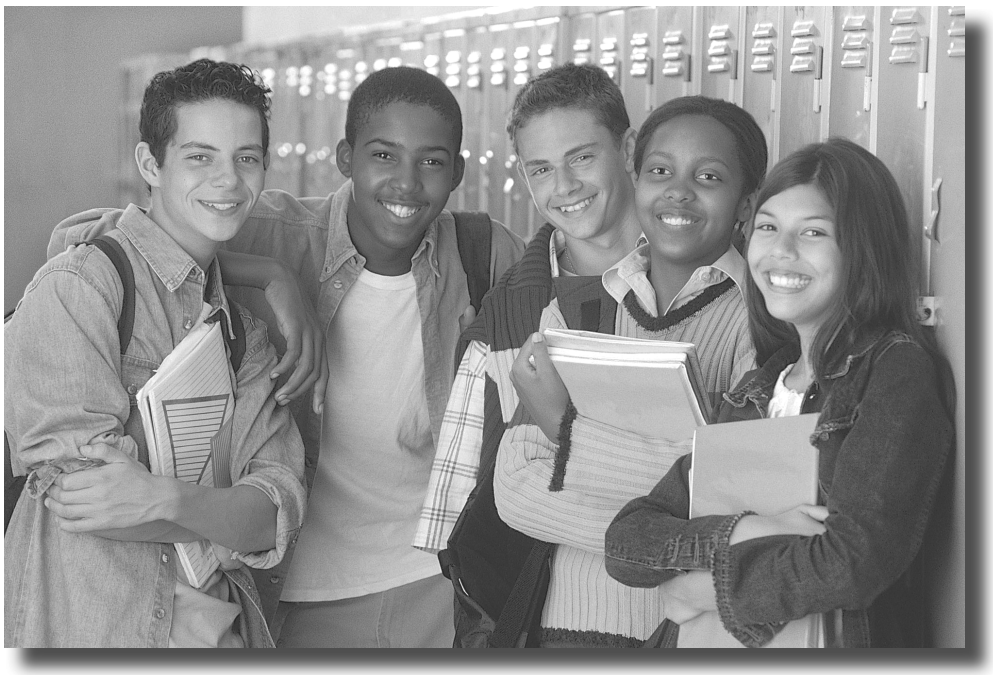
The Pennsylvania System of School Assessment

Mathematics
Item and Scoring Sampler



2008–2009
Grade 8

Pennsylvania Department of Education Bureau of Assessment and Accountability 2008–2009

MULTIPLE-CHOICE ITEMS

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

A.2.1.1

1. Simplify: $8 \bullet 3^2 + 7 \bullet (6 - 4)$

A	62	*$3^2 = 6$*
B	86	*
C	110	*$(8 \times 9) + (7 \bullet 6) - 4$*
D	590	*$(8 \times 3)^2$*

A.3.2.1

2. Jim earned $127.59 last month. He spent about 20% of the money. Which is the closest estimate of the amount of money Jim spent?

A	$13	*10% of $130*
B	$20	*20% of $100*
C	$26	*
D	$30	*20% of $150*

A.3.3.1

3. Multiply:

41.6×3

A	12.48	*incorrect decimal point placement*
B	123.18	*$0.6 \times 3 = 0.18$ with no regroup*
C	124.8	*
D	1231.8	*$0.6 \times 3 = 1.8$ with no regroup*

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

A.1.1.2

4. What is the square root of 64?

A	2	*factor*
B	8	*
C	32	*divided by 2*
D	4,096	*64 squared*

A.2.1.1

5. Simplify:

$$2^3 + 6 \div 3 - (^{-}10 \div 2)$$

A	0	$(8 + 2 - 10) \div 2$
B	3	$6 + 6 \div 3 - 5$
C	13	$6 + 2 + 5$
D	15	*

A.3.3.1

6. Solve:

$$27 - {}^{-}9$$

A	$^{-}3$	$27 \div {}^{-}9$
B	$^{-}18$	${}^{-}27 + 9$
C	18	$27 - 9$
D	36	*

A.1.1.1

7. Which is 5,291,000 written in scientific notation?

A 5.291×10^3
exponent equals number of zeros

B 529.1×10^4
incorrect placement of decimal point

C 52.91×10^5
incorrect placement of decimal point

D 5.291×10^6
*

A.1.1.1

8. The population of Pennsylvania in the year 2000 was approximately 12,281,100. What is this number written in scientific notation?

A 1.2281100×10^1 *wrong exponent*

B 122811×10^2 *lead number not between 1 and 10*

C 1.22811×10^7 *

D 0.12281100×10^8 *lead number not between 1 and 10*

A.2.2.1

9. The newsstand price of a magazine is discounted 28% for subscribers. The newsstand price is $5.00. What is the subscription price?

A $1.40 *5 × 0.28*

B $3.60 *

C $4.72 *5 – 0.28*

D $5.28 *5 + 0.28*

A.2.2.2

10. Hassan deposited $7,500 into a bank account. At the end of 3 years, the account had earned $900 in simple interest. What rate of interest did the account earn per year?

A 2.78% *approximately 7,500 ÷ 2,700; with percent sign*

B 4% *

C 8.33% *approximately 7,500 ÷ 900; with percent sign*

D 12% *900 ÷ 7,500*

A.3.1.1

11. Lisa needs 56 envelopes. She buys the envelopes in packages of 12. What is the **minimum** number of packages Lisa should buy to get 56 envelopes?

A 3 *56 rounded to 60 and 12 to 20; 60 ÷ 20*

B 4 *56 ÷ 12; rounded*

C 5 *

D 6 *56 rounded to 60 and 12 to 10; 60 ÷ 10*

A.3.1.2

12. Mara has $100. She wants to buy 3 pieces of luggage priced as shown below.

- suitcase $39.95
- carry-on bag $24.95
- tote bag $16.95

When is an estimate appropriate?

A when Mara is deciding if $100 is enough to buy all 3 pieces
*

B when the salesperson is scanning the cost of each piece
exact amount

C when Mara is told how much money is due
exact amount

D when the salesperson is counting out Mara's change
exact amount

B.1.1.1

13. The lead on Jack's pencil is 5 millimeters long. What is this length in centimeters (cm)?

A 0.05 cm *5 ÷ 100*

B 0.5 cm *

C 50 cm *5 × 10*

D 500 cm *5 × 100*

B.1.1.2

14. Denise drinks 5 gallons of milk per month. How many pints of milk does Denise drink per month?

A 10 pints *5 × 2*

B 20 pints *5 × 4*

C 40 pints *

D 80 pints *5 × 16*

B.1.1.3

15. Danny babysat for 5 hours yesterday. For how many seconds did Danny babysit yesterday?

A	300	*minutes, 5 × 60*
B	3,600	*seconds in 1 hour, 60 × 60*
C	7,200	*minutes in 5 days, 5 × 24 × 60*
D	18,000	*

B.1.1.4

16. The thermometer in Molly's backyard read 21°F. What was the approximate temperature in degrees Celsius?

A	−20.3°C	*(5/9)(21) – 32*
B	–6.1°C	*
C	11.6°C	*(5/9)(21)*
D	69.8°C	*(9/5)21 + 32*

B.2.1.1

Use the polygon below to answer question 17.

17. What is the total number of degrees of the interior angles of this polygon?

A	64°	*number of sides × 8*
B	360°	*number of degrees in quadrilateral*
C	900°	*number of degrees in heptagon*
D	1,080°	*

B.2.1.2

18. What is the measure of 1 interior angle of a regular quadrilateral?

A	4°	*number of sides*
B	40°	*based on 4*
C	90°	*
D	360°	*total number of degrees*

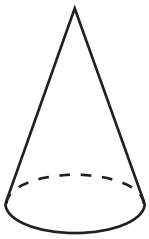
B.2.1.3

19. The sum of the measures of the interior angles of a polygon is 900°. Exactly how many sides does the polygon have?

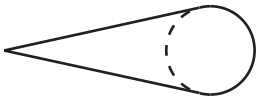
A	3	*900 ÷ 180 – 2*
B	5	*900 ÷ 180*
C	7	*
D	10	*900 ÷ 180 × 2*

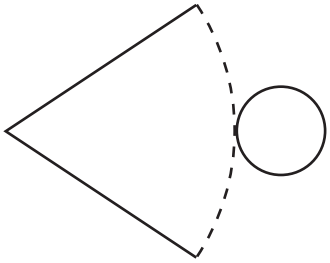
C.1.1.1

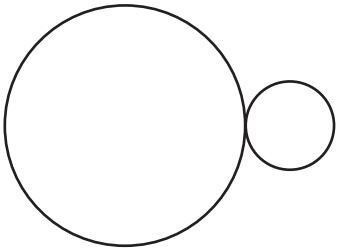
20. A cone is shown below.



Which is a net for the cone?

A 

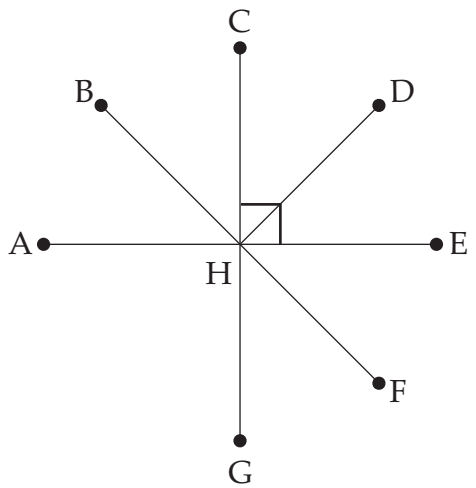
B  *

C 

D 

C.1.1.2

Use the diagram below to answer question 21.



21. Which angles are supplementary?

A ∠AHD and ∠DHE *

B ∠CHD and ∠DHE *complementary*

C ∠BHD and ∠DHE *adjacent*

D ∠BHC and ∠FHG *vertical*

C.1.1.2

22. Angles J and K are vertical angles. The measure of angle J is 46°. What is the measure of angle K?

A 44° *complement*

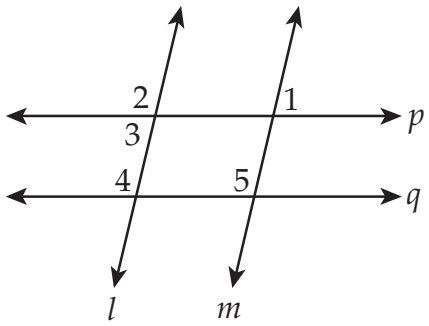
B 46° *

C 134° *supplement*

D 136° *46° + 90°*

C.1.1.3

23. In the diagram below, line *l* is parallel to line *m* and line *p* is parallel to line *q*.



Which angle has the same measure as ∠1?

A ∠2 *supplement*

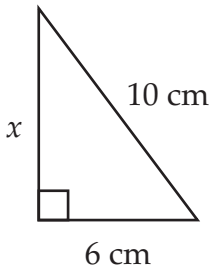
B ∠3 *

C ∠4 *supplement*

D ∠5 *supplement*

C.1.2.1

Use the shape below to answer question 24.

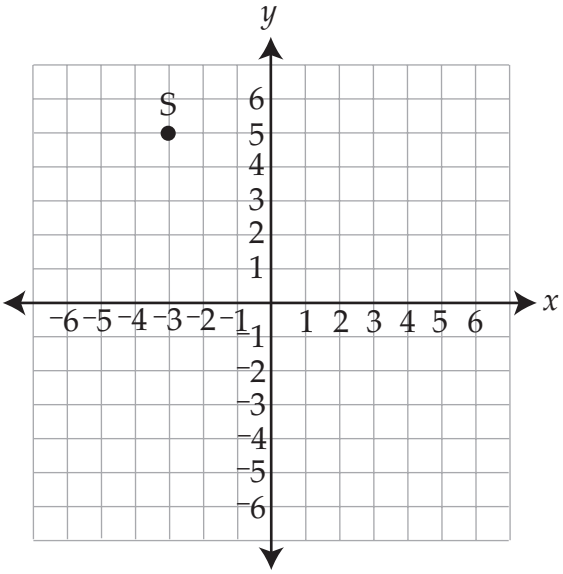


24. What is the value of x?

A	4 cm	*10 – 6*
B	6 cm	*congruent to other leg*
C	7 cm	*reasonable estimate*
D	8 cm	*

C.3.1.1

Use the figure below to answer question 25.

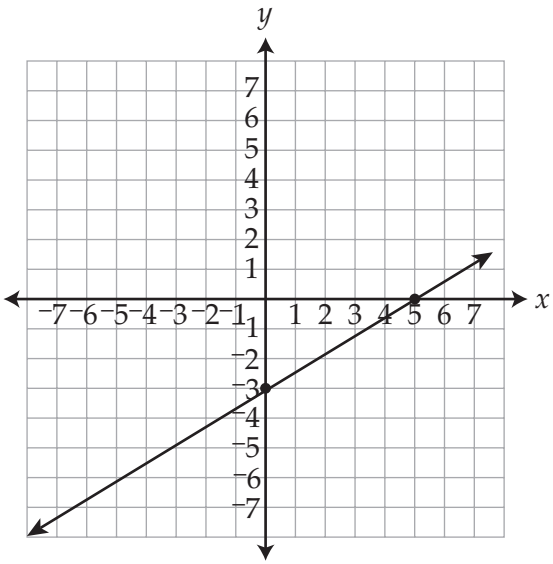


25. What is the location of point S?

A	(−3, 5)	*
B	(3, 5)	*sign error*
C	(−5, 3)	*location error*
D	(5, −3)	*y, x reversed*

C.3.1.1

Use the graph below to answer question 26.



26. At what point does the line intersect the y-axis?

A (−3, 0) *reverse order*

B (0, −3) *

C (0, 5) *reverse order of x-intercept*

D (5, 0) *x-intercept*

D.1.1.1

27. Fiona created a pattern using numbers as shown below.

0, 2, 6, 12

The pattern continues. What is the next number in the pattern?

A 14 *0 + 2 = 2; 12 + 2 = 14*

B 18 *6 + 6 = 12; 12 + 6 = 18*

C 20 *

D 24 *6 × 2 = 12; 12 × 2 = 24*

D.1.1.2

28. At 3:00 P.M. the temperature in Pittsburgh was 93°F. The temperature decreased at a rate of 2°F every 30 minutes. What was the temperature at 7:30 P.M.?

A 75°F *

B 77°F *93 − (2 × 8)*

C 84°F *93 − (2 × 4.5)*

D 111°F *93 + (2 × 9)*

D.1.1.2

29. Sid wrote a list of numbers using a rule.

8, 15, 24, 35, ___

Based on the rule, what should be the next number?

A 42 *(15 – 8) + 35*

B 44 *(24 – 15) + 35*

C 46 *(35 – 24) + 35*

D 48 *

D.1.1.3

Use the table below to answer question 30.

x	y
1	−1
3	5
5	11
7	17

30. The relationship of the values in the table is based on which rule?

A $x - 2 = y$

B $x + 2 = y$

C $2x - 1 = y$

D $3x - 4 = y$ *

D.2.1.1

31. Dora owns a card store. After a full week, she made $250.00 by selling cards (c). Using the equation $1.25c = 250$, how many cards did Dora sell that week?

A 125 *250 – 125*

B 200 *

C 251 *250 + 1*

D 312 *250 × 1.25*

D.2.1.1

32. There is $150 in Dave's bank account. He deposits $200 into the account each month. Dave needs at least $700 to buy a used car. The inequality below can be solved for x to find the number of deposits Dave must make to reach his goal.

$$200x + 150 \geq 700$$

How many deposits must Dave make?

A $x \geq 2.75$ *

B $x \leq 2.75$ *incorrect symbol*

C $x \geq 4.25$ *added 150*

D $x \leq 4.25$ *added 150; symbol reversed*

D.2.1.2

33. In which equation is $m = 28$ the solution?

A $\frac{m}{5} - 3 = 5$ $\boxed{m = 40}$

B $m - \frac{3}{5} = 5$ $\boxed{m = 5\frac{3}{5}}$

C $\frac{m-3}{5} = 5$ *

D $(m - 3)5 = 5$ $\boxed{m = 4}$

D.2.1.3

Use the expression below to answer question 34.

$$5x - 12 - x$$

34. What is the value of the expression when $x = {}^{-}2$?

A ⁻24 $\boxed{{}^{-}10 - 12 - 2}$

B ⁻20 *

C ⁻4 $\boxed{10 - 12 - 2}$

D 0 $\boxed{10 - 12 + 2}$

D.2.2.1

35. When Bernie earns 5 times more than the amount (a) of money he has plus another \$1,000, he will have at least \$16,000 to start a small business. Which statement represents this situation?

A $5a + 1{,}000 \geq 16{,}000$ *

B $5 + 1{,}000a \leq 16{,}000$

C $5a + 1{,}000 \leq 16{,}000$

D $5 + 1{,}000a \geq 16{,}000$

D.2.2.1

36. Which expression represents 4 times the sum of x squared and 6?

A $4x^2 + 6$ $\boxed{\textit{4 distributed to first term only}}$

B $4(x^2 + 6)$ *

C $4(x + 6)^2$ $\boxed{\textit{quantity squared}}$

D $(4x + 6)^2$ $\boxed{\textit{entire expression squared}}$

D.2.2.2

37. Jay is 3 years less than 4 times Nelly's age (n). Which expression represents Jay's age?

A $3 - 4n$

B $3n - 4$

C $4n - 3$ *

D $4n + 3$

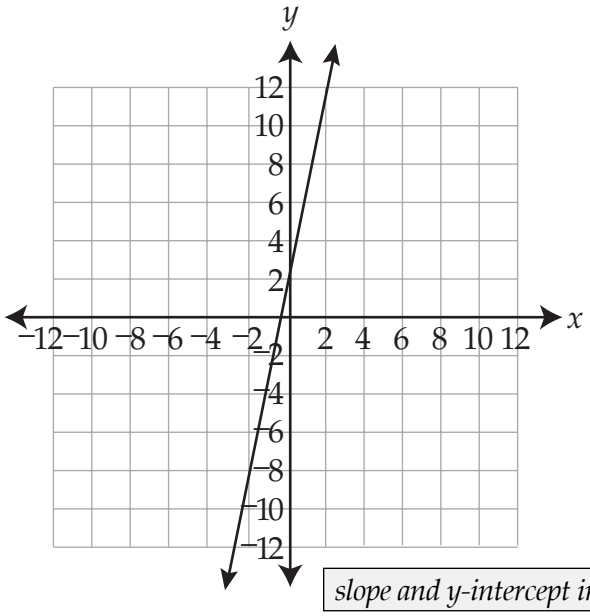
D.4.1.1

Use the table below to answer question 38.

x	y
3	11
6	17
9	23
12	29

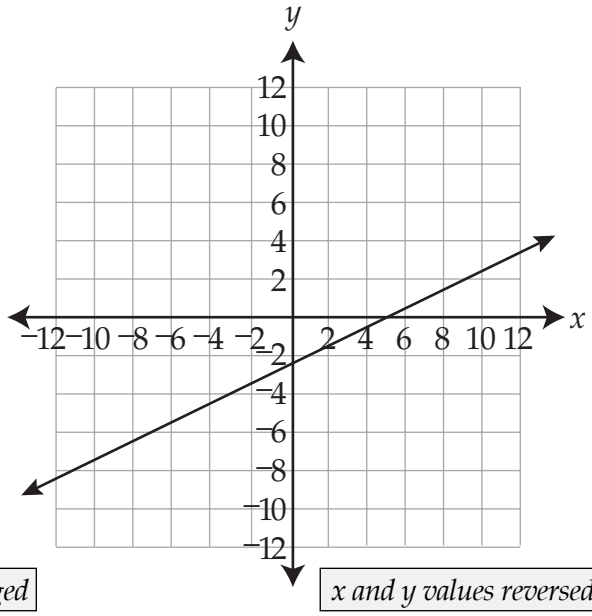
38. Which graph shows the relationship?

A



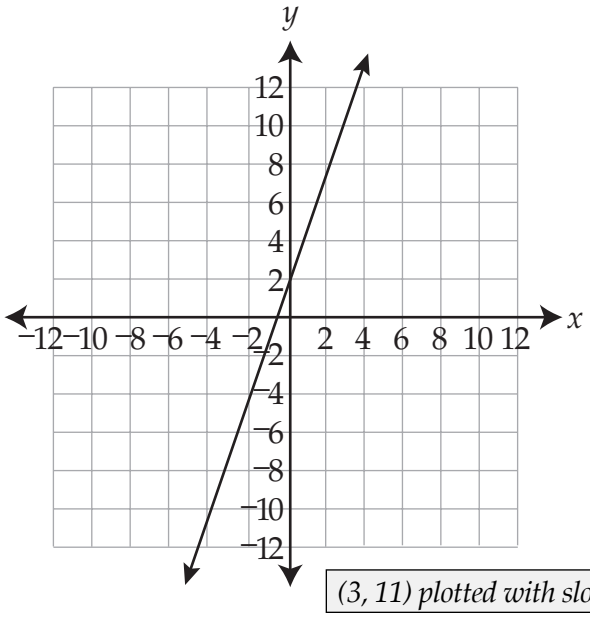
slope and y-intercept interchanged

B



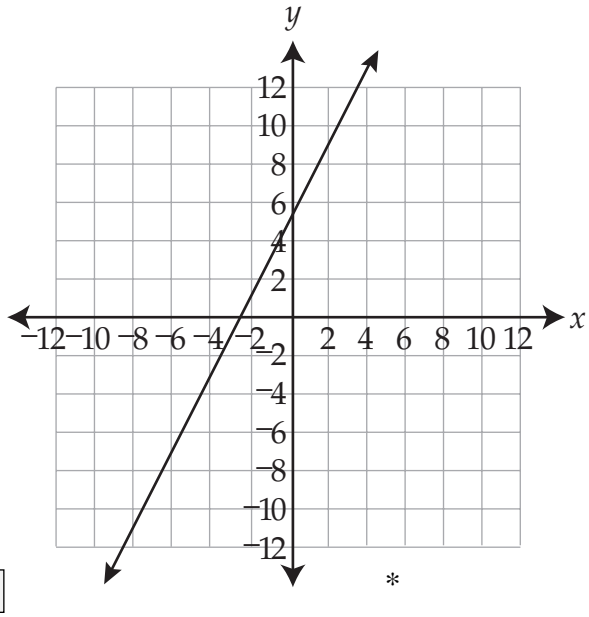
x and y values reversed

C



(3, 11) plotted with slope of 3

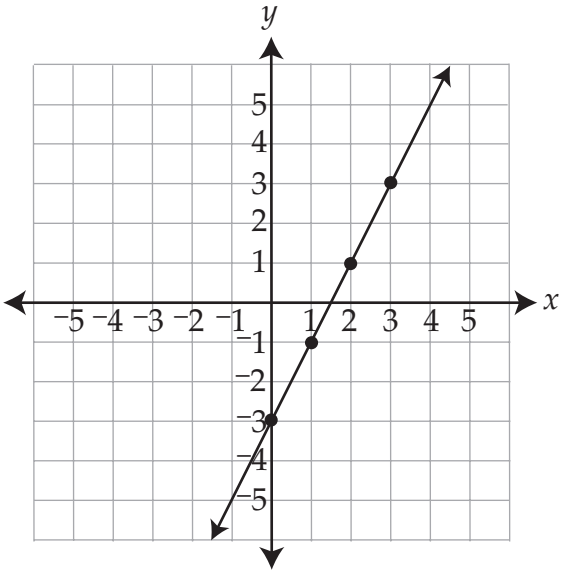
D



*

D.4.1.2

Use the graph below to answer question 39.



39. Which table of values matches the graphed function?

A

x	y
0	−3
1	−1
2	1
3	3

*

B

x	y
−3	0
−1	1
1	2
3	3

C

x	y
0	3
1	1
2	1
3	−3

D

x	y
0	−2
1	−1
2	1
3	−3

D.4.1.3

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

x	y
−5	−9
−2	−6
1	−3
2	−2
4	0

Which equation describes the relationship?

A $y = {}^{-}2x - 1$ *x = 1; y = ⁻3 (3rd row)*

B $y = {}^{-}x + 4$ *x = 4; y = 0 (5th row)*

C $y = x - 4$ *

D $y = 2x - 5$ *x = 1; y = ⁻3 (3rd row)*

E.1.1.1

41. A student surveyed his classmates about their favorite choice for a field trip. The results of the survey are shown below.

21% art gallery
15% museum
16% theater
48% zoo

Which of these displays would **best** represent the data?

A line graph *2 variables*

B circle graph *

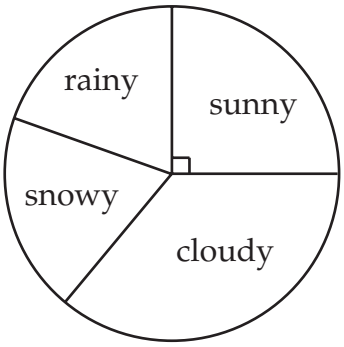
C frequency table *tally list*

D box-and-whiskers plot *data list*

E.1.1.2

42. The graph below shows the frequency of days that were sunny, cloudy, rainy, and snowy in February of 2005.

February 2005



Which statement about the data is true?

A It was sunny the same number of days as it was rainy.

sunny section larger than rainy

B It was snowy the same number of days as it was rainy.

*

C It was sunny more days than it was cloudy.

cloudy section larger than sunny

D It was snowy more days than it was sunny.

sunny section larger than snowy

E.1.1.3

43. Raja showed the number of pages she read each night on a stem-and-leaf plot.

Nightly Pages Read

1	2 2
2	5
3	8
5	7 8

Key
4 | 6 = 46

What is the total number of pages Raja read?

A 43 *adds each digit*

B 142 *adds sums of tens and ones*

C 202 *

D 763 *122 + 25 + 38 + 578*

E.3.1.1

44. There were 5 women, 14 men, and 21 children on a bus. One person signaled the driver to stop. What is the probability that the person who signaled was a woman?

A $\frac{1}{40}$ *1 of 40 people*

B $\frac{1}{8}$ *

C $\frac{1}{7}$ *5 women, 35 others*

D $\frac{1}{5}$ *1 of 5 women*

E.3.2.1

45. Kari, Myrna, Nate, and Walt were standing in the lunch line. How many different ways could they be arranged in the lunch line?

A 4 *4 names*

B 8 *4 times 2*

C 16 *4 times 4*

D 24 *

E.3.2.1

46. Matt has three pairs of shorts, five shirts, and two pairs of shoes. How many different outfits consisting of one shirt, one pair of shorts, and one pair of shoes can he make?

A 5 *number of shirts*

B 10 *3 + 5 + 2*

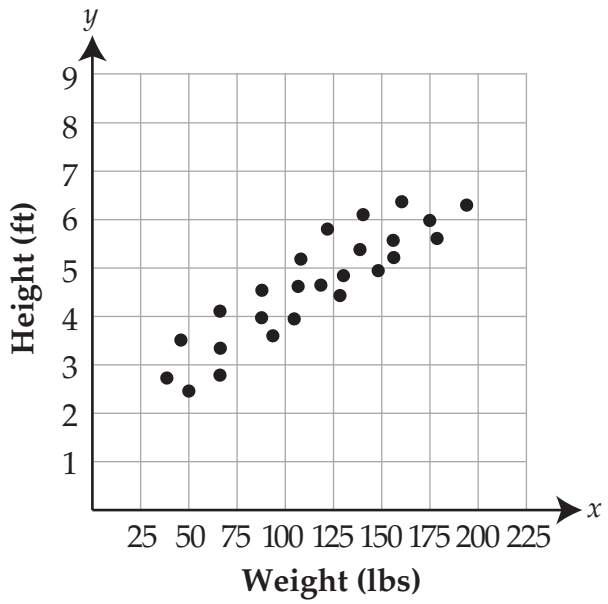
C 25 *5 × (3 + 2)*

D 30 *

E.4.1.1

Use the scatterplot below to answer question 47.

Weight and Height of 25 People



47. Which type of correlation is represented by the scatterplot?

A strong positive
*

B strong negative
opposite direction

C weak positive
incorrect relation of points

D weak negative
opposite direction; incorrect relation

E.4.1.2

48. A random survey shows that 14 out of 21 students plan to vote for Jacob for class president. Which is the **best** prediction of the total number of votes Jacob will receive if 180 students vote?

A	35	*14 + 21*
B	90	*180 ÷ 2*
C	120	*
D	173	*180 – (21 – 14)*

FIRST OPEN-ENDED ITEM

A.2

49. Train L and train M leave a station at the same time heading in opposite directions. Train L is going north at an average speed of 75 miles per hour (mph). Train M is going south at an average speed of 60 mph.

A. How long does it take **each** train, in hours, to travel 225 miles along the track? Show all your work. Explain why you did each step.

GO TO THE NEXT PAGE TO FINISH THE QUESTION.

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

B. What is the distance, in miles, between the two trains after each train travels for 6 hours? Show all your work. Explain why you did each step.