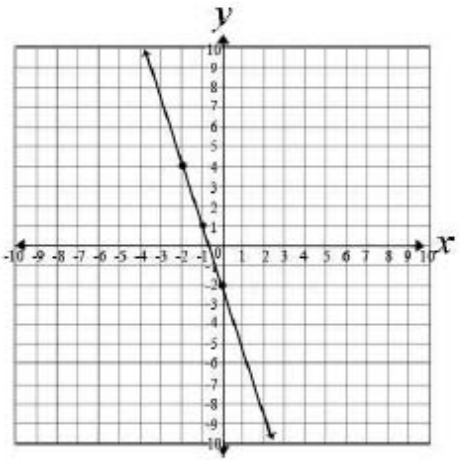
2008 Mathematics Standard Alignment is **Strand 2** – **Concept 3** – **Performance Objective 3**

**8** Which could be the graph of the equation below?

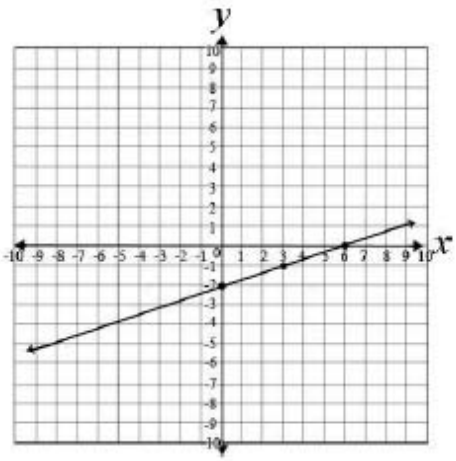
$$y = \frac{1}{3}x - 2$$



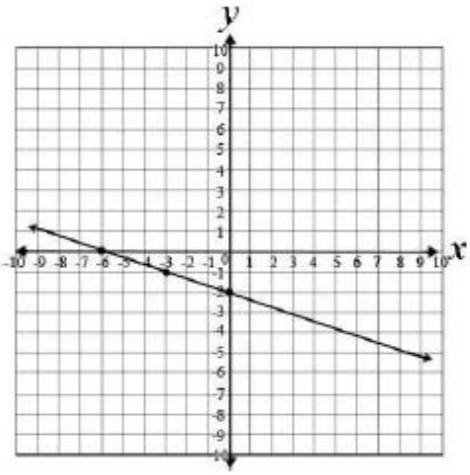

A




C




B




D

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3261753 | B | 0.59 | 0.5520 | 0.44 | 21 | 59 | 11 | 9 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 5**

**9** Which equation represents the data in the table?

| $n$ | $C$ |
|---|---|
| 10 | 70 |
| 20 | 100 |
| 30 | 130 |
| 40 | 160 |

**A** $C = 3n + 40$

**B** $C = -3n - 40$

**C** $C = 3n - 100$

**D** $C = -3n + 100$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3267512 | A | 0.77 | -0.4603 | 0.56 | 77 | 6 | 10 | 7 |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 3** – **Performance Objective 3**

**10** Which expression is the *n*th term of the quadratic sequence shown in the table below?

| Term No. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Value | 1 | 4 | 9 | 16 | 25 |

**A** $n^2$

**B** $2n^2$

**C** $n^2 + 3$

**D** $2n^2 + 2$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3267515** | **A** | **0.72** | **-0.1111** | **0.58** | **72** | **11** | **11** | **6** |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 1** – **Performance Objective 1**

**11** A committee consisting of 5 teachers will be chosen from a staff of 25 teachers. To find the number of different possible 5-teacher committees, which should be used?

**A** combination, because the order is important.

**B** permutation, because the order is important.

**C** combination, because the order is not important.

**D** permutation, because the order is not important.

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3267302** | **C** | **0.45** | **0.7772** | **0.24** | **23** | **14** | **45** | **18** |

2008 Mathematics Standard Alignment is **Strand 2 – Concept 3 – Performance Objective 2**

**12** Bob created a number pattern beginning with 3. He created the next term by doubling the previous term and subtracting 1. The first 5 terms of the number pattern are shown below.

3, 5, 9, 17, 33, . . .

What is the 7th term in Bob's number pattern?

**A** 51

**B** 65

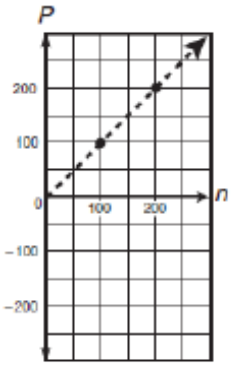
**C** 129

**D** 257

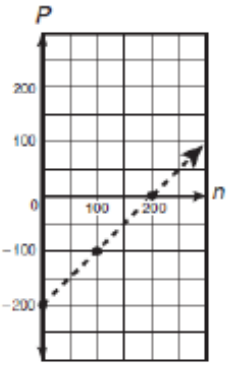
| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3511320** | **C** | **0.78** | **-0.5115** | **0.56** | **6** | **13** | **78** | **3** |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 1** – **Performance Objective 2**

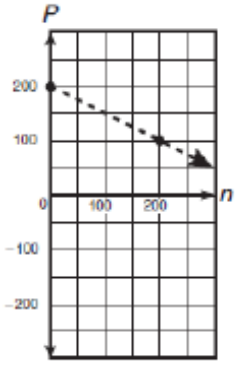
**13** Student council members plan to sell shaved-ice cones to raise funds. They will spend $200.00 for supplies and will charge $1.00 for each shaved-ice cone. Which graph represents *P*, their profit, as a function of *n*, the number of cones sold?



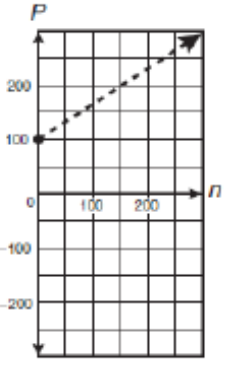

A




C




B

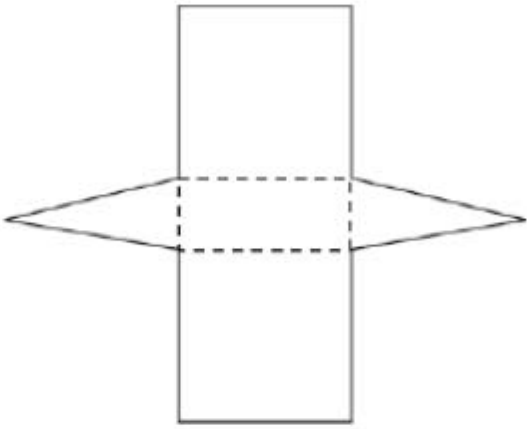


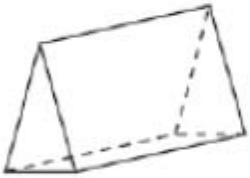

D

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3267522 | C | 0.66 | 0.2104 | 0.44 | 20 | 9 | 66 | 5 |

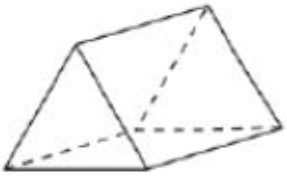
2008 Mathematics Standard Alignment is **Strand 3 – Concept 2 – Performance Objective 1**

**14** Which 3-dimensional object can be formed by folding the net along the dashed segments and taping the edges?

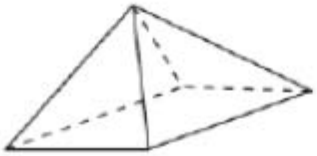




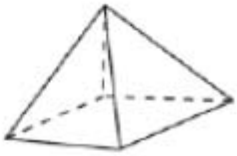
A



C



B



D

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3290283 | A | 0.93 | -2.0551 | 0.33 | 93 | 1 | 4 | 2 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 1 – Performance Objective 2**

**15** What is the value of the expression below when $a = -4$ and $b = 3$?

$$a^2 + |ab|$$

**A** $-4$

**B** $-28$

**C** $4$

**D** $28$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3501156 | D | 0.61 | 0.5065 | 0.49 | 11 | 12 | 16 | 61 |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 3** – **Performance Objective 8**

**16** A polygon has been rotated about the origin. Which statement must be true?

**A** The lengths of the sides are doubled.

**B** The area of the polygon did not change.

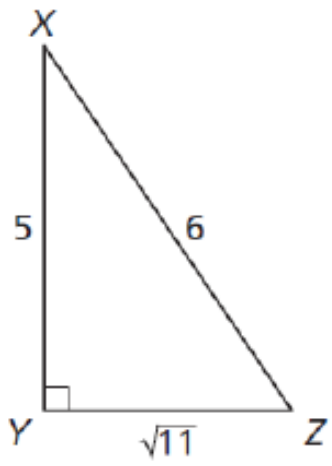
**C** The coordinates of the vertices did not change.

**D** The area of the polygon is 4 Times its original area.

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3501013** | **B** | **0.77** | **-0.4542** | **0.51** | **6** | **77** | **12** | **5** |

2008 Mathematics Standard Alignment is **Strand 4** – **Concept 2** – **Performance Objective 4**

**17** Study the triangle below.




What is the cosine of $\angle X$?

**A** $\frac{5}{6}$

**B** $\frac{\sqrt{11}}{6}$

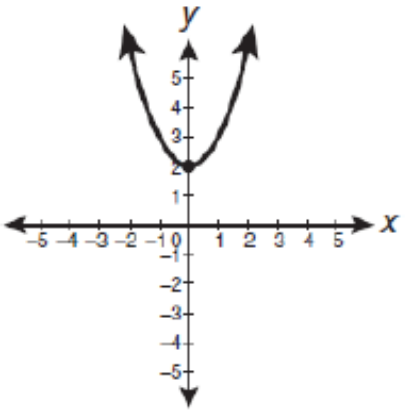
**C** $\frac{\sqrt{11}}{5}$

**D** $\frac{6}{5}$

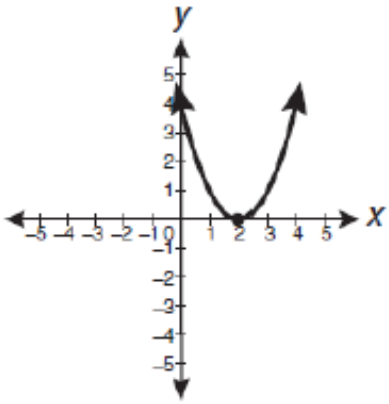
| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511335 | A | 0.51 | 0.4345 | 0.24 | 51 | 21 | 17 | 10 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 1 – Performance Objective 11**

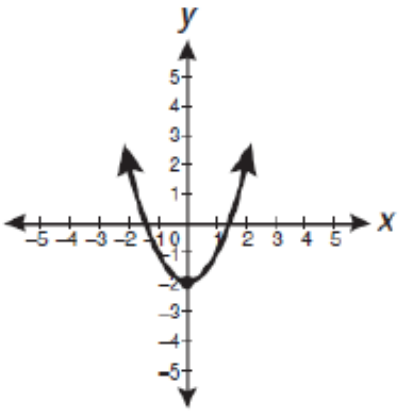
**18** Which is the graph of $y = x^2 + 2$?



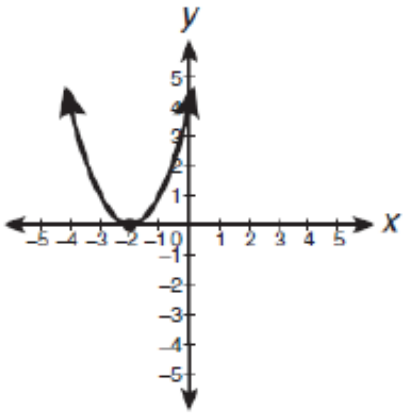

**A**




**C**




**B**

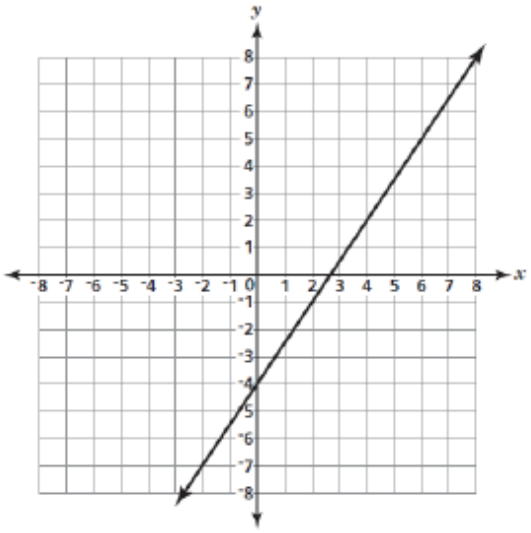



**D**

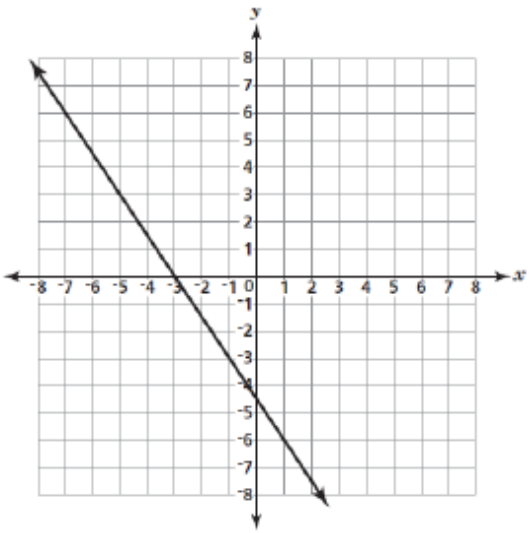
| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3290305** | **A** | **0.66** | **0.1442** | **0.49** | **66** | **7** | **22** | **5** |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 8**

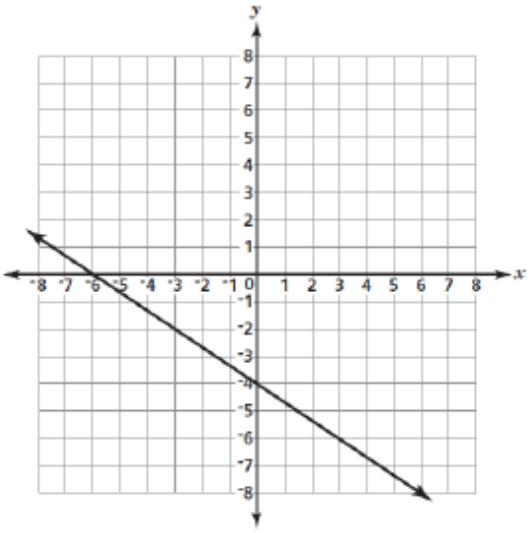
**19** Which is the apparent graph of $y = \frac{2}{3}x - 4$?



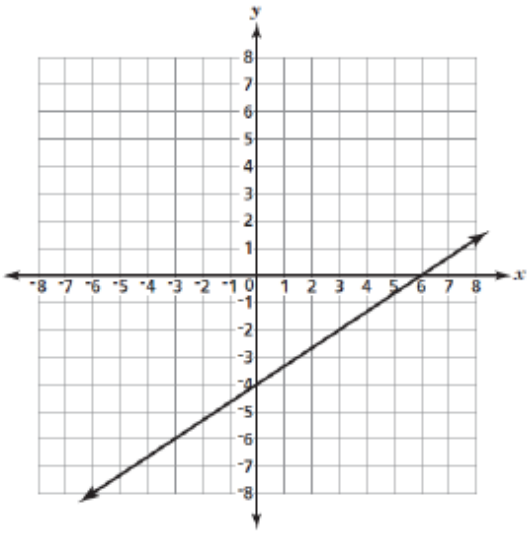

A




C




B




D

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3501150 | D | 0.53 | 0.9516 | 0.53 | 25 | 11 | 11 | 53 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 5**

**20** The formula for the lateral area of a pyramid is $A = \frac{1}{2}pl$. What is $p$ in terms of $A$ and $l$?

**A** $p = \frac{2A}{l}$

**B** $p = A - \frac{1}{2}l$

**C** $p = 2A - l$

**D** $p = \frac{1}{2}Al$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511332 | A | 0.47 | 0.6524 | 0.46 | 47 | 15 | 12 | 25 |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 3** – **Performance Objective 2**

**21** The rule for a particular number pattern is to multiply the immediately preceding term by 2 and then add 1. The first four terms of this number pattern are given below.

$-2, -3, -5, -9, \ldots$

What is the 6th term of the number pattern?

**A** $-35$

**B** $-33$

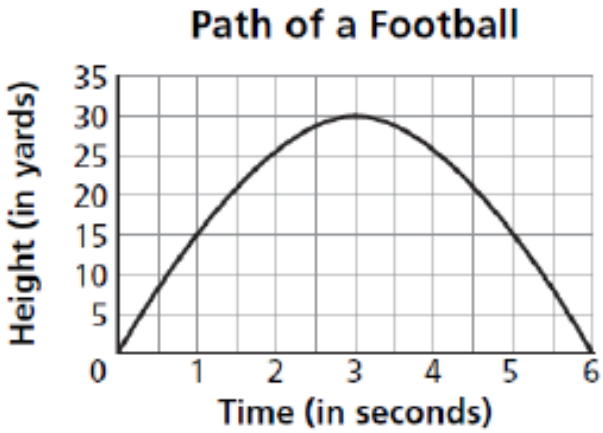
**C** $-18$

**D** $-17$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3511369** | **B** | **0.61** | **0.5157** | **0.53** | **6** | **61** | **13** | **20** |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 1** – **Performance Objective 2**

**22** The graph below shows the path of a football that was kicked during a game.




What was the maximum height of the football during the kick?

**A** 3 yards

**B** 6 yards

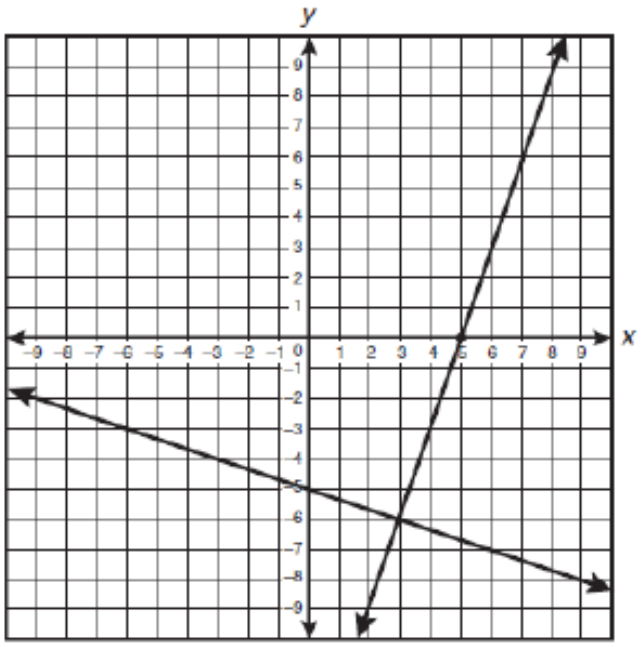
**C** 30 yards

**D** 35 yards

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3511440** | **C** | **0.91** | **-1.6837** | **0.40** | **4** | **3** | **91** | **2** |

2008 Mathematics Standard Alignment is **Strand 3** – **Concept 2** – **Performance Objective 1**

**23** What is the apparent solution to the system of equations graphed below?




**A** (−6, 3)

**B** (0, −5)

**C** (3, −6)

**D** (5, 0)

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3290313** | **C** | **0.57** | **0.6976** | **0.39** | **11** | **5** | **57** | **27** |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 3 – Performance Objective 7**

**24** Three transformations will be performed on triangle *ABC*. Which set of transformations will always produce a congruent triangle?

**A** dilation, rotation, translation

**B** reflection, dilation, translation

**C** rotation, reflection, dilation

**D** rotation, translation, reflection

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3301259 | D | 0.63 | 0.3843 | 0.48 | 8 | 12 | 17 | 63 |

2008 Mathematics Standard Alignment is **Strand 4** – **Concept 2** – **Performance Objective 4**

**25** The stem-and-leaf plot below shows test scores for 25 students.

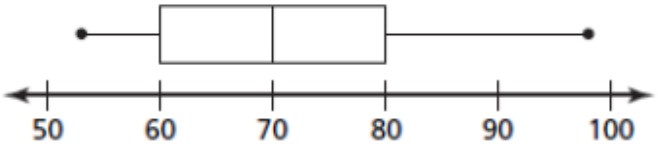
**Test Scores**

| Stem | Leaf |
|---|---|
| 5 | 3 5 7 |
| 6 | 2 4 6 8 9 |
| 7 | 1 3 3 5 5 5 6 7 8 |
| 8 | 1 1 3 5 8 |
| 9 | 1 2 8 |

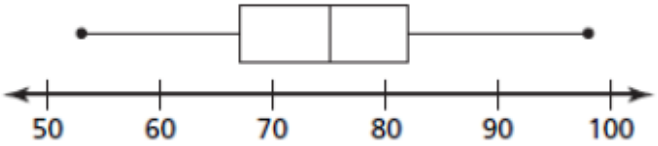
| KEY |
|---|
| 5\|3 = 53 |

Which box-and-whisker plot correctly displays the data in the stem-and-leaf plot?

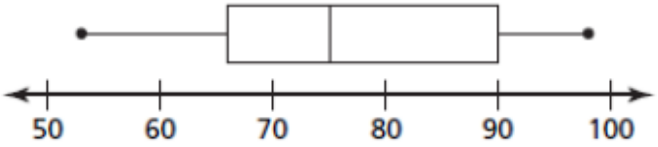
A



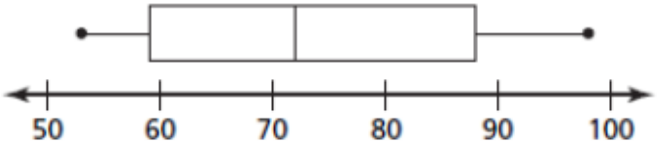

B




C




D




| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511313 | B | 0.56 | 0.2640 | 0.36 | 9 | 56 | 21 | 14 |

2008 Mathematics Standard Alignment is **Strand 2 – Concept 1 – Performance Objective 3**

**26** Study the proportion below.

$$\frac{-2}{x-7} = \frac{5}{x+21}$$

What value of $x$ makes the proportion true?

**A** $-4$

**B** $-1$

**C** 11

**D** 13

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3511361** | **B** | **0.52** | **0.9675** | **0.52** | **19** | **52** | **19** | **10** |

2008 Mathematics Standard Alignment is **Strand 3 – Concept 3 – Performance Objective 5**

**27** A teacher must select 2 students from a list of 4 students. How many distinct groups of 2 students are possible?

**A** 4

**B** 6

**C** 8

**D** 12

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| **3511408** | **B** | **0.42** | **1.5179** | **0.34** | **14** | **42** | **28** | **16** |

2008 Mathematics Standard Alignment is **Strand 2 – Concept 3 – Performance Objective 2**

**28** Study the quadratic equation below.

$$2x^2 + 3x - 20 = 0$$

Which of the following shows two solutions to the equation?

**A** 4 and $-\frac{5}{2}$

**B** 2 and $-5$

**C** $-4$ and $\frac{5}{2}$

**D** 5 and $-2$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511422 | C | 0.45 | 1.3425 | 0.30 | 21 | 22 | 45 | 12 |

2008 Mathematics Standard Alignment is **Strand 3 – Concept 3 – Performance Objective 13**

**29** Which of the following does **not** show a close approximation?

**A** $\sqrt{18} \approx 4.2$

**B** $\sqrt{23} \approx 11.5$

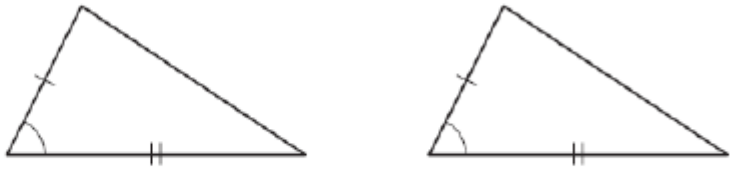
**C** $\sqrt{62} \approx 7.9$

**D** $\sqrt{80} \approx 8.9$

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511365 | B | 0.58 | 0.6655 | 0.44 | 15 | 58 | 15 | 12 |

2008 Mathematics Standard Alignment is **Strand 1** – **Concept 3** – **Performance Objective 1**

**30** Jan proved that the two triangles below are congruent.



Which postulate did Jan use for her proof?

**A** SSS (Side-Side-Side)

**B** SAS (Side-Angle-Side)

**C** AAS (Angle-Angle-Side)

**D** ASA (Angle-Side-Angle)

| Item Number | Correct Answer | P-Value | Equated Rasch Value | Point Biserial Correlation | Distractor Analysis Percentage | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Option A | Option B | Option C | Option D |
| 3511345 | B | 0.80 | -0.6836 | 0.49 | 6 | 80 | 8 | 6 |

2008 Mathematics Standard Alignment is **Strand 4 – Concept 1 – Performance Objective 8**