

Arizona's Instrument to Measure Standards (AIMS HS)

Mathematics

Released Items

November 15, 2008

AIMS Mathematics Released Items for 2008

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 2003, 2004, and 2005 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-two items from the 2002 through 2007 AIMS administrations, followed by the individual items and their statistics.

The statistical information includes:

- 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; and
- 5) performance objective as the item aligns to the 2003 standards.

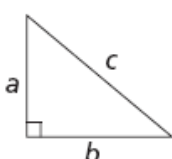
The items are reproductions of the actual items as they appeared on the AIMS tests. If you have any questions, please contact Frank Brashear, Director of Test & Item Development, at (602) 542-5031.

MATHEMATICS

AIMS Reference Sheet

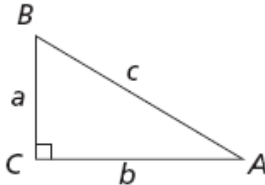
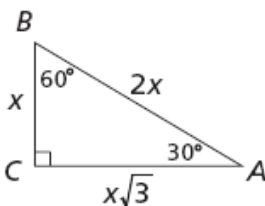
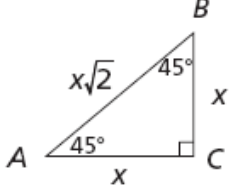
Formulas for Area		Key	
Triangle	$A = \frac{1}{2}bh$	b = base	d = diameter
Rectangle	$A = lw$	h = height	r = radius
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	l = length	ℓ = slant height
Parallelogram	$A = bh$	w = width	B = area of base
Circle	$A = \pi r^2$	P = perimeter of base	
Use 3.14 or $\frac{22}{7}$ for π .			

Formulas for Volume and Area of Solids		
Solid	Volume	Total Surface Area
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	$T = \frac{1}{2}(2\pi r)\ell + \pi r^2 = \pi r\ell + \pi r^2$
Pyramid	$V = \frac{1}{3}Bh$	$T = B + \frac{1}{2}P\ell$
Sphere	$V = \frac{4}{3}\pi r^3$	$T = 4\pi r^2$
Right Circular Cylinder	$V = \pi r^2 h$	$T = 2\pi r h + 2\pi r^2$
Right Prism	$V = Bh$	$T = 2B + Ph$

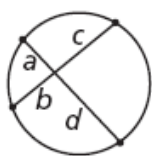
Linear Equation Forms	Coordinate Geometry
<p><u>Point-Slope Form:</u></p> $y - y_1 = m(x - x_1)$ <p><u>Standard or General Form:</u></p> $Ax + By = C$ <p><u>Slope-Intercept Form:</u></p> $y = mx + b$	<p style="text-align: center;">Given: Points $A(x_1, y_1), B(x_2, y_2)$</p> <p><u>Distance between two points:</u></p> $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ <p><u>Midpoint between two points:</u></p> <p style="text-align: center;">Midpoint of $\overline{AB} = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$</p> <p><u>Slope of line through two points:</u></p> $m = \frac{y_2 - y_1}{x_2 - x_1}$
Pythagorean Theorem	Quadratic Formula
<div style="display: flex; align-items: center;">  $c^2 = a^2 + b^2$ </div>	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

AIMS Reference Sheet

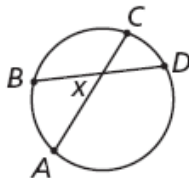
Sum of the measures of the interior angles of a convex polygon with n sides: $S = (n - 2)(180^\circ)$	Distance, rate, time formula, where $d =$ distance, $r =$ rate, $t =$ time: $d = rt$
Permutations of n objects taken r at a time: ${}_n P_r = \frac{n!}{(n-r)!}$	Combinations of n objects taken r at a time: ${}_n C_r = \frac{n!}{(n-r)! \cdot r!}$

Right-Triangle Relationships		
Trigonometric Ratios	30°–60°–90° Triangle Relationships	45°–45°–90° Triangle Relationships
 $\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$		

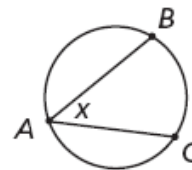
Additional Formulas	
Circumference = $\pi d = 2\pi r$	Use 3.14 or $\frac{22}{7}$ for π .
<u>Area of a sector:</u> $A = \pi r^2 \left(\frac{\text{degrees in corresponding arc}}{360^\circ} \right)$	<u>Length of a circular arc:</u> Length of $\widehat{AB} = 2\pi r \frac{m\widehat{AB}}{360^\circ}$



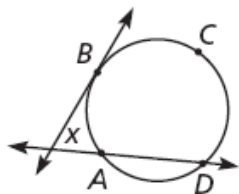
$$\frac{a}{b} = \frac{c}{d}$$



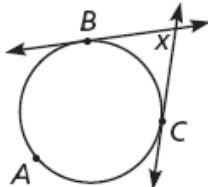
$$m\angle x = \frac{1}{2}(m\widehat{AB} + m\widehat{CD})$$



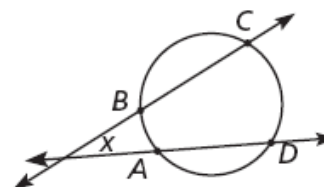
$$m\angle x = \frac{1}{2} m\widehat{BC}$$



$$m\angle x = \frac{1}{2}(m\widehat{BCD} - m\widehat{AB})$$



$$m\angle x = \frac{1}{2}(m\widehat{BAC} - m\widehat{BC})$$



$$m\angle x = \frac{1}{2}(m\widehat{CD} - m\widehat{AB})$$

Mathematics

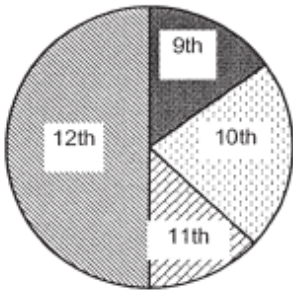
DIRECTIONS: Read each question and choose the best answer.

- 1 The table below shows information about the members of a concert choir at a high school.

Grade	Number of Members
9 th	6
10 th	12
11 th	15
12 th	27

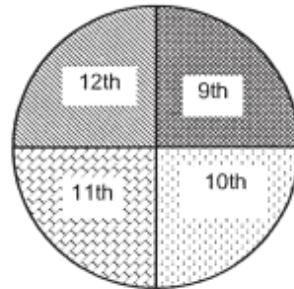
Which of the following graphs best describes the choir's membership data?

Number of Members



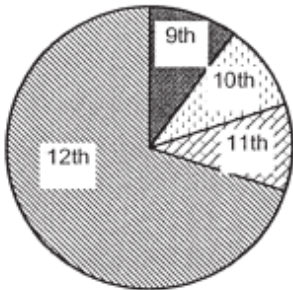
A

Number of Members



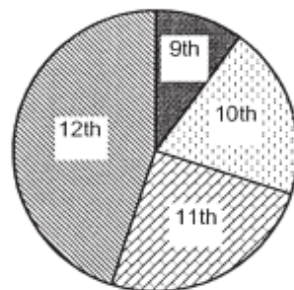
C

Number of Members



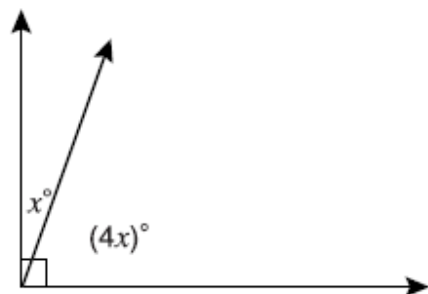
B

Number of Members



D

- 2 What is the value of x in the figure below?



- A $x = 18$
 B $x = 22$
 C $x = 30$
 D $x = 45$
- 3 The number cube shown is numbered 1 through 6 on its faces.



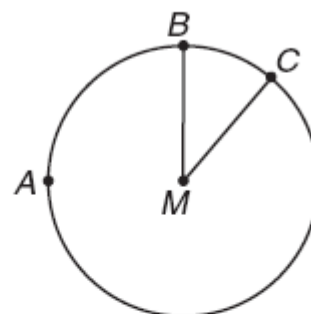
When the cube is tossed once, what is the probability a number divisible by three will be on the top face?

- A $\frac{1}{3}$
 B $\frac{1}{6}$
 C $\frac{1}{2}$
 D 1

- 4 Let n be any even integer. Which of the following is always true about $(n + 5)$?

- A $(n + 5)$ is an odd integer.
 B $(n + 5)$ is an even integer.
 C $(n + 5)$ is a prime integer.
 D $(n + 5)$ is the same as $(n - 5)$.

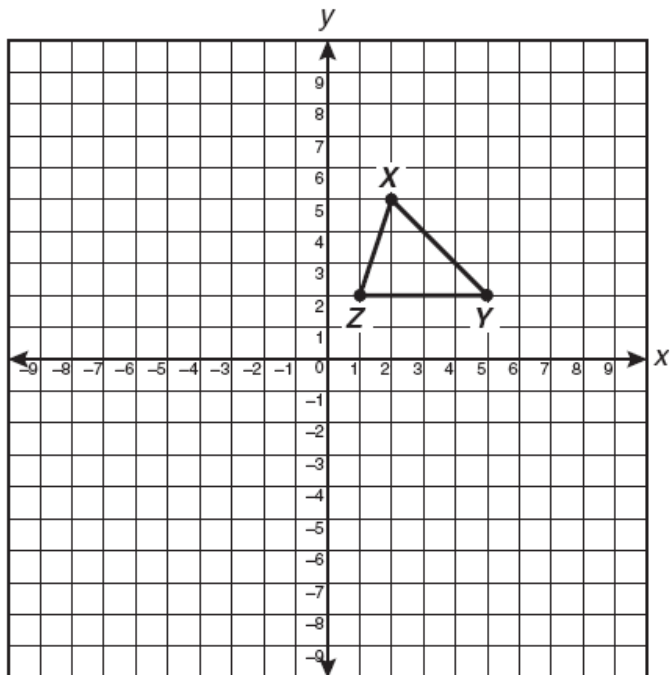
- 5 Points A , B , and C lie on circle M , as shown below.



What is the measure of $\angle BMC$ if the measure of arc BAC is 320° ?

- A 40°
 B 80°
 C 160°
 D 320°

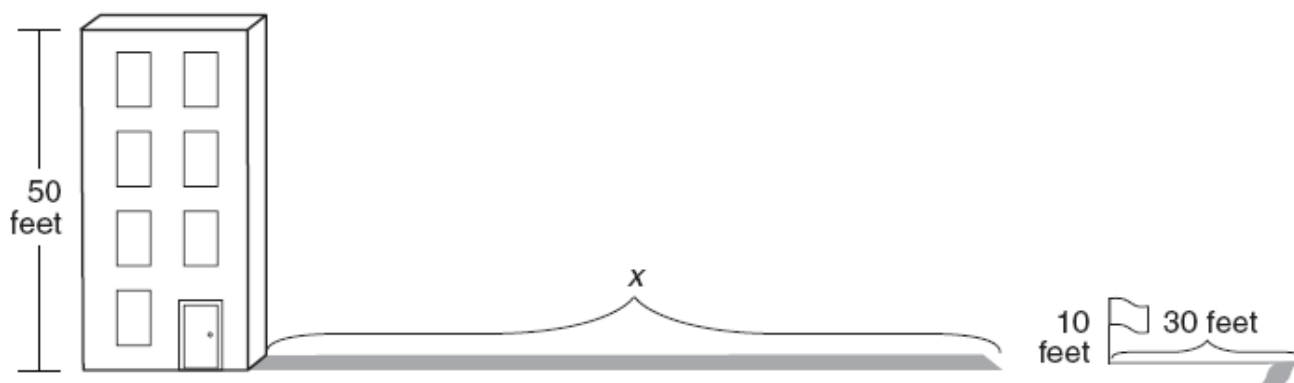
- 6** $\triangle XYZ$ is translated 3 units to the right and 2 units down.



What will be the apparent coordinates of the image of point X ?

- A** $(0, 8)$
 - B** $(3, 5)$
 - C** $(5, 3)$
 - D** $(8, 0)$
- 7** Which of the following are inverse operations?
- A** multiplication and addition
 - B** square root and division
 - C** subtraction and taking square root
 - D** addition and subtraction

- 8** The diagram below shows a building, a nearby flagpole, and their shadows.



Based on the information in the diagram, what is x , the length of the shadow of the building?

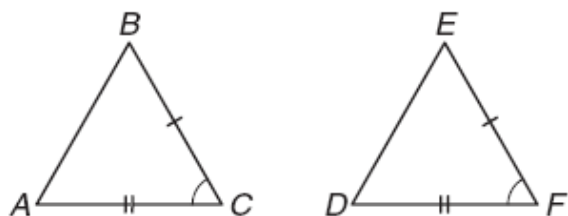
- A** 50 feet
 - B** 150 feet
 - C** 300 feet
 - D** 1500 feet
- 9** In the pattern below, each term is found by doubling the immediately preceding term and adding 1.

3, 7, 15, 31, 63, . . .

What is the 7th term in the pattern?

- A** 127
- B** 128
- C** 255
- D** 258

- 10** Based on the diagram below, which of these arguments is valid?



- A** The triangles are congruent by side-side-side (SSS).
- B** The triangles are congruent by side-angle-side (SAS).
- C** The triangles are congruent by angle-side-angle (ASA).
- D** The triangles are congruent by angle-angle-side (AAS).

- 11** Which statement is true?

- A** $7 < \sqrt{65} < 8$
- B** $4 < \sqrt{13} < 5$
- C** $6 < \sqrt{33} < 7$
- D** $9 < \sqrt{91} < 10$

- 12** Which expression below has been simplified using the correct procedure?

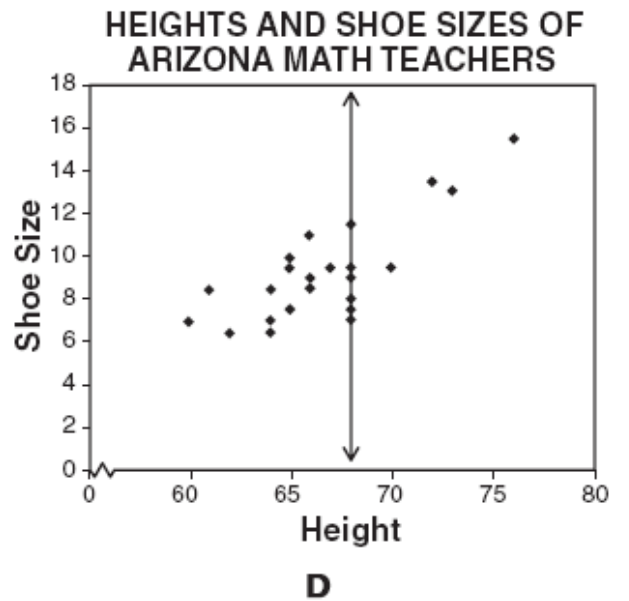
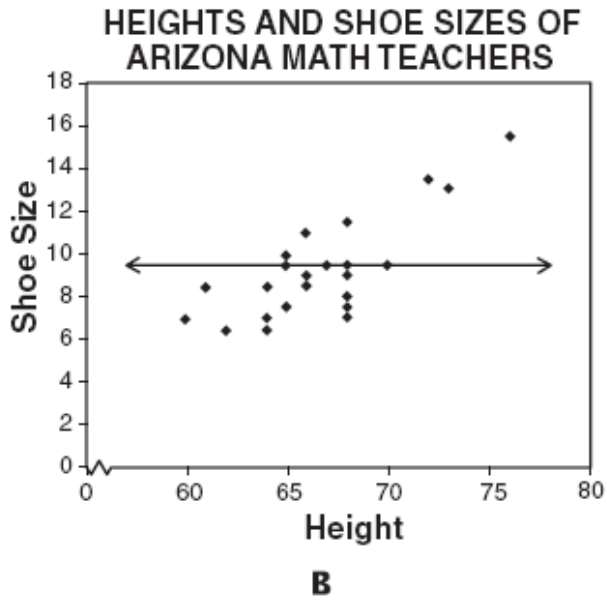
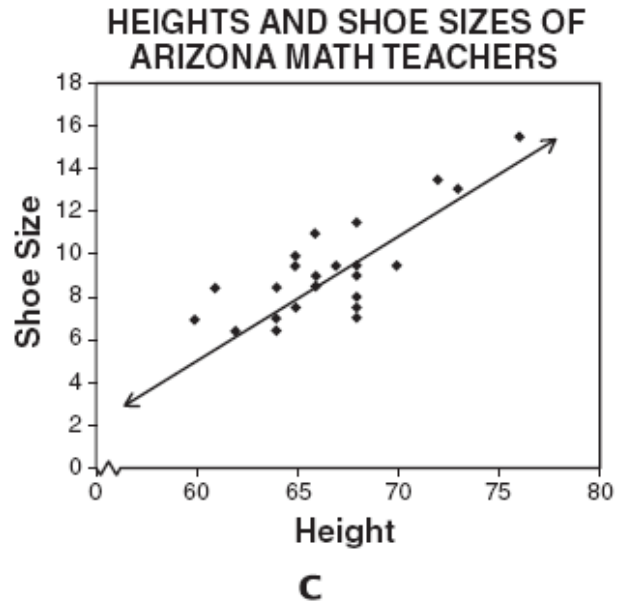
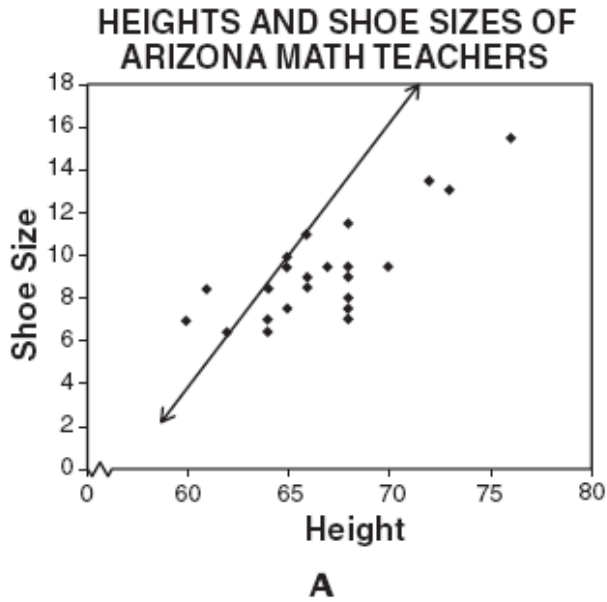
- A** $2 + 4(x + 2)$
 $2 + 4x + 8$
 $4x + 10$
- B** $2 + 5(x - 7)$
 $7(x - 7)$
 $7x - 49$
- C** $4 - 7(x + 5)$
 $4 - 7x + 5$
 $-7x + 9$
- D** $7 - 3(x - 5)$
 $7 - 3x - 15$
 $-3x - 8$

- 13** Which procedure correctly simplifies the expression below?

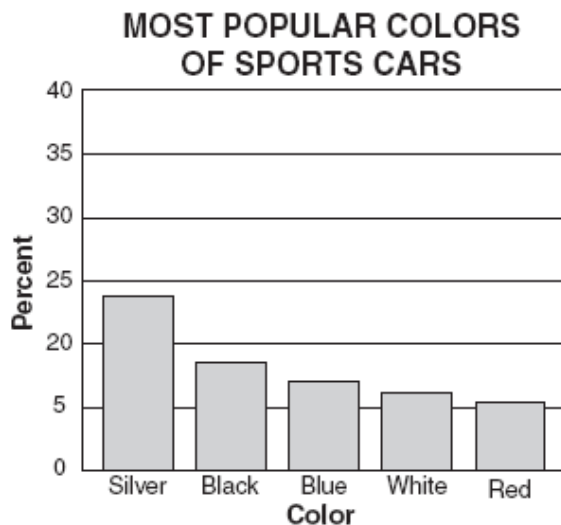
$$-(x + 3) - 2(4x - 3)$$

- A** $-x - 3 - 8x + 6$
 $-9x + 3$
- B** $-x - 3 - 8x - 6$
 $-9x - 9$
- C** $-x + 3 - 8x + 6$
 $-9x + 9$
- D** $-x - 3 - 8x - 3$
 $-9x - 6$

14 Which of the graphs below contains a line of best fit that best represents the data?



- 15** The table below shows the percentage of the most popular colors of sports cars made during 2002.



Which component causes the data to seem distorted?

- A** horizontal scale
 - B** vertical scale
 - C** bar width
 - D** color
- 16** Sam began a pattern with 4 and 7. He added them to get 11, the third term. To get each term after the third, he added the two preceding terms.

4, 7, 11, 18, 29, . . .

What is the 9th number in this sequence?

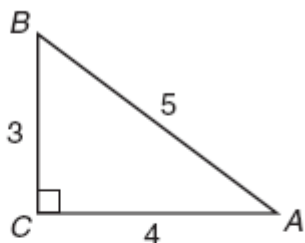
- A** 47
- B** 123
- C** 199
- D** 322

- 17** The set of real numbers shown below is a subset of which of the following?

$$\left\{ \frac{2}{3}, 3, -\frac{2}{5}, 0.57 \right\}$$

- A** rationals
- B** irrationals
- C** integers
- D** whole numbers

- 18** Triangle ABC is shown below.



What is the cosine of angle B ?

- A** $\frac{3}{5}$
- B** $\frac{4}{5}$
- C** $\frac{5}{4}$
- D** $\frac{5}{3}$

- 19** A 4th degree polynomial expression has the form below.

$$a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$$

In the polynomial expression $5x^4 - 7x^3 - 3x^2 + 8x - 4$, what is the value of a_3 ?

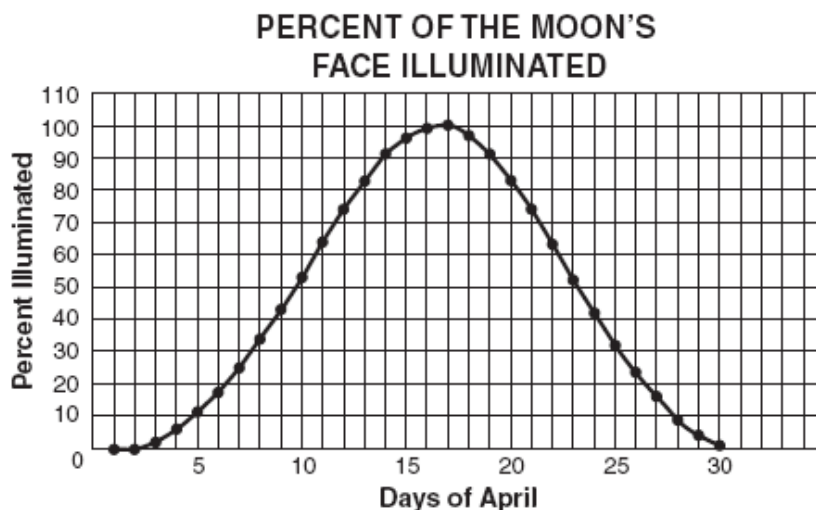
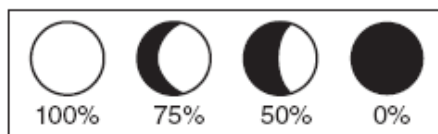
- A** -7
- B** -3
- C** 5
- D** 8

- 20** The formula for the surface area of a cube is $A = 6s^2$.

What is the formula for s in terms of A ?

- A** $s = \sqrt{\frac{A}{6}}$
- B** $s = \sqrt{6A}$
- C** $s = \sqrt{A - 6}$
- D** $s = 6A$

21 The graph below shows the percent of the moon's face illuminated for the month of April.



On what day in April did the moon reach its maximum illumination?

- A** 100 **B** 30 **C** 17 **D** 15

22 Which is a correct procedure for solving the linear inequality below?

$$2y + 8 > 4 - 6y$$

A

$$\begin{aligned} 2y + 8 &> 4 - 6y \\ -4y + 8 &> 4 \\ -4y &> -4 \\ y &> 1 \end{aligned}$$

C

$$\begin{aligned} 2y + 8 &> 4 - 6y \\ -4y + 8 &> 4 \\ -4y &> -4 \\ y &< 1 \end{aligned}$$

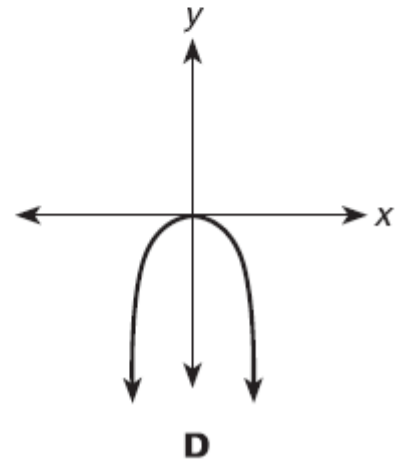
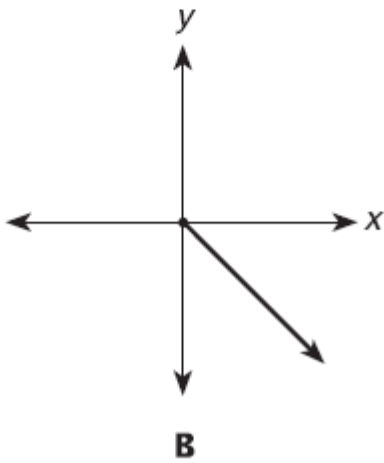
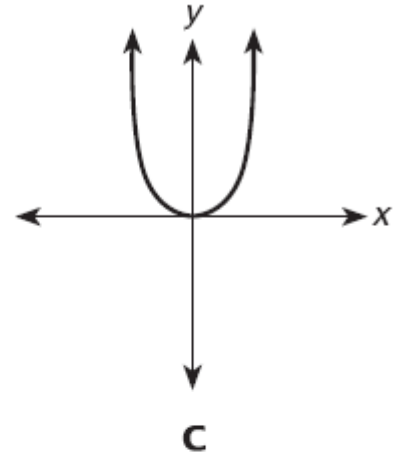
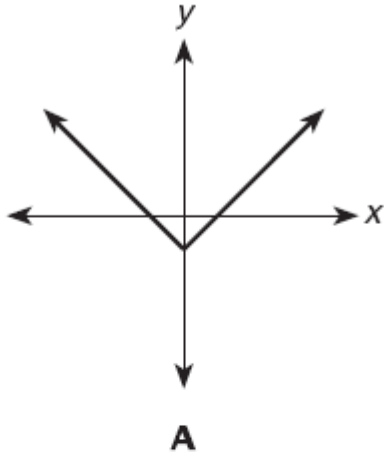
B

$$\begin{aligned} 2y + 8 &> 4 - 6y \\ 8y + 8 &> 4 \\ 8y &> -4 \\ y &> -\frac{1}{2} \end{aligned}$$

D

$$\begin{aligned} 2y + 8 &> 4 - 6y \\ 8y + 8 &> 4 \\ 8y &> -4 \\ y &< -\frac{1}{2} \end{aligned}$$

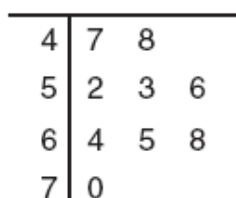
23 Which of the following functions of x has the apparent range of $\{y: y \geq 0\}$?



- 24** The Palmdale High School varsity basketball team's total points per game for this year's season are shown below.

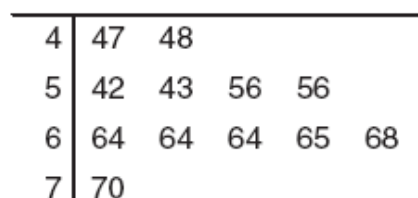
Game Number	1	2	3	4	5	6	7	8	9	10	11	12
Number of Points	48	53	52	64	56	47	56	64	70	65	64	68

Which stem-and-leaf plot could be used to correctly display the data?



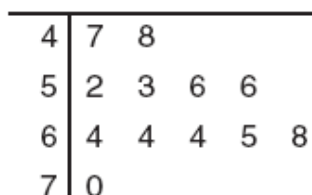
4|7 represents 47

A



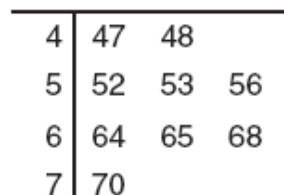
4|47 represents 47

C



4|7 represents 47

B



4|47 represents 47

D

- 25** If $b \neq 0$, which equation is equivalent to the one shown?

$$ax + by = c$$

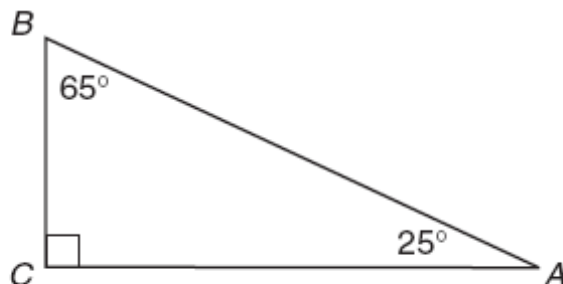
A $y = \frac{c}{b} - abx$

C $y = \frac{c}{b} - \frac{ax}{b}$

B $y = \frac{c}{b} + abx$

D $y = \frac{c}{b} + \frac{ax}{b}$

- 26** If the sum of the measures of two angles is 90° , then the angles are complementary. In triangle ABC , $m\angle A = 25^\circ$, $m\angle B = 65^\circ$, $m\angle C = 90^\circ$.



Which valid conclusion follows directly from the previous statements?

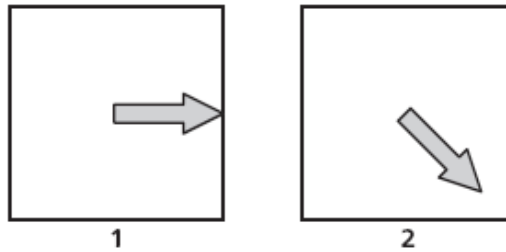
- A** $\angle C$ is a complementary angle.
B $\angle B$ and $\angle C$ are complementary angles.
C $\angle A$ and $\angle C$ are complementary angles.
D $\angle A$ and $\angle B$ are complementary angles.

- 27** What is the solution to the inequality below?

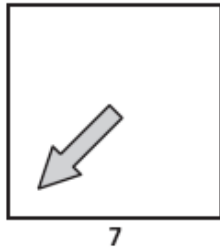
$$-3x - 1 \leq 5$$

- A** $x \leq -2$
B $x \geq -2$
C $x \leq -\frac{4}{3}$
D $x \geq -\frac{4}{3}$

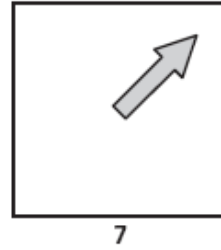
- 28** The first two terms in a sequence are shown below. Each term after the first is found by rotating the arrow 45° clockwise.



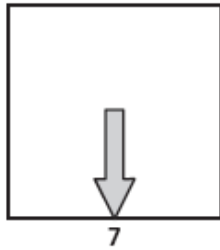
What will be the 7th term in the sequence?



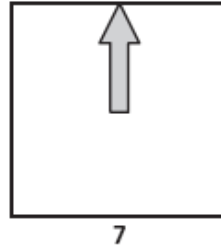
A



C



B



D

- 29** In a cafeteria survey, 300 students chose one favorite lunch from 4 choices. The probability that a randomly selected student chose pizza was 0.25. Which data set supports this conclusion?

A

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	100	25	75	100

B

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	75	30	100	95

C

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	60	75	60	105

D

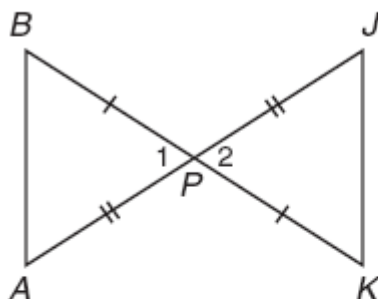
Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	50	120	60	70

- 30** Which rule could be used to find each term, after the second, in the recursive sequence shown below?

2, 3, 6, 18, 108, ...

- A** Multiply the two immediately preceding terms.
- B** Multiply the immediately preceding term by 2.
- C** Add the two immediately preceding terms then add 1.
- D** Square the immediately preceding term and subtract 3.

- 31** In the diagram below $\overline{BP} \cong \overline{PK}$ and $\overline{AP} \cong \overline{PJ}$.



What additional information is sufficient to prove $\triangle APB \cong \triangle JPK$ by side-angle-side (SAS)?

- A** $\angle A \cong \angle K$
 - B** $\angle B \cong \angle J$
 - C** $\angle 1 \cong \angle K$
 - D** $\angle 1 \cong \angle 2$
- 32** A pattern is defined by the following rules.
- The first term is 4.
 - The second term is 7.
 - Each term after the second is found by adding 3 to the immediately preceding term.


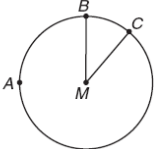
What is the fifth term in this pattern?

- A** 10
- B** 13
- C** 16
- D** 19



Item	Item Data																	
1	Item Number	2019571	Correct Answer	D	P-Value	0.87	Equated Rasch Value	-1.2291										
	2003 Mathematics Standard Alignment is Strand 2 – Concept 1 – Performance Objective 4																	
<p>1 The table below shows information about the members of a concert choir at a high school.</p>																		
<table border="1"> <thead> <tr> <th>Grade</th> <th>Number of Members</th> </tr> </thead> <tbody> <tr> <td>9th</td> <td>6</td> </tr> <tr> <td>10th</td> <td>12</td> </tr> <tr> <td>11th</td> <td>15</td> </tr> <tr> <td>12th</td> <td>27</td> </tr> </tbody> </table>									Grade	Number of Members	9 th	6	10 th	12	11 th	15	12 th	27
Grade	Number of Members																	
9 th	6																	
10 th	12																	
11 th	15																	
12 th	27																	
<p>Which of the following graphs best describes the choir's membership data?</p>																		
<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 10px;"> <p>Number of Members</p> <p>A</p> </div> <div style="text-align: center; margin: 10px;"> <p>Number of Members</p> <p>B</p> </div> <div style="text-align: center; margin: 10px;"> <p>Number of Members</p> <p>C</p> </div> <div style="text-align: center; margin: 10px;"> <p>Number of Members</p> <p>D</p> </div> </div>																		
2	Item Number	2019618	Correct Answer	A	P-Value	0.63	Equated Rasch Value	0.1498										
	2003 Mathematics Standard Alignment is Strand 4 – Concept 1 – Performance Objective 6																	
<p>2 What is the value of x in the figure below?</p>																		
<p>A $x = 18$ B $x = 22$ C $x = 30$ D $x = 45$</p>																		

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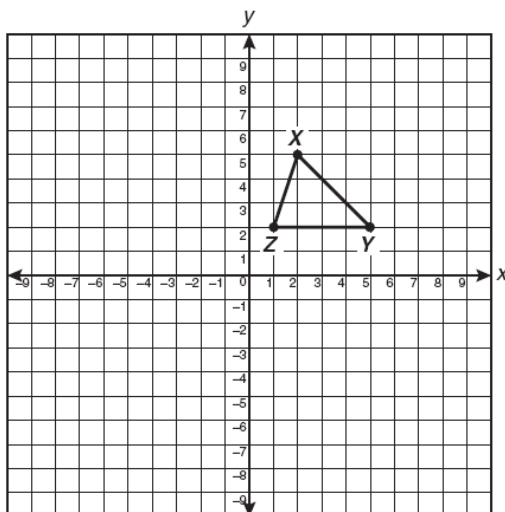
3	Item Number	3015190	Correct Answer	A	P-Value	0.53	Equated Rasch Value	0.6291		
	2003 Mathematics Standard Alignment is Strand 2 – Concept 2 – Performance Objective 1									
<p>3 The number cube shown is numbered 1 through 6 on its faces.</p>  <p>When the cube is tossed once, what is the probability a number divisible by three will be on the top face?</p> <p>A $\frac{1}{3}$</p> <p>B $\frac{1}{6}$</p> <p>C $\frac{1}{2}$</p> <p>D 1</p>										
4	Item Number	3140834	Correct Answer	A	P-Value	0.50	Equated Rasch Value	0.7376		
	2003 Mathematics Standard Alignment is Strand 5 – Concept 2 – Performance Objective 5									
<p>4 Let n be any even integer. Which of the following is always true about $(n + 5)$?</p> <p>A $(n + 5)$ is an odd integer.</p> <p>B $(n + 5)$ is an even integer.</p> <p>C $(n + 5)$ is a prime integer.</p> <p>D $(n + 5)$ is the same as $(n - 5)$.</p>										
5	Item Number	3261727	Correct Answer	A	P-Value	0.75	Equated Rasch Value	-0.2241		
	2003 Mathematics Standard Alignment is Strand 4 – Concept 1 – Performance Objective 7									
<p>5 Points A, B, and C lie on circle M, as shown below.</p>  <p>What is the measure of $\angle BMC$ if the measure of arc BAC is 320°?</p> <p>A 40°</p> <p>B 80°</p> <p>C 160°</p> <p>D 320°</p>										

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6

Item Number	3140770	Correct Answer	C	P-Value	0.72	Equated Rasch Value	-0.1083
2003 Mathematics Standard Alignment is Strand 4 – Concept 2 – Performance Objective 3							

6 $\triangle XYZ$ is translated 3 units to the right and 2 units down.



What will be the apparent coordinates of the image of point X?

- A (0, 8)
- B (3, 5)
- C (5, 3)
- D (8, 0)

7

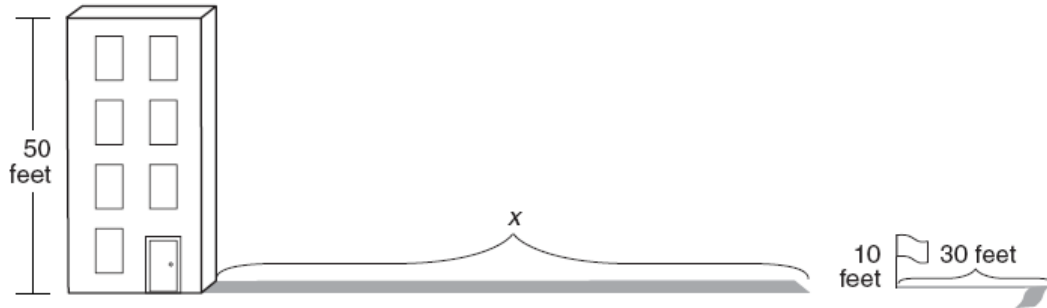
Item Number	3261832	Correct Answer	D	P-Value	0.63	Equated Rasch Value	0.3083
2003 Mathematics Standard Alignment is Strand 1 – Concept 2 – Performance Objective 5							

7 Which of the following are inverse operations?

- A multiplication and addition
- B square root and division
- C subtraction and taking square root
- D addition and subtraction

8	Item Number	3015111	Correct Answer	B	P-Value	0.83	Equated Rasch Value	-1.2584		
	2003 Mathematics Standard Alignment is Strand 4 – Concept 4 – Performance Objective 9									

8 The diagram below shows a building, a nearby flagpole, and their shadows.



Based on the information in the diagram, what is x , the length of the shadow of the building?

- A** 50 feet
- B** 150 feet
- C** 300 feet
- D** 1500 feet

9	Item Number	3261924	Correct Answer	C	P-Value	0.73	Equated Rasch Value	-0.2760		
	2003 Mathematics Standard Alignment is Strand 3 – Concept 1 – Performance Objective 2									

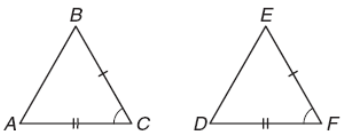
9 In the pattern below, each term is found by doubling the immediately preceding term and adding 1.

3, 7, 15, 31, 63, . . .

What is the 7th term in the pattern?

- A** 127
- B** 128
- C** 255
- D** 258

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10	Item Number	3261806	Correct Answer	B	P-Value	0.77	Equated Rasch Value	-0.4560		
	2003 Mathematics Standard Alignment is Strand 5 – Concept 2 – Performance Objective 8									
<p>10 Based on the diagram below, which of these arguments is valid?</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <p>A The triangles are congruent by side-side-side (SSS).</p> <p>B The triangles are congruent by side-angle-side (SAS).</p> <p>C The triangles are congruent by angle-side-angle (ASA).</p> <p>D The triangles are congruent by angle-angle-side (AAS).</p>										
11	Item Number	3261922	Correct Answer	D	P-Value	0.53	Equated Rasch Value	0.9453		
	2003 Mathematics Standard Alignment is Strand 1 – Concept 3 – Performance Objective 3									
<p>11 Which statement is true?</p> <p>A $7 < \sqrt{65} < 8$</p> <p>B $4 < \sqrt{13} < 5$</p> <p>C $6 < \sqrt{33} < 7$</p> <p>D $9 < \sqrt{91} < 10$</p>										
12	Item Number	3261895	Correct Answer	A	P-Value	0.71	Equated Rasch Value	-0.0483		
	2003 Mathematics Standard Alignment is Strand 5 – Concept 1 – Performance Objective 1									
<p>12 Which expression below has been simplified using the correct procedure?</p> <p>A $2 + 4(x + 2)$ $2 + 4x + 8$ $4x + 10$</p> <p>B $2 + 5(x - 7)$ $7(x - 7)$ $7x - 49$</p> <p>C $4 - 7(x + 5)$ $4 - 7x + 5$ $-7x + 9$</p> <p>D $7 - 3(x - 5)$ $7 - 3x - 15$ $-3x - 8$</p>										

13	Item Number	3261794	Correct Answer	A	P-Value	0.56	Equated Rasch Value	0.6714		
	2003 Mathematics Standard Alignment is Strand 5 – Concept 1 – Performance Objective 1									

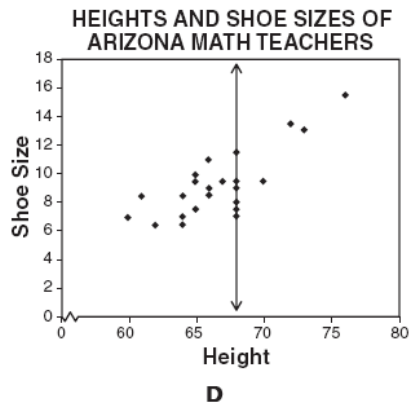
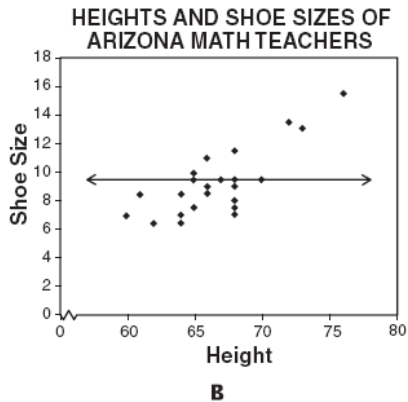
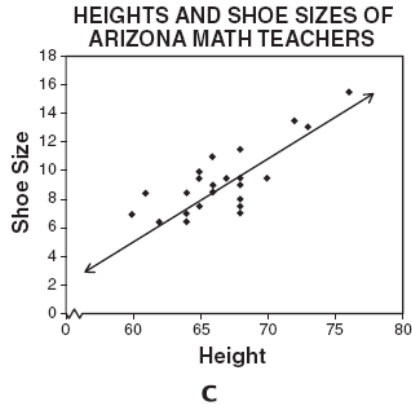
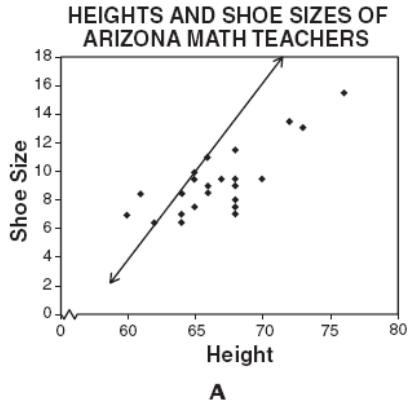
13 Which procedure correctly simplifies the expression below?

$$-(x + 3) - 2(4x - 3)$$

- A** $-x - 3 - 8x + 6$
 $-9x + 3$
- B** $-x - 3 - 8x - 6$
 $-9x - 9$
- C** $-x + 3 - 8x + 6$
 $-9x + 9$
- D** $-x - 3 - 8x - 3$
 $-9x - 6$

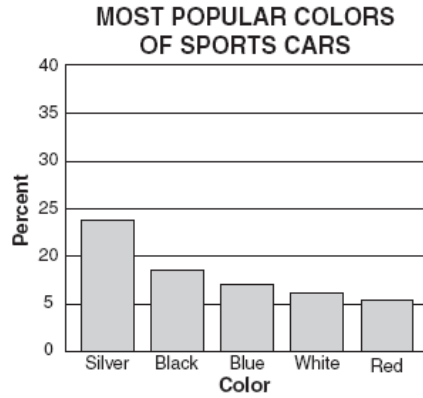
14	Item Number	3015153	Correct Answer	C	P-Value	0.81	Equated Rasch Value	-0.7072		
	2003 Mathematics Standard Alignment is Strand 2 – Concept 1 – Performance Objective 13									

14 Which of the graphs below contains a line of best fit that best represents the data?



15	Item Number	3140645	Correct Answer	B	P-Value	0.44	Equated Rasch Value	1.3966
	2003 Mathematics Standard Alignment is Strand 2 – Concept 1 – Performance Objective 5							

15 The table below shows the percentage of the most popular colors of sports cars made during 2002.



Which component causes the data to seem distorted?

- A** horizontal scale
- B** vertical scale
- C** bar width
- D** color

16	Item Number	3140912	Correct Answer	C	P-Value	0.64	Equated Rasch Value	0.0609
	2003 Mathematics Standard Alignment is Strand 3 – Concept 1 – Performance Objective 2							

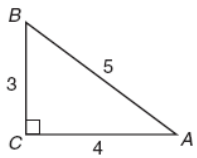
16 Sam began a pattern with 4 and 7. He added them to get 11, the third term. To get each term after the third, he added the two preceding terms.

4, 7, 11, 18, 29, . . .

What is the 9th number in this sequence?

- A** 47
- B** 123
- C** 199
- D** 322

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17	Item Number	3140723	Correct Answer	A	P-Value	0.35	Equated Rasch Value	1.8708		
	2003 Mathematics Standard Alignment is Strand 1 – Concept 1 – Performance Objective 1									
<p>17 The set of real numbers shown below is a subset of which of the following?</p> $\left\{\frac{2}{3}, 3, -\frac{2}{5}, 0.57\right\}$ <p> A rationals B irrationals C integers D whole numbers </p>										
18	Item Number	3267497	Correct Answer	A	P-Value	0.52	Equated Rasch Value	0.8824		
	2003 Mathematics Standard Alignment is Strand 3 – Concept 3 – Performance Objective 18									
<p>18 Triangle ABC is shown below.</p>  <p>What is the cosine of angle B?</p> <p> A $\frac{3}{5}$ B $\frac{4}{5}$ C $\frac{5}{4}$ D $\frac{5}{3}$ </p>										
19	Item Number	3261715	Correct Answer	A	P-Value	0.67	Equated Rasch Value	0.0678		
	2003 Mathematics Standard Alignment is Strand 1 – Concept 2 – Performance Objective 4									
<p>19 A 4th degree polynomial expression has the form below.</p> $a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$ <p>In the polynomial expression $5x^4 - 7x^3 - 3x^2 + 8x - 4$, what is the value of a_3?</p> <p> A -7 C 5 B -3 D 8 </p>										

20

Item Number	3267445	Correct Answer	A	P-Value	0.50	Equated Rasch Value	0.9845
2003 Mathematics Standard Alignment is Strand 3 – Concept 4 – Performance Objective 2							

20 The formula for the surface area of a cube is $A = 6s^2$.

What is the formula for s in terms of A ?

- A** $s = \sqrt{\frac{A}{6}}$
- B** $s = \sqrt{6A}$
- C** $s = \sqrt{A - 6}$
- D** $s = 6A$

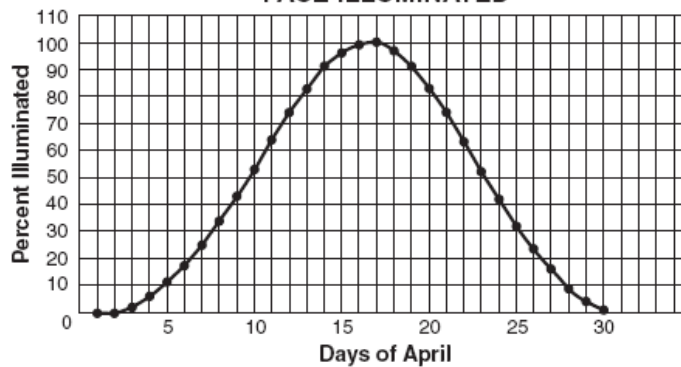
21

Item Number	3140802	Correct Answer	C	P-Value	0.88	Equated Rasch Value	-1.3252
2003 Mathematics Standard Alignment is Strand 3 – Concept 2 – Performance Objective 6							

21 The graph below shows the percent of the moon's face illuminated for the month of April.



PERCENT OF THE MOON'S FACE ILLUMINATED



On what day in April did the moon reach its maximum illumination?

- A** 100
- B** 30
- C** 17
- D** 15

22	Item Number	3261799	Correct Answer	B	P-Value	0.48	Equated Rasch Value	1.0945
	2003 Mathematics Standard Alignment is Strand 5 – Concept 1 – Performance Objective 3							

22 Which is a correct procedure for solving the linear inequality below?

$$2y + 8 > 4 - 6y$$

A $2y + 8 > 4 - 6y$
 $-4y + 8 > 4$
 $-4y > -4$
 $y > 1$

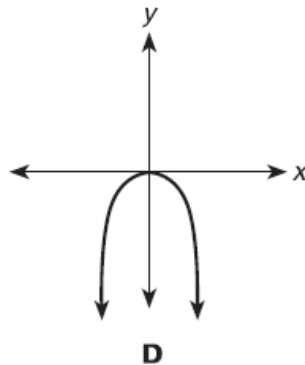
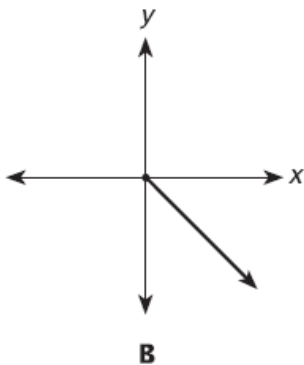
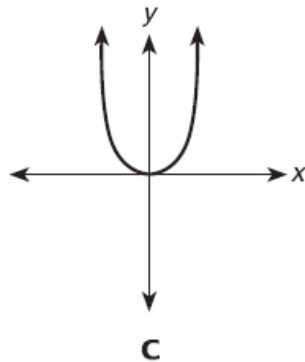
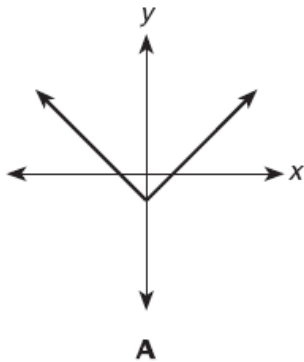
C $2y + 8 > 4 - 6y$
 $-4y + 8 > 4$
 $-4y > -4$
 $y < 1$

B $2y + 8 > 4 - 6y$
 $8y + 8 > 4$
 $8y > -4$
 $y > -\frac{1}{2}$

D $2y + 8 > 4 - 6y$
 $8y + 8 > 4$
 $8y > -4$
 $y < -\frac{1}{2}$

23	Item Number	3140850	Correct Answer	C	P-Value	0.64	Equated Rasch Value	0.1418
	2003 Mathematics Standard Alignment is Strand 3 – Concept 2 – Performance Objective 5							

23 Which of the following functions of x has the apparent range of $\{y: y \geq 0\}$?



24

Item Number	3261180	Correct Answer	B	P-Value	0.74	Equated Rasch Value	-0.3503
2003 Mathematics Standard Alignment is Strand 2 – Concept 1 – Performance Objective 4							

24 The Palmdale High School varsity basketball team’s total points per game for this year’s season are shown below.

Game Number	1	2	3	4	5	6	7	8	9	10	11	12
Number of Points	48	53	52	64	56	47	56	64	70	65	64	68

Which stem-and-leaf plot could be used to correctly display the data?

4	7 8
5	2 3 6
6	4 5 8
7	0

4|7 represents 47

A

4	47 48
5	42 43 56 56
6	64 64 64 65 68
7	70

4|47 represents 47

C

4	7 8
5	2 3 6 6
6	4 4 4 5 8
7	0

4|7 represents 47

B

4	47 48
5	52 53 56
6	64 65 68
7	70

4|47 represents 47

D

25

Item Number	3267446	Correct Answer	C	P-Value	0.51	Equated Rasch Value	1.0442
2003 Mathematics Standard Alignment is Strand 3 – Concept 4 – Performance Objective 2							

25 If $b \neq 0$, which equation is equivalent to the one shown?

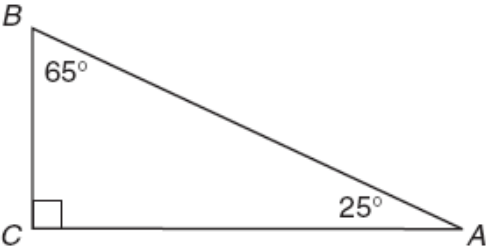
$$ax + by = c$$

A $y = \frac{c}{b} - abx$

C $y = \frac{c}{b} - \frac{ax}{b}$

B $y = \frac{c}{b} + abx$

D $y = \frac{c}{b} + \frac{ax}{b}$

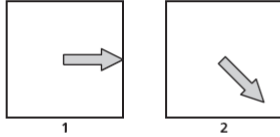
26	Item Number	3261687	Correct Answer	D	P-Value	0.59	Equated Rasch Value	0.5271		
	2003 Mathematics Standard Alignment is Strand 5 – Concept 2 – Performance Objective 1									
<p>26 If the sum of the measures of two angles is 90°, then the angles are complementary. In triangle ABC, $m\angle A = 25^\circ$, $m\angle B = 65^\circ$, $m\angle C = 90^\circ$.</p>										
										
<p>Which valid conclusion follows directly from the previous statements?</p>										
<p>A $\angle C$ is a complementary angle.</p> <p>B $\angle B$ and $\angle C$ are complementary angles.</p> <p>C $\angle A$ and $\angle C$ are complementary angles.</p> <p>D $\angle A$ and $\angle B$ are complementary angles.</p>										
27	Item Number	3267469	Correct Answer	B	P-Value	0.57	Equated Rasch Value	0.6217		
	2003 Mathematics Standard Alignment is Strand 3 – Concept 3 – Performance Objective 9									
<p>27 What is the solution to the inequality below?</p> $-3x - 1 \leq 5$										
<p>A $x \leq -2$</p> <p>B $x \geq -2$</p> <p>C $x \leq -\frac{4}{3}$</p> <p>D $x \geq -\frac{4}{3}$</p>										

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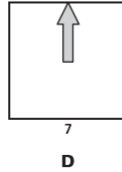
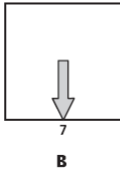
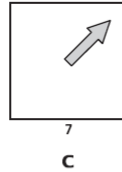
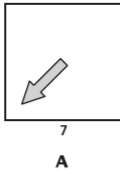
28

Item Number	3261184	Correct Answer	D	P-Value	0.59	Equated Rasch Value	0.6108
2003 Mathematics Standard Alignment is Strand 3 – Concept 1 – Performance Objective 2							

28 The first two terms in a sequence are shown below. Each term after the first is found by rotating the arrow 45° clockwise.



What will be the 7th term in the sequence?



29

Item Number	3261187	Correct Answer	C	P-Value	0.40	Equated Rasch Value	1.5056
2003 Mathematics Standard Alignment is Strand 2 – Concept 2 – Performance Objective 5							

29 In a cafeteria survey, 300 students chose one favorite lunch from 4 choices. The probability that a randomly selected student chose pizza was 0.25. Which data set supports this conclusion?

A

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	100	25	75	100

B

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	75	30	100	95

C

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	60	75	60	105

D

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	50	120	60	70

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30	Item Number	3267514	Correct Answer	A	P-Value	0.71	Equated Rasch Value	-0.0470		
	2003 Mathematics Standard Alignment is Strand 3 – Concept 1 – Performance Objective 1									
<p>30 Which rule could be used to find each term, after the second, in the recursive sequence shown below?</p> <p style="text-align: center;">2, 3, 6, 18, 108, ...</p> <p>A Multiply the two immediately preceding terms.</p> <p>B Multiply the immediately preceding term by 2.</p> <p>C Add the two immediately preceding terms then add 1.</p> <p>D Square the immediately preceding term and subtract 3.</p>										
31	Item Number	3261736	Correct Answer	D	P-Value	0.68	Equated Rasch Value	0.0148		
	2003 Mathematics Standard Alignment is Strand 4 – Concept 1 – Performance Objective 11									
<p>31 In the diagram below $\overline{BP} \cong \overline{PK}$ and $\overline{AP} \cong \overline{PJ}$.</p> <div style="text-align: center;"> </div> <p>What additional information is sufficient to prove $\triangle APB \cong \triangle JPK$ by side-angle-side (SAS)?</p> <p>A $\angle A \cong \angle K$</p> <p>B $\angle B \cong \angle J$</p> <p>C $\angle 1 \cong \angle K$</p> <p>D $\angle 1 \cong \angle 2$</p>										
32	Item Number	3267517	Correct Answer	C	P-Value	0.84	Equated Rasch Value	-1.0545		
	2003 Mathematics Standard Alignment is Strand 3 – Concept 1 – Performance Objective 2									
<p>32 A pattern is defined by the following rules.</p> <ul style="list-style-type: none"> • The first term is 4. • The second term is 7. • Each term after the second is found by adding 3 to the immediately preceding term. <p>What is the fifth term in this pattern?</p> <p>A 10</p> <p>B 13</p> <p>C 16</p> <p>D 19</p>										