

MEAP

MICHIGAN
EDUCATIONAL
ASSESSMENT
PROGRAM

High School Test In Mathematics

Released Items

Spring 2004

- 1 The owner of Salvadore's Restaurant plans to advertise the variety of lunches served. If there are six varieties of vegetables, five types of main courses, and four kinds of salads, which sign *most* accurately states the number of lunches possible containing one each of vegetables, main courses, and salads?
- A 15 combinations of lunches available
 - B 45 combinations of lunches available
 - C 120 combinations of lunches available
 - D 455 combinations of lunches available
- 2 Sam loaded 12 cartons weighing 85 pounds each into his pickup truck, which can carry a maximum load of one ton. How many additional 85-pound boxes can he place in the truck without overloading it? (2,000 pounds = one ton)
- A 10
 - B 11
 - C 12
 - D 15
- 3 The soccer stadium wall casts a shadow that extends 150 feet from its base when the edge of the shadow forms a 23-degree angle with the ground. What is the height of the stadium wall to the nearest foot?
- A 59 feet
 - B 64 feet
 - C 138 feet
 - D 353 feet

- 4 Jimmy completed 7 of the 10 mathematics tests. His scores are 79, 86, 91, 87, 89, 100, and 85. The teacher has a policy of dropping the lowest score. Jimmy needs a final average of at least 90% to receive an A. With which three scores below would he earn an A?
- A 90, 86, 91
- B 94, 78, 94
- C 87, 90, 90
- D 79, 96, 98
-
- 7 There are 27 students in a chemistry class and 22 students in a physics class. Seven of these students take both physics and chemistry. What is the ratio of the number of students taking only physics to those taking only chemistry?
- A $\frac{3}{4}$
- B $\frac{7}{49}$
- C $\frac{22}{27}$
- D $\frac{34}{29}$

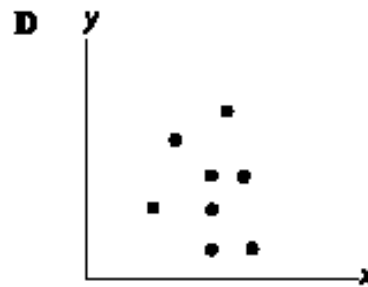
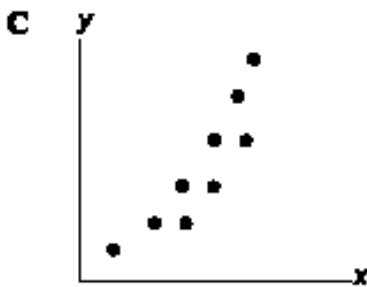
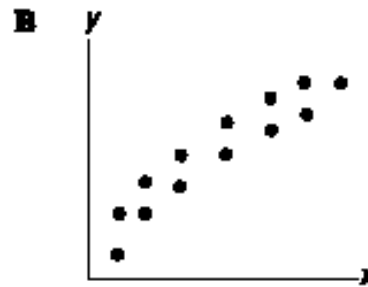
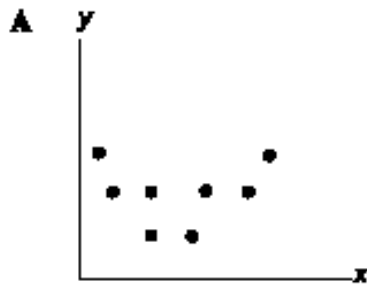
- 10 A quality control specialist observed the following pattern of defective eyeglass lenses in each batch of her inventory.

Quality Report

Number in Batch	6	12	18	24	30
Number Defective	1	2	3	4	5

According to the pattern, if she received a batch of 480 eyeglass lenses, how many were defective?

- A 48
 - B 80
 - C 96
 - D 120
- 11 Which scatterplot does **NOT** indicate a quadratic relationship between x and y ?



- 12 These charts show weights (in grams) of a certain type of frog.

Frog Weight

Frog	g
A	75
B	61
C	57
D	57
E	54
F	50
G	41
H	41
I	41

4	1 1 1
5	0 4 7 7
6	1
7	5

- Which of the following correctly describes the central tendency measures of these data?
- A mean = 41, median = 54, mode = 53
- B mean = 54, median = 53, mode = 41
- C mean = 53, median = 41, mode = 54
- D mean = 53, median = 54, mode = 41
- 13 This year's "taste-off" competition among restaurants has been narrowed to 25 finalists: 10 Italian, 5 German, 5 Mexican, and 5 Japanese restaurants. What is the probability that an Italian or German restaurant wins the competition, given that all restaurants have an equal chance?
- A $\frac{3}{5}$
- B $\frac{4}{7}$
- C $\frac{2}{5}$
- D $\frac{1}{15}$

26 (4 Points)

Each number below represents the total points scored per game by one high school basketball player.

15, 44, 32, 18, 22, 41, 29, 23, 34, 21, 20, 33, 60, 19, 28

- A** Organize the data in a box plot.
- B** Identify the minimum, maximum, quartile 1, quartile 2, and quartile 3.
- C** Use 1.5 times the interquartile range (quartile 3 minus quartile 1) to identify any existing outliers.

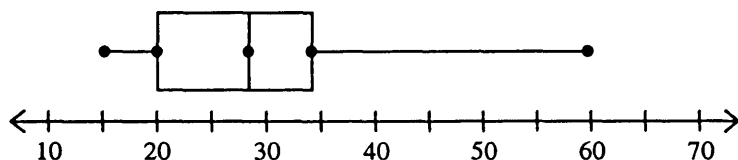
Explain your answers, including supporting calculations, tables, diagrams, charts, drawings, or graphs in your answer booklet.

ANSWER THIS ITEM IN THE SPACE PROVIDED ON PAGE 2 OF YOUR ANSWER FOLDER. NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

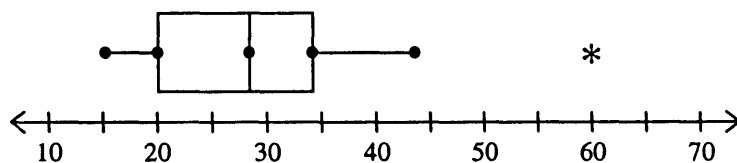
MEAP HST 2004
Mathematics
Item 26

A 4-point response includes all of the following components:

- Part A: Provides a correctly drawn box plot which includes at least 1 of the given datum correctly.



Alternatively, if the student draws the box plot so the outlier 60 is represented, it should look as follows:



- Part B: Correctly identifies the following values:

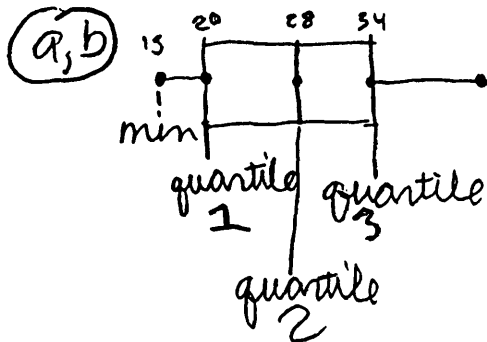
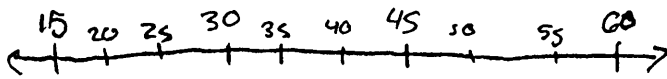
- Minimum = 15
- Maximum = 60
- Quartile 1 = 20
- Quartile 2 (or median) = 28
- Quartile 3 = 34

- Part C: Correctly identifies the outlier as “60”.

General Scoring Rubric:

- Part A: Correctly drawn box plot = 1 point.
- Part B: 4 or 5 correct values = 2 points; 2 or 3 correct values = 1 point.
- Part C: Correctly identifies outlier as “60” = 1 point.

15, 18, 19, 20, 21, 22, 23, 28, 29, 32, 33, 34, 41
 mid 60



60
 *
 max

© $34 - 20 = 14 \cdot 1.5 = 21$

$$34 + 21 = 55$$

$$60 > 55$$

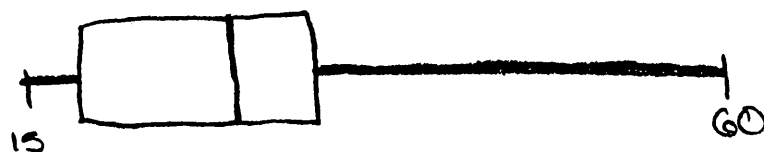
60 = outlier

$$20 - 21 = -1$$

Score Point: 4

This response provides a correctly drawn box plot, correctly identifies all five of the values, and correctly identifies 60 as the outlier.

A)

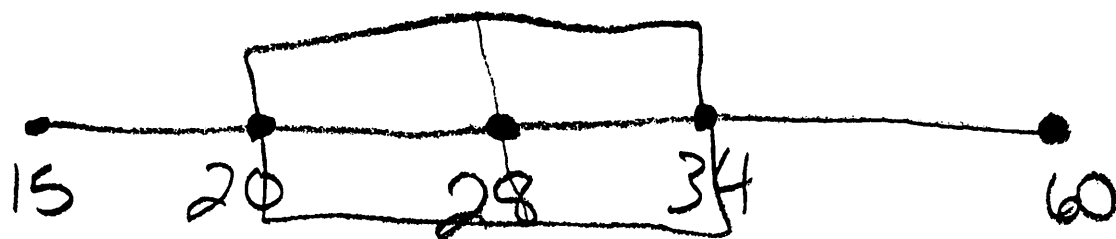


B) minimum = 15
maximum = 60
quartile 1 = 20
quartile 2 = 28
quartile 3 = 34

C) $1.5(34 - 20)$
 $1.5(14)$
21

Score Point: 3

This response provides a correctly drawn box plot and correctly identifies all five of the values.



Ⓑ 15 = min
60 = max

Score Point: 2

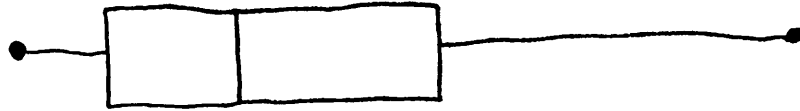
This response provides a correctly drawn box plot and correctly identifies two of the values.



Score Point: 1

This response provides a correctly drawn box plot.

15, 18, 19, 20, 21, 22, 23, 28, 29, 32, 33, 34, 41, 44, 60



Score Point: 0

This response demonstrates no understanding of the item being tested.

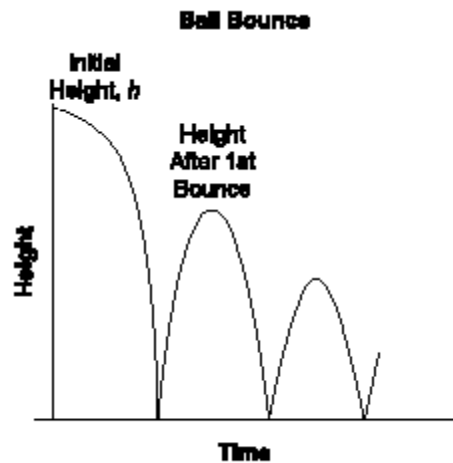
27

Movie Ticket Prices

1970	\$2.50
1975	\$3.00
1980	\$4.00
1985	\$5.50
1990	\$7.50

- If the pattern continued, what was the cost of a movie ticket in 2000?
- A** \$ 8.50
- B** \$ 9.50
- C** \$10.50
- D** \$13.00
-
- 28** Helen earns a yearly salary of \$65,000 before deductions. Her weekly (52 times) deductions are 28% for taxes, 4% for voluntary deductions, and \$70 for insurance. How much is Helen's net yearly salary after taxes, deductions, and insurance?
- A** \$40,560
- B** \$41,288
- C** \$44,130
- D** \$44,858

- 29 Hanna scored 570 on a standardized exam. Her score exceeded the scores of 95,000 of the 125,000 who took the exam. What was her percentile rank?
- A 6.0
- B 24.0
- C 31.6
- D 76.0
- 30 When a ball is dropped from height h , it bounces to $\frac{2}{3}$ of its initial height. When the ball bounces a second time, it reaches $\frac{2}{3}$ the height after the first bounce, and so on. Which expression shows the height of the ball after its n th bounce?



- A $\left(\frac{2}{3}\right)^n h$
- B $n\left(\frac{2}{3}h\right)$
- C $\left(\frac{2}{3}h\right)^n$
- D $\frac{2}{3}h^n$

- 31 During football season, Ronald recorded his body weight.

1 st week	215 pounds
2 nd week	222 pounds
3 rd week	219 pounds
4 th week	226 pounds
5 th week	223 pounds
6 th week	230 pounds

- According to the pattern, how much would Ronald weigh in the 11th week?
- A 227 pounds
- B 235 pounds
- C 238 pounds
- D 245 pounds
- 32 Which number is *closest* in value to $\sqrt{7}$, on the real number line?

- A $-\sqrt{7}$
- B $\sqrt{6}$
- C $\frac{5}{2}$
- D 7^2

- 36 What is the result of transforming the graph of the equation $y = x^2$ onto the graph of the equation $y = (x - a)^2$, $a > 0$?
- A a translation a units to the right
- B a translation a units up
- C a translation a units down
- D a translation a units to the left

- 39 The list shows the ages of all the children registered in a daycare center.

3, 2, 1, 3, 4, 1, 2, 1, 1, 4, 3, 5, 2, 1, 3, 4, 1, 3, 2, 2, 4, 3, 1, 2, 4, 4, 2, 1, 3, 3, 1, 4

Which conclusion about this daycare center is **NOT** true?

- A The range is 5.
- B The median age is less than 3.
- C The daycare center has less than 34 children.
- D There are more 1-year-old children than 4-year-old children.
- 43 A chemistry teacher received a shipment of 20 glass graduated cylinders. Four of these have cracks. If she randomly selects 2 cylinders from the box to use for a class demonstration, what is the probability that neither cylinder is cracked?

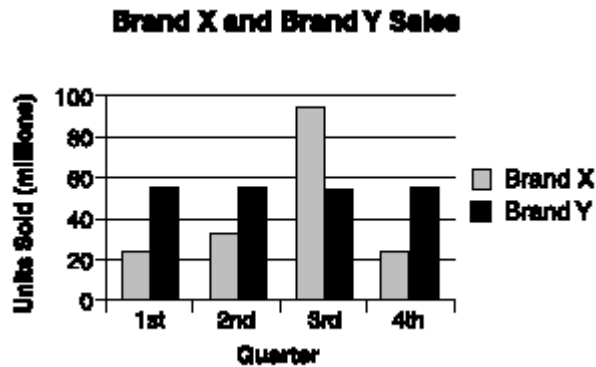
A $\frac{1}{5}$

B $\frac{4}{5}$

C $\frac{1}{8}$

D $\frac{12}{19}$

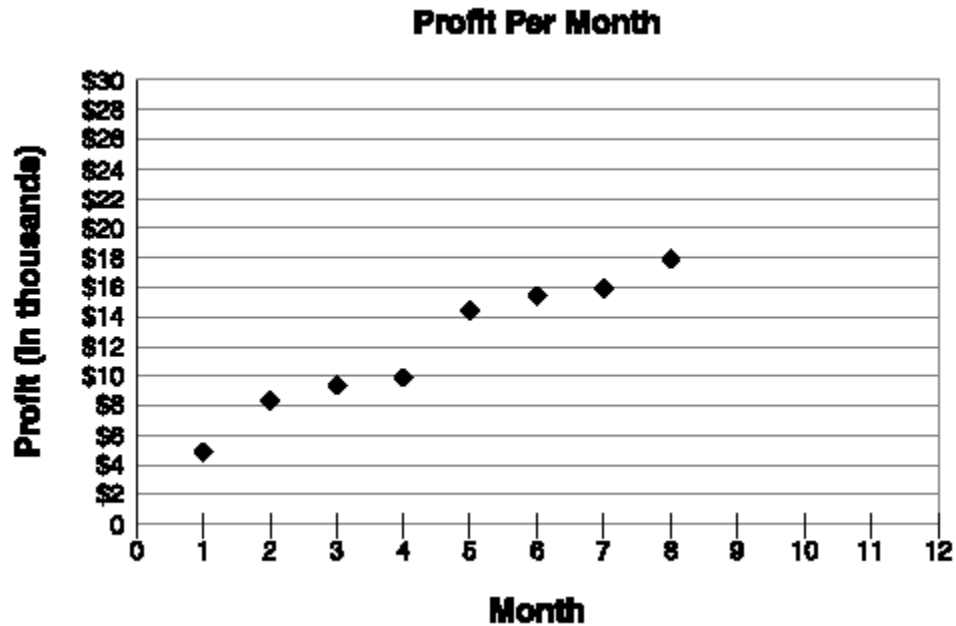
- 44 The bar graph shows the sales of Brand X and Brand Y cereals.



- Which statement is **NOT** true?
- A The sales volumes of the two brands are not the same.
 - B The sales volumes differed most during the 3rd quarter.
 - C The 2nd and 4th quarter Brand X sales were the same.
 - D The 1st and 2nd quarter Brand Y sales exceeded Brand X sales.
- 45 Miguel was hired for an after-school job earning \$7.00 an hour. He was promised a raise every 3 months. The first raise was 10 cents an hour, the second was 15 cents an hour, the third was 20 cents an hour, and so on. What was his hourly wage after the 8th raise?
- A \$ 7.45
 - B \$ 7.80
 - C \$ 9.20
 - D \$10.60

50 (4 Points)

Trendy Threads clothing store has been in business for 8 months. The graph shows each month's profit.



- A Indicate the line of best fit for this information.
- B What is the equation and the slope of that line?
- C Predict the profit for month 12.

Explain your answers, including supporting calculations, tables, diagrams, charts, drawings, or graphs in your answer booklet.

ANSWER THIS ITEM IN THE SPACE PROVIDED ON PAGE 3 OF YOUR ANSWER FOLDER. NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

MEAP HST 2004
Mathematics
Item 50

A **4-point** response includes all of the following components:

- Part A: Correctly indicates line of best fit for the given points. A “reasonable line” is defined as follows: a positive slope line that must either have at least one dot above and 1 dot below it **OR** the y-intercept must from positive 2 to 8.
- Part B: Correctly indicates the slope and the equation ($y = mx + b$) of the line of best fit. The slope must range from positive .5 to 2.5; the equation must be where “m” matches given slope and “b” ranges from positive 2 to 8.
- Part C: Indicates, in thousands, a reasonable prediction (range from \$22,000 to \$30,000) for the profit in month 12.

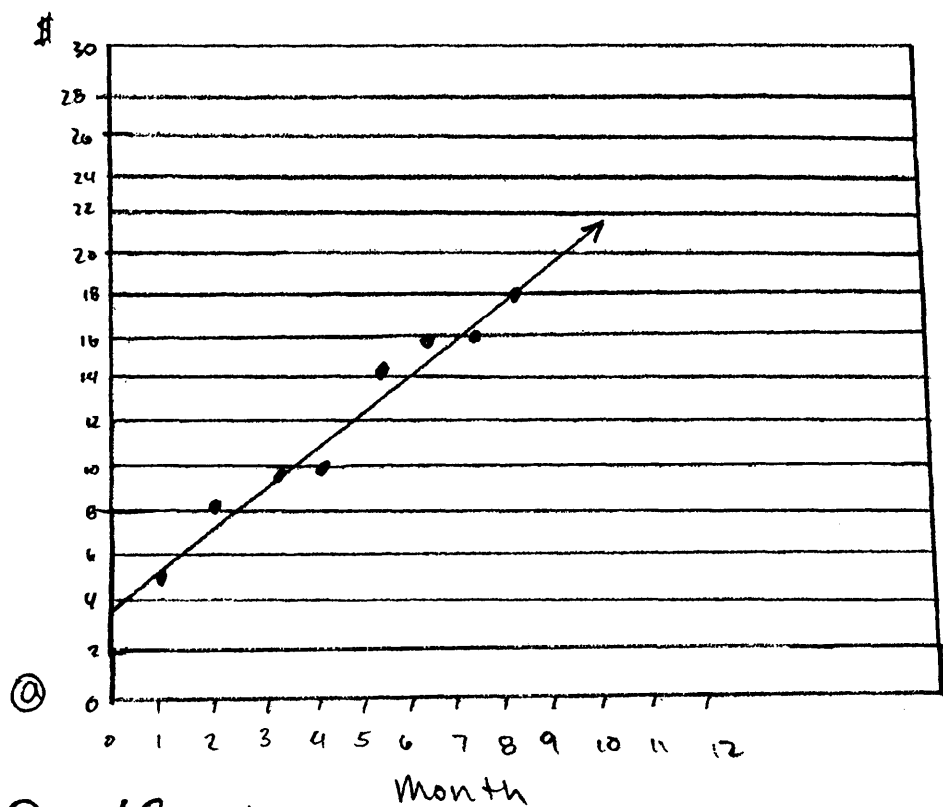
General Scoring Rubric

Line of best fit = 1 point

Slope = 1 point

Equation = 1 point

Profit = 1 point



② $y = 1.8x + 4$
slope = 1.8

③ about \$25.6 (thousand)

Score Point: 4

This response correctly indicates a graph of a line of best fit, correctly indicates an equation ($y=1.8x+4$), correctly indicates the slope (slope=1.8), and indicates a reasonable prediction for the profit in month 12 (\$25.6 thousand).

$(3, 9)$ $(7, 16)$ points

$$\frac{16-9}{7-3} = \frac{7}{4} = \text{slope}$$

$$9 = 7/4(3) + b$$

$$9 - 5\frac{1}{4} = b$$

$$3\frac{3}{4} = b$$

$$(y = 7/4x + \frac{10}{4}) \quad 4$$

$$-7x + 4y = 10$$

$$\boxed{7x - 4y = -10} \quad \text{equation}$$

$$7(12) - 4y = -10$$

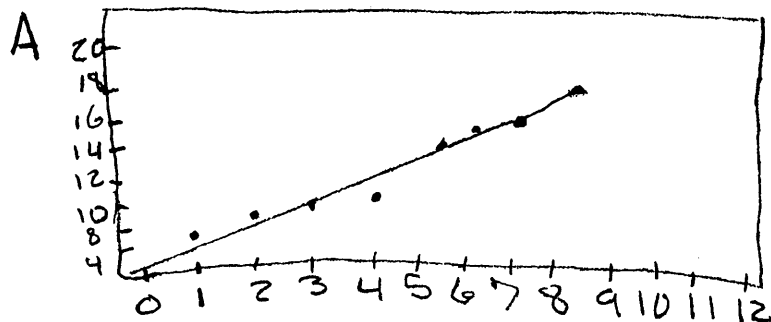
$$84 - 4y = -10$$

$$-4y = -84 - 10 \quad -94$$

$$y = 23\frac{1}{2} \quad \boxed{\$23,500} \quad \text{-in 12 months}$$

Score Point: 3

This response correctly indicates a slope ($7/4$ =slope), correctly indicates an equation ($y=7/4x+10/4$), and indicates a reasonable profit for month 12 (\$23,500).



$(1, 4)$ $(2, 8)$ are on the line

$$B = \boxed{y = 4x}$$

$$C = \boxed{\$26 \text{ thousand}}$$

Score Point: 2

This response correctly provides a graph of a line of best fit and correctly indicates a reasonable profit for month 12 (\$26,000).

a. Horizontal line

b. 2 $y=2x+b$

c. \$26 I predict

Score Point: 1

This response correctly indicates a slope of 2.

A) Start at the first month & go then to the fourth month, then to the seventh month

B) $y = \frac{5}{3}x + b$

$$y = \frac{5}{3}x + 1.5$$

$$10 = \frac{5}{3}(4) + b$$

$$1.5 = b$$

Score Point: 0

This response demonstrates no understanding of the item being tested.

High School Mathematics Key	
Item #	Key
1	C
2	B
3	B
4	D
7	A
10	B
11	D
12	D
13	A
26	CR
27	D
28	A
29	D
30	A
31	B
32	C
36	A
39	A
43	D
44	C
45	C
50	CR