The Pennsylvania System of School Assessment

Mathematics
Item and Scoring Sampler

2008–2009
Grade 6

MATHEMATICS

MULTIPLE-CHOICE ITEMS

> **During an assessment, students would not be permitted to use a calculator on items 1–3.**

A.1.1.1

1. What is 1% represented as a fraction?

   A $\dfrac{1}{1}$ *100%*

   B $\dfrac{1}{10}$ *10%*

   C $\dfrac{1}{100}$ *

   D $\dfrac{1}{1000}$ *0.1%*

A.3.1.1

2. Maria took $60.00 with her to go shopping. She spent $27.89 in one store and $11.42 in another store. She made no other purchases. Which is the **closest estimate** of the amount of money Maria had left?

   A $10   *$11.42 rounded to $20*

   B $20   *

   C $30   *$27.89 rounded to $20*

   D $40   *amount spent, rounded*

A.3.1.1

3. Varsha had $79.80. He bought the following items:

Item	Price (including tax)
lamp	$23.88
stapler	$ 8.14
3-hole punch	$ 4.59
pencil holder	$ 3.30
journal	$16.20

   Which is the **closest estimate** to the amount of money he had left over after buying the items?

   A $20.00   *rounded each to nearest 5*

   B $21.00   *rounded all numbers up*

   C $24.00   *

   D $26.00   *rounded all numbers down*

MATHEMATICS

During an assessment, students would not be permitted to use a calculator on items 4–6.

A.3.2.1

4. Solve:

$$12 \times \frac{1}{4}$$

A   3   *

B   4 | *taken from* $\frac{1}{4}$ |

C $11\frac{3}{4}$ | $12 - \frac{1}{4}$ |

D   48 | 12×4 |

A.3.2.1

5. Divide: $1.5\overline{)12.75}$

A   7.2 | *incorrect first step* |

B   8.4 | *incorrect second step* |

C   8.5   *

D   9.2 | *incorrect first step* |

A.3.2.1

6. What is $\frac{5}{7} - \frac{1}{2}$?

A $\frac{3}{14}$ *

B $\frac{2}{7}$ | $\frac{5}{14} - \frac{1}{14}$ *reduced* |

C $\frac{4}{7}$ | $\frac{15}{14} - \frac{7}{14}$ *reduced* |

D $\frac{4}{5}$ | $\frac{5-1}{7-2}$ |

MATHEMATICS

A.1.1.2

7. What decimal number is equivalent to $\frac{1}{6}$?

    A   0.16 | *digits from fraction* |

    B   0.6 | $\frac{6}{1}$; *decimal point incorrect* |

    C $0.1\overline{6}$ *

    D   0.2 | *0.16 rounded* |

A.1.1.4

8. Shawna's jump rope was $6\frac{2}{3}$ feet long. Which fraction is equivalent to this length?

    A $\frac{8}{3}$ feet | $\frac{(6+2)}{3}$ |

    B $\frac{11}{3}$ feet | $\frac{(3+6+2)}{3}$ |

    C $\frac{12}{3}$ feet | $6 \times \frac{2}{3}$ |

    D $\frac{20}{3}$ feet   *

A.1.2.1

9. The table below shows the weights of several objects.

Weights of Objects

Object	Weight (in ounces)
1	3.511
2	2.998
3	3.091
4	3.089

Which object has the **greatest** weight?

    A   object 1 *

    B   object 2

    C   object 3

    D   object 4

A.1.3.1

10. What is the greatest common factor (GCF) of 46 and 42?

    A   2   *

    B   4 | *common 1st digit* |

    C   6 | *digit in 46; factor of 42* |

    D   7 | *factor of 42* |

MATHEMATICS

A.1.3.2

11. A librarian is placing books on shelves.

- The librarian has more than 20 books.
- The librarian can put 8 books on each shelf with no books left over.
- The librarian could also put 20 books on each shelf with no books left over.

Which is the **least** number of books that the librarian could have?

A   28 books   *numbers from stem*
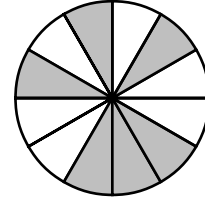
B   40 books   *

C   80 books   *multiple of 8 and 20*

D   160 books   *multiple of 8 and 20*

A.1.3.3

12. Mr. Jones is separating the school band into groups. He can put the students into either groups of 3 or groups of 10 without leaving out any students. How many students could be in the band?

A   33   *multiple of 3*

B   60   *

C   133   *numbers from stem*

D   160   *multiple of 10*

A.1.4.1

13. The circle below is divided into equal-sized sections.

What percent of the circle is shaded?

A   6%   *6 shaded sections*

B   12%   *12 sections in total*

C   50%   *

D   60%   *6 shaded sections × 10*

A.2.1.1

14. Which expression completes the equation $(19 \times 3) + (19 \times 1) = \boxed{}$?

A $19 + (3 \times 1)$ *incorrect operations*

B $19 \times (3 + 1)$ *

C $(19 + 19) \times (3 + 1)$ *used both 19s*

D $(19 + 3) \times (19 + 1)$ *incorrect operations*

MATHEMATICS

B.1.1.1

15. Jill arrived at her grandmother's house at 8:03 A.M. on May 18. Jill left her grandmother's house on May 20 at 1:00 P.M. How long was Jill at her grandmother's house?

A   5 hours   3 minutes | 8:00 to 1:00 + 3 minutes |

B   7 hours   3 minutes | 8:03 – 1 hour |

C   28 hours 57 minutes | 8:03 to 1:00 + 1 day |

D   52 hours 57 minutes *

B.1.1.1

16. Larry began exercising at 9:15 A.M. He finished exercising at 10:08 A.M. and did not take any breaks. How many minutes did Larry exercise?

A   53 minutes   *

B   57 minutes | 15 – 8 = 7;
50 + 7 = 57 |

C   67 minutes | 10 – 9 = 1; 15 – 8 = 7;
1 hr 7 min = 67 min |

D   93 minutes | 10.08 – 9.15 = 0.93 as
93 minutes |

B.2.1.1

Use the figure below to answer question 17.
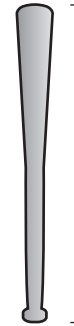
17. Using your ruler, what is the length of the toy bat?

A   40 millimeters | off by 2 mm |

B   42 millimeters   *

C   44 millimeters | off by 2 mm |

D   46 millimeters | off by 4 mm |

MATHEMATICS

B.2.1.1

18. Sue Lee looked at 4 keys on her computer keyboard.

| A | S | D | F |
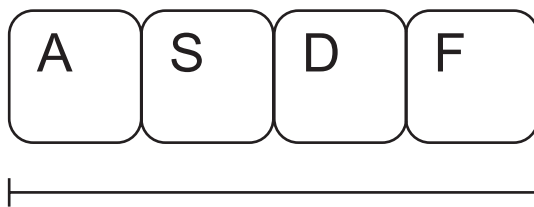
Using your ruler, what is the total length, in inches (in.), of the keys?

A $1\frac{3}{4}$ in.

B $2\frac{3}{8}$ in.

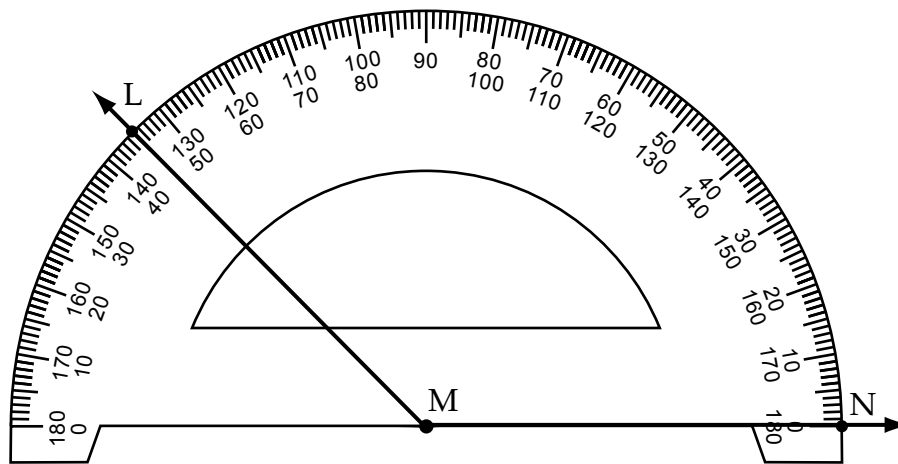C $2\frac{1}{2}$ in.

D $2\frac{3}{4}$ in. *

B.2.1.2

19. Molly bought a bunch of grapes. Which measurement of the weight of Molly's grapes is the **most** precise?

A 1,363 grams *

B 2 kilograms

C 50 ounces

D 3 pounds

MATHEMATICS

B.2.1.3

Use the protractor below to answer question 20.

20. What is the measure of ∠LMN?

A   45° | *wrong scale* |

B   55° | *wrong scale read in wrong direction* |

C   135°   *

D   145° | *scale read in wrong direction* |

B.2.2.1

21. The rectangular calendar on Ted's wall is 12 inches long and 10 inches wide. What is the perimeter of the calendar?

A   22 inches | *12 + 10* |

B   44 inches   *

C   88 inches | *22 × 4 sides* |

D   120 inches | *12 × 10* |

B.2.3.1

22. Which type of angle has the **greatest** number of degrees?

A   acute | *less than 90°* |

B   obtuse | *between 90° and 180°* |

C   right | *exactly 90°* |

D   straight   *

MATHEMATICS

C.1.1.1

23. Which shape has the **greatest** number of sides?

A   decagon   *

B   pentagon | 5 sides |

C   heptagon | 7 sides |

D   quadrilateral | 4 sides |

C.1.1.1

Use the figure below to answer question 24.
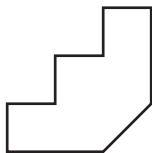
24. What type of polygon is the figure?

A   decagon | 10 sides |

B   heptagon | 7 sides |

C   nonagon   *

D   octagon | 8 sides |

C.1.1.2

25. Lindsey's triangle has angles that measure 90°, 45°, and 45°. What type of triangle must this be?

A   acute

B   obtuse

C   scalene

D   isosceles *

C.1.1.3

26. Circle T is shown below.
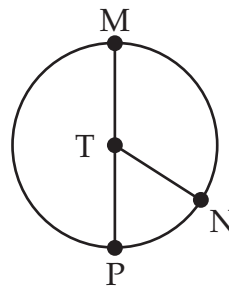
Nina measured the length of line segment MP as 20 centimeters (cm). What is the length of line segment NT?

A   5 cm | half of NT |

B   10 cm   *

C   15 cm | NT plus half of NT |

D   20 cm | MP |

MATHEMATICS

C.1.1.4

27. How many degrees will the minute hand on a clock move in 1 full rotation?

A   90° $\frac{1}{4}$ rotation

B   180° $\frac{1}{2}$ rotation
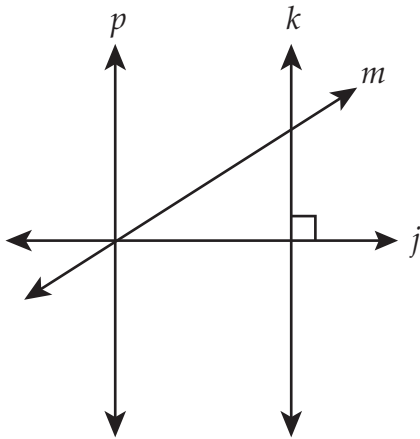
C   300° $\frac{5}{6}$ rotation

D   360°   *

C.1.2.1

28. Line p is parallel to line k in the figure shown below.

Which statement about the lines in the figure is **true**?
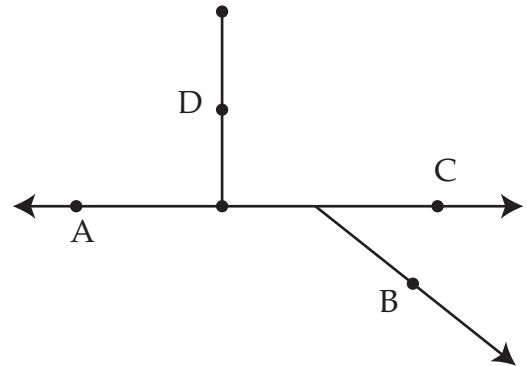
A   Line k is parallel to line m.

     intersecting

B   Line m is parallel to line j.

     intersecting

C   Line p is perpendicular to line k.

     parallel

D   Line j is perpendicular to line p.

         *

C.1.2.2

Use the drawing below to answer question 29.

29. Which point is on just a line segment?

A   point A   *on a line*

B   point B   *on a ray*

C   point C   *on a line*

D   point D   *

MATHEMATICS

C.3.1.1

Use the coordinate plane below to answer question 30.
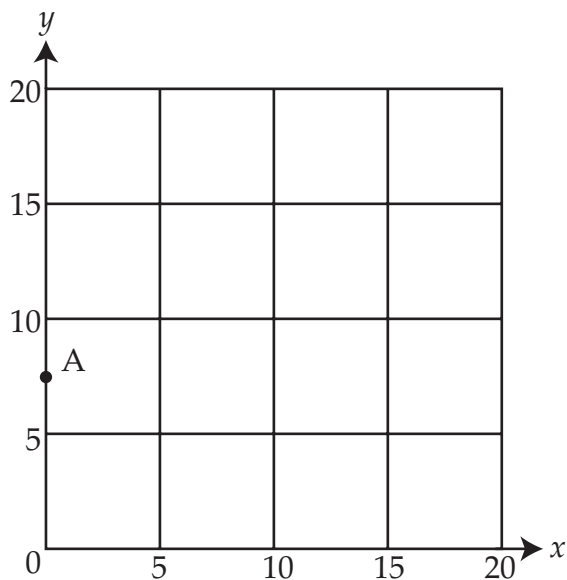
30. What is the location of point A?

   A   (0, 5.5)

   B   (0, 2.5)

   C   (7.5, 0)

   D   (0, 7.5) *

D.1.1.1

31. Luis wrote a series of numbers based on a pattern.

60, 30, 36, 18, 24, 12, 18, _?_ , _?_

The pattern continues. What should be the next 2 numbers in his series?

   A   9, 15   *

   B   9, 24 $\frac{18}{2}; 18 + 6$

   C   24, 18 $18 + 6; 12 + 6$

   D   24, 30 $18 + 6; 12 + 18$

MATHEMATICS

D.1.1.1

32. The table below shows the time it takes Sam to run different distances.

Time (in seconds)	Distance of Run (in meters)
10	6
20	12
30	18
40	24

Based on the pattern shown in the table, how many meters can Sam run in 70 seconds?

A   24 meters | *last distance in table* |

B   35 meters | *(70 ÷ 10) 5* |

C   42 meters   *

D   48 meters | *distance in 80 seconds* |

D.1.2.1

Use the table below to answer question 33.

Input	Output
0	3
1	5
2	7
3	9

33. Which rule was used on the input number to get the output number?

A   multiply by 1 and add 2
| *differences in first column and in second column are 1 and 2* |

B   multiply by 1 and add 3
| *generates first row output* |

C   multiply by 2 and add 2
| *wrong value added after multiplying* |

D   multiply by 2 and add 3
    *

MATHEMATICS

D.1.2.1

34. A baker charged $0.69 for one bagel. He gave a $0.15 discount for each dozen bagels purchased. Which chart shows this information?

A

Bagel Prices

Number of Bagels	Price
1	$ 0.69
6	$ 4.14
12	$ 8.28
24	$16.56

B

Bagel Prices

Number of Bagels	Price
1	$ 0.69
6	$ 4.14
12	$ 8.13
24	$16.11

C

Bagel Prices

Number of Bagels	Price
1	$0.69
6	$1.23
12	$2.31
24	$4.47

D

Bagel Prices *

Number of Bagels	Price
1	$ 0.69
6	$ 4.14
12	$ 8.13
24	$16.26

D.2.1.1

35. Which operation should be used to solve $3x = 36$ for x?

A   add 3 to both sides

B   subtract 3 from both sides

C   divide both sides by 3 *

D   multiply both sides by 3

D.2.1.1

36. Emmy is 12. She writes an equation to find her mother's age, m.

$$m - 12 = 35$$

Which operation solves the equation for m?

A   add 12 to both sides *

B   subtract 12 from both sides

C   multiply both sides by 12

D   divide both sides by 12

D.2.1.2

37. The equation $t \div 4 = 24$ can be used to find Tom's age (t). How old is Tom?

A   6 $24 \div 4$

B   20 $24 - 4$

C   28 $24 + 4$

D   96   *

MATHEMATICS

D.2.1.2

38. What is the value of x in the equation $32x = 512$?

    A   16   *

    B   480 | $512 - 32$ |

    C   544 | $512 + 32$ |

    D 16,384 | 512×32 |
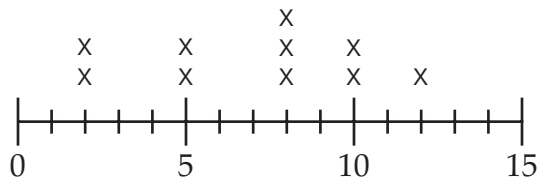
D.2.2.1

39. Dave has 14 shirts. He has 6 fewer shirts than Cal. Which expression represents the number of shirts (c) that Cal has?

    A $c + 6 = 14$

    B $c - 6 = 14$ *

    C $c \times 6 = 14$

    D $c = 6 - 14$

E.1.1.1

40. The line plot below shows how many hours of homework 10 students had in one week.

Hours of Homework in One Week

How many hours of homework did they have in all?

    A   30 | $5 + 10 + 15$ |

    B   37 | $2 + 5 + 8 + 10 + 12$ |

    C   70   *

    D   80 | $4 + 10 + 24 + 30 + 12$ |

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E.1.1.1

41. The graph below shows how the 6th and 7th grade students at Ames Middle School travel to school.

Student Travel
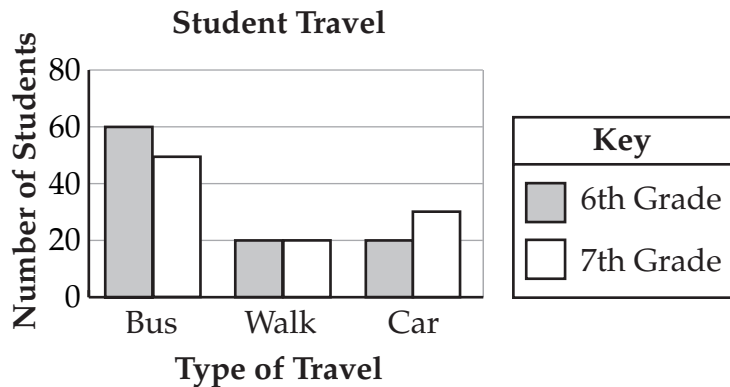
Based on the graph, what is the total number of 7th grade students who ride a bus to school?

A   20   *most common number on graph*

B   30   *number of 7th graders who travel by car*

C   50   *

D   60   *number of 6th graders who travel by bus*

E.1.1.2

42. Devon recorded the results of a survey of 100 students in the table below.

Favorite Sport

Sport	Percent of Students
none	10%
biking	20%
hockey	25%
soccer	25%
basketball	20%

Which graph correctly displays this information?

A   **Favorite Sport**   *
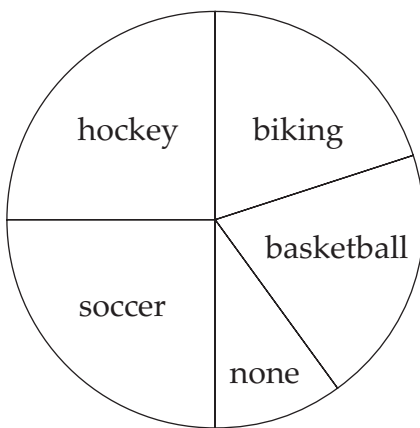
B   **Favorite Sport**
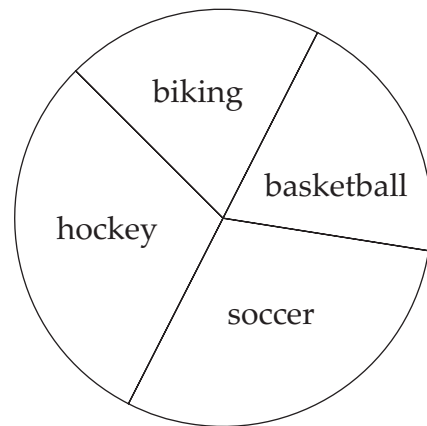
C   **Favorite Sport**
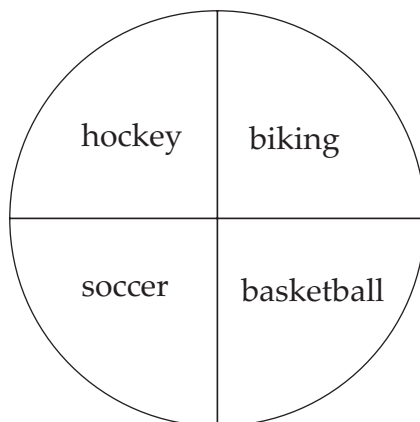
D   **Favorite Sport**
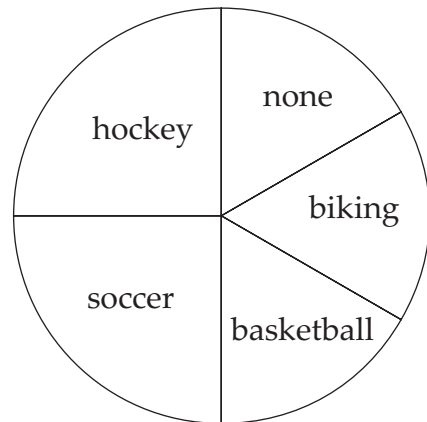
MATHEMATICS

E.1.1.2

43. Cynthia surveyed 200 people about their favorite season. The results are shown in the table below.

Favorite Season

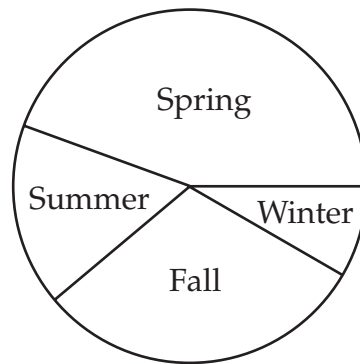| Season	Number of People
Spring	68
Summer	58
Fall	47
Winter	27

Which circle graph **best** displays the data in the table?

A **Favorite Season**
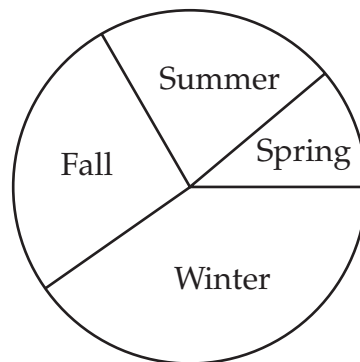
*
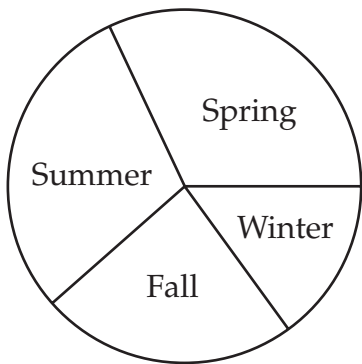
B **Favorite Season**

spring section is too large

C **Favorite Season**
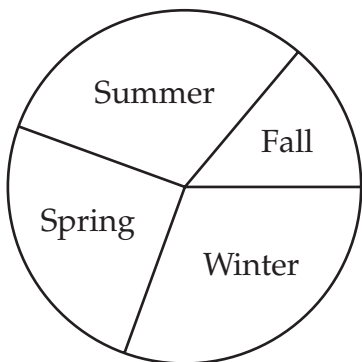
winter section is too large

D **Favorite Season**

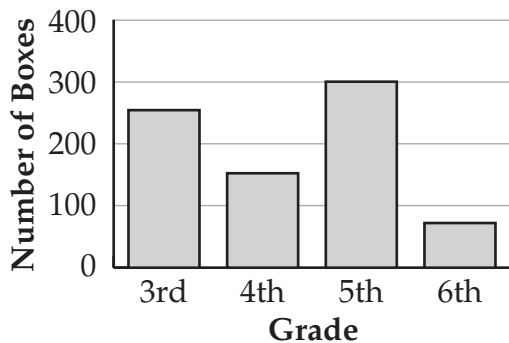spring section is too small

MATHEMATICS

E.1.1.3

44. Students in 4 grades sold boxes of candy to raise money for a trip.

- The 3rd grade class sold 250 boxes.
- The 4th grade class sold 150 boxes.
- The 5th grade class sold 300 boxes.
- The 6th grade class sold 100 boxes.

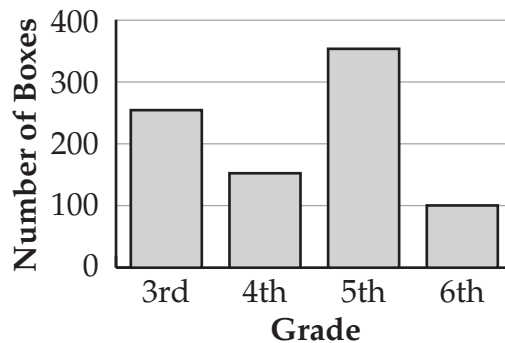Which bar graph shows this data?

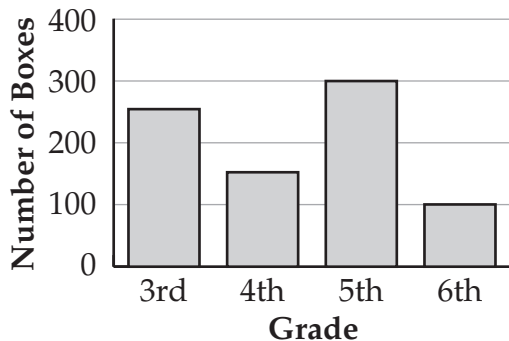A

**Boxes of Candy
Sold by Grade**

sixth grade incorrect

B

**Boxes of Candy
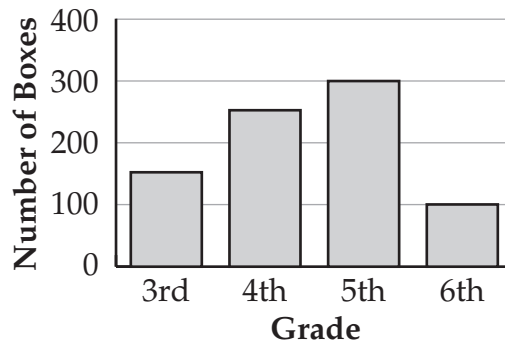Sold by Grade**

fifth grade incorrect

C *

**Boxes of Candy
Sold by Grade**

D

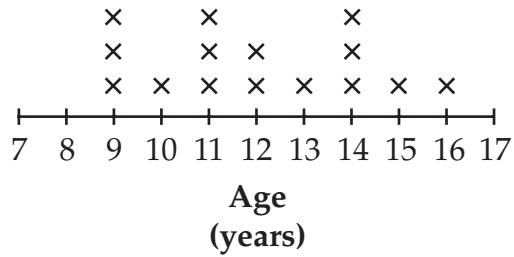**Boxes of Candy
Sold by Grade**

third and fourth grade in wrong order

MATHEMATICS

45. The ages of the children in a drama class are shown in the line plot below.

Ages of Children in a Drama Class

What is the **range** of the children's ages?

A   7 years   *

B   9 years   `least age`

C   14 years   `a mode`

D   16 years   `greatest  age`

46. Mr. Yee recorded Brad's test scores in his grade book.

Brad's Test Scores

100
78
86
100
84
70
100
86

What is Brad's **median** test score?

A   30   `range`

B   86   *

C   88   `mean`

D   100   `mode`

MATHEMATICS

E.3.1.1

47. Hank has a case of CDs. Of the 8 CDs in the case, 3 are **new.** Hank drops the case and 1 CD breaks. What is the probability that a **new** CD breaks?

A $\frac{1}{8}$ | *1 out of 8* |

B $\frac{1}{3}$ | *1 out of 3 new CDs* |

C $\frac{3}{8}$ *

D $\frac{3}{5}$ | *3 new out of 5 not new* |

E.3.1.1

48. Vic had a bouquet of 4 daisies, 6 roses, 1 iris, and 5 carnations. Vic dropped 1 flower from the bouquet. What is the probability that Vic dropped a daisy?

A $\frac{1}{16}$ | *1 daisy; 16 flowers* |

B $\frac{1}{15}$ | *1 daisy; 15 left* |

C $\frac{1}{4}$ *

D $\frac{1}{3}$ | *4 daisies; 12 non-daisies* |

E.3.1.2

49. A store offered the following choices for ring designs for kids.

Ring Designs

Band Color	Stone Color
red	clear
yellow	white
blue	black

How many different ring design combinations could be made using 1 band color and 1 stone color?

A 2 | *1 band; 1 stone* |

B 3 | *the 3 combinations listed* |

C 6 | *6 choices* |

D 9   *

MATHEMATICS

E.3.1.2

50. Four basketball players are lining up to practice free throws. Of the 4 players, 1 has already been chosen to practice first. In how many different orders could the **other** players line up?

A 6 *

B 7 | 4 + 3 |

C 9 | 3 × 3 |

D 12 | 4 × 3 |

FIRST OPEN-ENDED ITEM

A.1

51. An officer of a company conducted a survey to find out the age ranges of customers. He recorded the number of customers surveyed as 20 × 20 × 20 × 20.

A. Write the number of customers surveyed in exponential form.

The officer then made a chart to show the portions of customers in each age range.

Age Range of Customers

Age Range	Portion of Customers	Decimal Portion
20–29	50%	
30–39	25%	
40–59	$\dfrac{19}{100}$	
60–99	$\dfrac{6}{100}$	

B. In order to make comparisons, the officer wanted to change all the portions to decimals. Fill in the Decimal Portion column with each equivalent decimal.

GO TO THE NEXT PAGE TO FINISH THE QUESTION.

51. *Continued.* Please refer to the previous page for task explanation.

    C. The officer wanted to introduce a new product to sell to at least $\frac{1}{3}$ of the customers in the age range 60–99. Convert $\frac{1}{3}$ to a decimal and explain why the decimal is or is not a terminating decimal.