# The Pennsylvania System of School Assessment 

Mathematics Item and Scoring Sampler

## SUPPLEMENT

2009-2010
Grade 8

## MATHEMATICS

## MULTIPLE-CHOICE ITEMS

Note: All percentages listed in the tables below the items have been rounded.

## A.1.1.1

1. The distance between Duncan's house and his grandparents' house is 3,400 miles. What is this distance written in scientific notation?

A $3.4 \times 10^{-2}$
used 2 for 2 zeros; moved left so used negative

B $\quad 3.4 \times 10^{-3} \quad$ moved left so used negative

C $3.4 \times 10^{2} \quad$ used 2 for 2 zeros
D $3.4 \times 10^{3}$

| $\mathbf{A}$ | B | C | D |
| ---: | :---: | :---: | :---: |
| $2 \%$ | $5 \%$ | $17 \%$ | $76 \%$ |

## A.2.1.1

During an assessment, students would not be permitted to use a calculator on item 2.

Use the expression below to answer question 2.

$$
(15-7)^{2}+(2 \cdot 2)^{2}-(4+3)
$$

2. What is the value of the expression?

A 17

> simplifed $8^{2}$ to be 16 and $4^{2}$ to be 8 , so $16+8-7=17$

B 73

C 79 simplified correctly until end; subtracted 4 from 80 then added 3

D 137

$$
\begin{aligned}
& \text { added } 8+4 \text {, then squared } 12 \text { and } \\
& \text { subtracted } 7
\end{aligned}
$$

| $\mathbf{A}$ | B | C | D |
| :---: | :---: | :---: | :---: |
| $9 \%$ | $79 \%$ | $10 \%$ | $3 \%$ |

## MATHEMATICS

## A.2.2.2

During an assessment, formulas will be provided on a reference sheet.
3. Abner walks 3 miles per hour. At this rate, how long will it take him to walk $7 \frac{1}{2}$ miles?

A $2 \frac{1}{2}$ hours
B $4 \frac{1}{2}$ hours subtracted
C $10 \frac{1}{2}$ hours added
D $22 \frac{1}{2}$ hours $\quad$ multiplied

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $69 \%$ | $11 \%$ | $5 \%$ | $15 \%$ |

## MATHEMATICS

## A.3.2.1

During an assessment, students would not
be permitted to use a calculator on item 5 .
5. Sheldon's restaurant bill is $\$ 37.56$.

He plans to leave a $15 \%$ tip. Which is closest to the amount of money Sheldon plans to leave for a tip?

A $\$ 3$
divided 40 by 15 and then rounded up
B $\$ 4$
found $10 \%$ and rounded up
C $\$ 6$

D $\$ 8$

$$
\begin{array}{|l|}
\hline \text { about } 20 \% \\
\hline
\end{array}
$$

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| :---: | :---: | :---: | :---: |
| $12 \%$ | $18 \%$ | $61 \%$ | $9 \%$ |

B.1.1.1
6. Lavasha's backpack holds up to 14.75 kilograms. What is this mass expressed in grams?

A 0.01475
thinks kilogram is 1/1000 of a gram
B 1.475
thinks 1 kilogram is $1 / 10$ of a gram

C 1,475
thinks 100 grams is 1 kilogram
D 14,750

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $22 \%$ | $15 \%$ | $17 \%$ | $45 \%$ |

## B.2.1.1

7. Claire uses 5 straws as the sides of a regular polygon. Each straw is used as one side of the polygon. What is the sum of the measures of the interior angles of the polygon?
A $360^{\circ}$
$2 \times 180$
B $540^{\circ}$
C $720^{\circ} \quad 4 \times 180$
D $900^{\circ} \quad 5 \times 180$

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $18 \%$ | $65 \%$ | $8 \%$ | $9 \%$ |

## MATHEMATICS

## B.2.2.2

8. A pool in the shape of a rectangular prism has a width of $8 \frac{1}{2}$ feet $(\mathrm{ft})$, a length of 12 ft , and a depth of 8 ft . What is the volume of the pool?

A $102 \mathrm{ft}^{3} \quad 12 \times 8.5$; found area
B $\quad 532 \mathrm{ft}^{3} \quad 8^{3}+12+8$
C $\quad 816 \mathrm{ft}^{3}$
D $1,728 \mathrm{ft}^{3}$
$12^{3}$; thought all sides had same length

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| ---: | :---: | :---: | :---: |
| $9 \%$ | $5 \%$ | $84 \%$ | $2 \%$ |

## C.1.1.2

9. Harriet drew the figure below on a piece of paper.


Which describes a relationship between $\angle 3$ and $\angle 4$ in the figure?

A complementary angles

> | confused supplementary |
| :--- |
| and complementary |

B obtuse angles

$$
\text { saw that angle } 3 \text { is obtuse }
$$

C supplementary angles

D vertical angles
confused supplementary and vertical

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| :---: | :---: | :---: | :---: |
| $24 \%$ | $7 \%$ | $59 \%$ | $10 \%$ |

## MATHEMATICS

## C.3.1.1

Use the figure below to answer question 10.

10. Which building is located at $(-2,3)$ ?

A School reversed numbers; reversed negative
B Library *
C Market ignored negative
D Bank reversed $x$ and $y$ order

| $\mathbf{A}$ | B | C | D |
| :---: | :---: | :---: | :---: |
| $2 \%$ | $85 \%$ | $2 \%$ | $10 \%$ |

D.2.1.1
11. What is the solution of $\frac{x}{3}>-3$ ?
A $x<-1 \quad-3 / 3$ and reversed sign
B $x>-1 \quad-3 / 3$
C $x<-9 \quad$ reversed sign
D $\quad x>-9$ *

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| :---: | :---: | :---: | :---: |
| $13 \%$ | $23 \%$ | $19 \%$ | $45 \%$ |

## MATHEMATICS

## D.2.2.2

12. The violin section makes up $\frac{3}{5}$ of a school orchestra. The equation below is used to determine the total number of musicians ( $m$ ) in the orchestra.

$$
\frac{3}{5} m=60
$$

What is the total number of musicians in the orchestra?
A $36 \quad 60 \times 3 / 5$
B 100
C 195
$(60+5) \times 3$
D 297
$60 \times 5-3$

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $16 \%$ | $76 \%$ | $5 \%$ | $2 \%$ |

## D.4.1.3

13. The table below shows a relationship between the values of $x$ and $y$.

| $x$ | $y$ |
| ---: | ---: |
| -7 | -10 |
| -2 | -5 |
| 3 | 0 |
| 8 | 5 |

Which equation describes the relationship?

A $y=x-3$
B $y=x+3$
added 3 instead of subtracted
C $y=-x-3$
used negative coefficient
D $y=-x+3$
added 3 instead of subtracted;
used negative coefficient

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $74 \%$ | $10 \%$ | $9 \%$ | $6 \%$ |

## MATHEMATICS

## E.1.1.1

14. The student council needs to make a budget that shows the percent of money it will spend on each item during the school year. Which type of graph would best represent the budget?

A circle graph *

B double bar graph
would use to compare budgets
C histogram
would not be the best way to display percents of a whole
D double line graph
budget items are discrete

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| :---: | :---: | :---: | :---: |
| $69 \%$ | $13 \%$ | $8 \%$ | $9 \%$ |

## E.3.2.1

15. Olivia is creating a 3-letter code using the letters A, B, and C. She has decided that each letter will only be used once in the code. How many different 3 -letter codes can Olivia create?


| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ |
| ---: | :---: | :---: | :---: |
| $7 \%$ | $70 \%$ | $20 \%$ | $3 \%$ |

## MATHEMATICS

## E.4.1.1

16. The scatter plot below shows the average price of car insurance for drivers of different ages.


Which type of correlation best describes the relationship between a driver's age and the average price of that driver's car insurance?

A weak negative points close together
B strong negative
C weak positive points close together
and line decreases

D strong positive $\square$

| A | B | C | D |
| :---: | :---: | :---: | :---: |
| $15 \%$ | $59 \%$ | $12 \%$ | $14 \%$ |

## MATHEMATICS

## OPEN-ENDED ITEM

## D. 1

17. The table below shows the numbers of cups of mix and water Rodney uses to make different amounts of lemonade.

Lemonade Batches

| Cups of Mix (m) | 1 | 2 | 3 | 4 | 8 | 10 | 12 | 14 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Cups of Water (w) | 3 | 6 | 9 | 12 | 24 |  |  | 42 |

A. Complete the table with the missing cups of water Rodney uses to make the lemonade.
B. Write an equation to describe the relationship between the amount of mix $(m)$ and water ( $w$ ) Rodney uses to make lemonade.

## MATHEMATICS

17. Continued. Please refer to the previous page for task explanation.

Rodney's sister thinks the lemonade made with the amounts in the table is too strong. She doubles the amount of water in every batch.
C. Explain how the equation written in part B should change to show the relationship between the amounts of mix and water Rodney's sister uses to make lemonade.
D. How many cups of water would Rodney's sister mix with 18 cups of mix to make lemonade?

| Score <br> Point 4 | Score <br> Point 3 | Score <br> Point 2 | Score <br> Point 1 | Score <br> Point 0 |
| :---: | :---: | :---: | :---: | :---: |
| $31 \%$ | $20 \%$ | $20 \%$ | $16 \%$ | $13 \%$ |

