

Appendix D: Sample Practice Papers

For each constructed response item on Part 1 and Part 2 of the Algebra Achievement test two sets of practice papers were constructed. Each set contained five practice papers for each question. For Part 3, there were three sets of practice papers, with ten practice papers per set. At the end of training, scorers used the first set of practice papers, and were expected to obtain 80% agreement with the scoring key for each item. Otherwise, they retrained on the item and were tested on the second practice set. In almost all cases, scorers obtained 80% agreement on the first practice set. In all cases, they obtained 80% agreement on at least one practice set.

Scorers graded student papers at home. Since they used only the first set of practice papers on most items, they brought the second set home for reference or self-testing part way through the scoring.

This appendix contains the answer key for Practice Set A for the four parts of Part 1, Question 3. It also contains the student papers comprising Practice Set A for Part 1, Question 3.3. It contains the answer key for Practice Set A for the eight constructed response items in Part 2. It also contains the student papers comprising Practice Set A for Part 2, Question 10. It contains the answer key for Practice Set A, Part 3. Finally, it contains five of the ten student papers comprising Practice Set A, Part 3. For readers wishing to use the test and scoring rubric, the full set of practice papers and answer keys are available from the author.

Practice Set A for Part 1, Question 3.3

Question 3.3: For what number of cycle sales will income be at least \$9,112,500?

$$9,112,500 = 4500n - .02n^2$$

2,000 m.
2010

(A5)

8,000 motorcycles

86,000
2020

4040100

Question 3.4: For what number of cycle sales will income be as large as possible, and what will that income be?

1,000,000,000 cycles

4.5¹²

1.18

-5.19

5.1810¹⁹ money

Question 3.3: For what number of cycle sales will income be at least \$9,112,500?

$$9,112,500 = 4500(n) - .2n^2$$

(A4)

$$\frac{2025}{.2} = \frac{n - .2n}{.2} \quad -10125 = n - n^2$$

$$-10125 + n = -n^2$$

Question 3.4: For what number of cycle sales will income be as large as possible, and what will that income be?

11

\$ 25,311,544

Question 3.3: For what number of cycle sales will income be at least \$9,112,500?

$$9,112,500 = 4500x - 12x^2$$

$$x \geq 2250$$

A₃

I USED A TABLE
AND FOUND THE
TOTAL

Question 3.4: For what number of cycle sales will income be as large as possible, and what will that income be?

THE INCOME WILL KEEP
RISING SO THERE IS NO
REAL ANSWER, IT IS
AN INFINITE #.

00

I USED A
GRAPH

Question 3.3: For what number of cycle sales will income be at least \$9,112,500?

$$9,112,500 \leq 4500n - 0.2n^2$$

$$n = 2200$$

I put $4500n - 0.2n^2$ in $Y =$. I made a table and when Y was at least 9,112,500 $X = 2200$.

(A2)

Question 3.4: For what number of cycle sales will income be as large as possible, and what will that income be?

$$25312000 = (4500 \cdot 11300) - (0.2 \cdot 11300^2)$$

$$n = 11300$$

I put $4500n - 0.2n^2$ in $Y =$ and when Y got as large as it could at 25,312,000 $X = 11300$

22

Practice "A" sets: key

Problem 7		Problem 8	
A ₁	1	A ₁	3
A ₂	2	A ₂	0
A ₃	3	A ₃	2
A ₄	1	A ₄	1
A ₅	N	A ₅	1

Problem 9		Problem 10	
00000 A ₁	N	A ₁	0
A ₂	0	A ₂	3
A ₃	0	A ₃	1
A ₄	2	A ₄	0
A ₅	0	A ₅	1

Problem 11		Problem 12	
A ₁	1	A ₁	1
A ₂	0	A ₂	0
A ₃	N	A ₃	3
A ₄	3	A ₄	0
A ₅	3	A ₅	3

Problem 13		Problem 14	
A ₁	N	A ₁	1
A ₂	0	A ₂	1
A ₃	1	A ₃	3
A ₄	1	A ₄	2
A ₅	0	A ₅	0

Key for Practice Set A, Part 2

Practice Set A for Part 2, Question 10

Practice 10 A

10. Solve the equation $x^2 + 3x - 4 = 0$ for x .

Work Space:

Answer:

$$x = 1$$

$$x^2 + 3x - 4 = 0$$

(A) $x^2 + 3x = 4$

$$4x = 4$$

11. Solve $(2x - 6)(x + 4) = 0$ for x .

Work Space:

Answer:

$$(2x - 6)(x + 4) = 0$$

$$2x^2 + 2x - 24 = 0$$

$$2x^2 + 2x = 24$$

12. Solve $4 = \frac{15}{x+3}$ for x .

Work Space:

Answer:

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

$$4 = \frac{15}{x+3}$$

$$(x+3) = 15$$

$$x + 12 = 15$$

$$x = 15 - 12$$

10. Solve the equation $x^2 + 3x - 4 = 0$ for x .

Work Space:

$$(x + 4)(x - 1)$$

$$x^2 = 1 + 4x - 4$$

(A₂)

Answer:

$$x = -4, 1$$

11. Solve $(2x - 6)(x + 4) = 0$ for x .

Work Space:

$$2x^2 + 8x - 6x - 24$$

$$2x^2 + 2x - 24$$

$$(2x - 6)(x + 4)$$

Answer:

12. Solve $4 = \frac{15}{x+3}$ for x .

Work Space:

$$1 = \frac{15}{x}$$

Answer:

$$15$$

10. Solve the equation $x^2 + 3x - 4 = 0$ for x .

Work Space:

Answer:

$x = 1$

A3

11. Solve $(2x - 6)(x + 4) = 0$ for x .

Work Space:

Answer:

$x = 2$

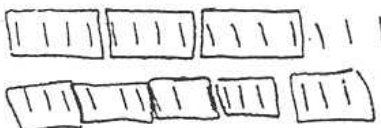
12. Solve $4 = \frac{15}{x+3}$ for x .

Work Space:

$4 \overline{) 15}$

Answer:

$x = 0.3$



10. Solve the equation $x^2 + 3x - 4 = 0$ for x .

Work Space:

$$x^2 + 3x - 4 = 0$$

$$+4 \quad +4$$

$$x^2 + 3x + 4 = 4$$

$$\frac{x^2}{3} = \frac{4}{3}$$

(A)

Answer:

$$\sqrt{1/3}$$

11. Solve $(2x - 6)(x + 4) = 0$ for x .

Work Space:

$$2x^2 + 6x - 6x - 24 = 0$$

$$\frac{2x^2}{2} = \frac{24}{2}$$

$$\sqrt{x^2} = \sqrt{12}$$

Answer:

$$\sqrt{12}$$

12. Solve $4 = \frac{15}{x+3}$ for x .

Work Space:

$$4 = \frac{15}{x+3}$$

$$1 = \frac{15}{x}$$

$$15 = x$$

Answer:

$$15$$

10. Solve the equation $x^2 + 3x - 4 = 0$ for x .

Work Space:

$$\begin{aligned} (x-1)(x+4) \\ x^2 - 1x - 4 + 4x \\ x^2 + 3x - 4 = 0 \\ (x-1)(x+4) = 0 \end{aligned}$$

Answer:

As

11. Solve $(2x-6)(x+4) = 0$ for x .

Work Space:

Answer:

12. Solve $4 = \frac{15}{x+3}$ for x .

Work Space:

Answer:

$$x = 12$$

Key for Practice Set A, Part 3

<u>updated</u>	
Key for Part 3 Practice, Set A	
A_1	1
A_2	0
A_3	1
A_4	2
A_5	3
A_6	2
A_7	1
A_8	2
A_9	1
A_{10}	2

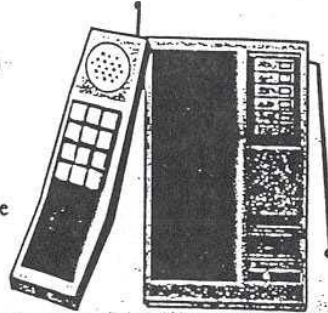
Five Sample Student Papers from Practice Set A, Part 3

A1

Selling by Telephone

52
473

Many companies sell their products through long-distance telephone calls to customers. For example, the *CD Club* sells music compact discs all across the country from its headquarters in New York. Sales calls made by the *CD Club* last an average of about 4 minutes apiece. The club has bids from three possible providers for their long-distance telephone service:



- 1) *Apple Communications* will charge \$0.35 for placing each call and then \$0.15 per minute of time used in the call.
- 2) *Bell Telephone* makes a fixed charge of \$260 per week for access to its long-distance lines, but charges only \$0.10 per minute of time used by the calls.
- 3) *Capital Long Distance Services* will make a fixed charge of \$600 per week for unlimited use of its long-distance lines.

Question: For the *CD Club* the problem is to choose the long-distance service that is least expensive for their business. What advice would you give about the phone company to choose and why?

250 calls
1000 min

Conclusions and Reasoning:

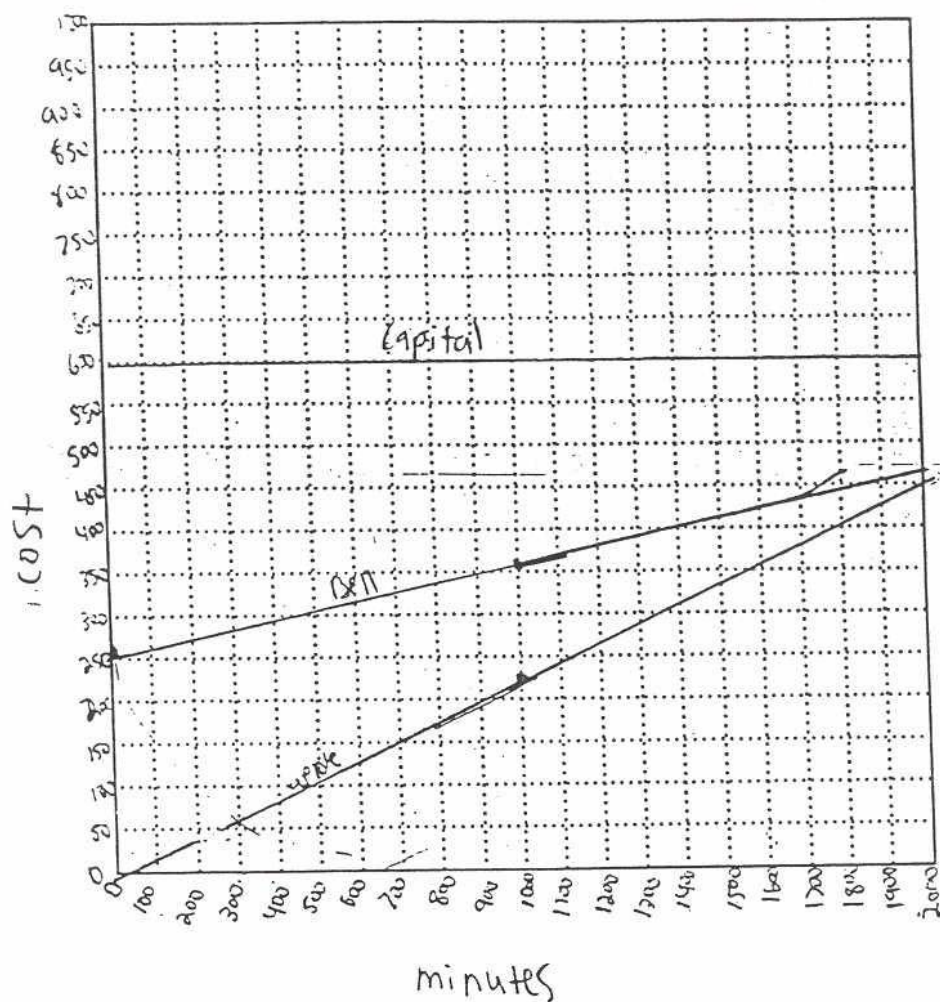
1) $0.35 + 0.15x$ $x = \#$ of min

2) $260 + 0.10x$

3) 600

on the graph next page
we used the Hypothetical Situation
that company 250 calls a week
which comes out to be 1000 min
a week under this situation apple is
by far the cheapest, but if the calls
were more than 2100 min then Bell
would be the better deal.

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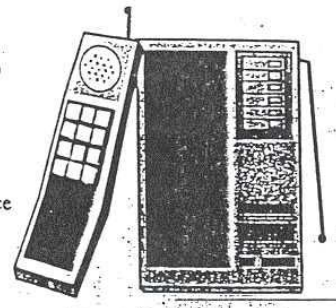
for 250 call (1000 min)

A 2

119
159

Selling by Telephone

Many companies sell their products through long-distance telephone calls to customers. For example, the *CD Club* sells music compact discs all across the country from its headquarters in New York. Sales calls made by the *CD Club* last an average of about 4 minutes apiece. The club has bids from three possible providers for their long-distance telephone service:



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- 3) *Capital Long Distance Services* will make a fixed charge of \$600 per week for unlimited use of its long-distance lines.

Question: For the *CD Club* the problem is to choose the long-distance service that is least expensive for their business. What advice would you give about the phone company to choose and why?

Conclusions and Reasoning:

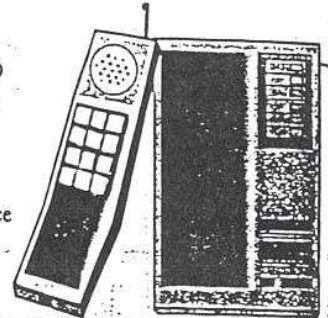
$$\begin{array}{r}
 11900 \\
 \times 0.0075 \\
 \hline
 89250
 \end{array}$$
 Apple \$ 89.25
 Apple Comm. \$ 6.05
 Because the others cost too much per week

A3.

316
321

Selling by Telephone

Many companies sell their products through long-distance telephone calls to customers. For example, the *CD Club* sells music compact discs all across the country from its headquarters in New York. Sales calls made by the *CD Club* last an average of about 4 minutes apiece. The club has bids from three possible providers for their long-distance telephone service:



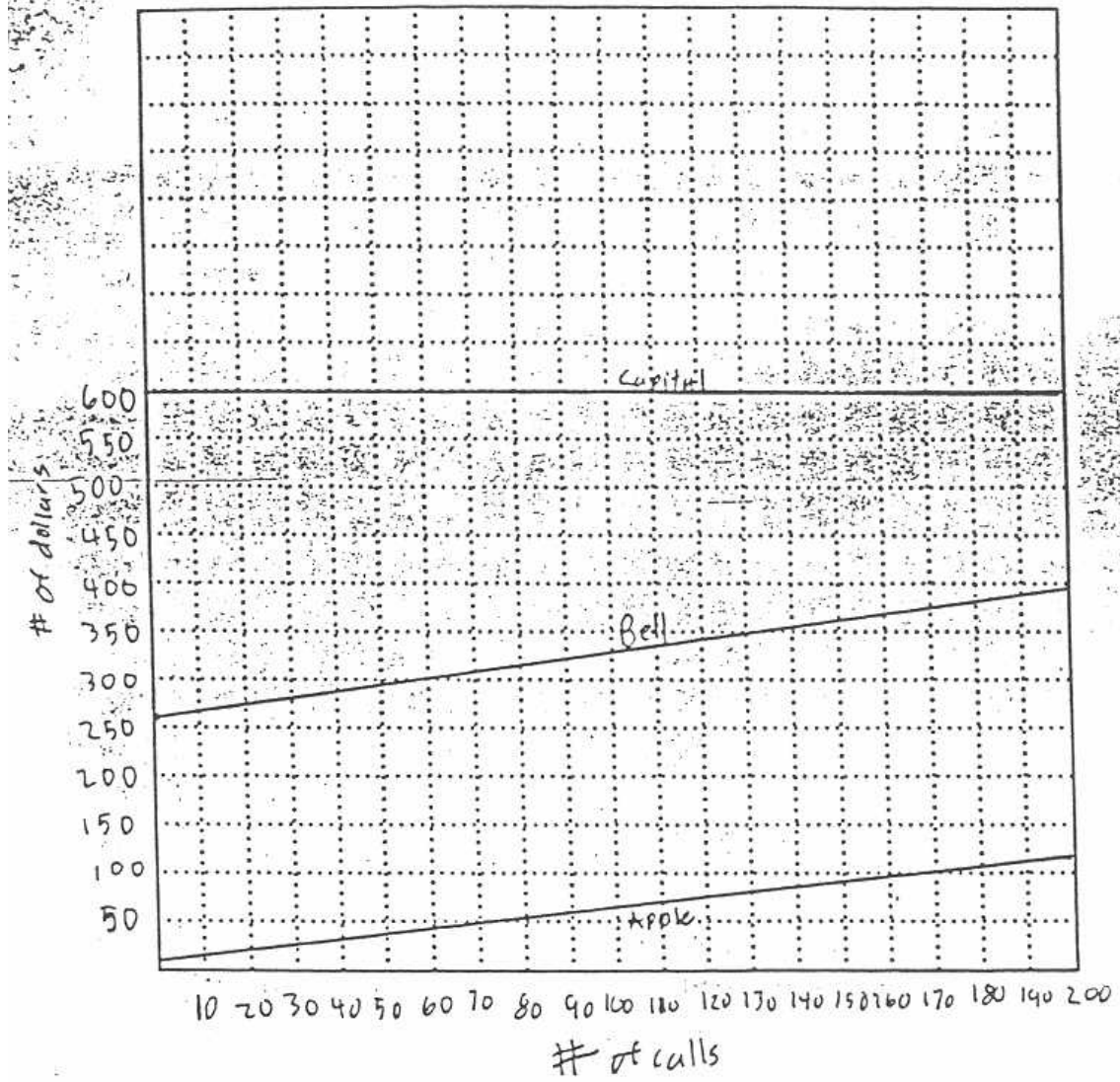
- 1) *Apple Communications* will charge \$0.35 for placing each call and then \$0.15 per minute of time used in the call.
- 2) *Bell Telephone* makes a fixed charge of \$260 per week for access to its long-distance lines, but charges only \$0.10 per minute of time used by the calls.
- 3) *Capital Long Distance Services* will make a fixed charge of \$600 per week for unlimited use of its long-distance lines.

Question: For the *CD Club* the problem is to choose the long-distance service that is least expensive for their business. What advice would you give about the phone company to choose and why?

Conclusions and Reasoning:

If they do an average of 200 calls a week then Apple Communications would be the cheapest. Bell would be the second best company and capital long distance would be the worst

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A4

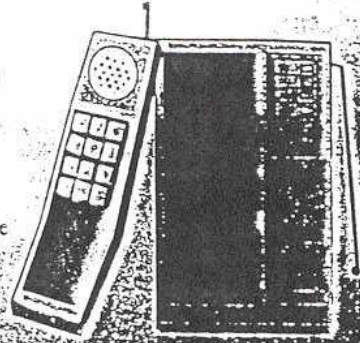
4.5

600 most 99

174

Selling by Telephone

Many companies sell their products through long-distance telephone calls to customers. For example, the *CD Club* sells music compact discs all across the country from its headquarters in New York. Sales calls made by the *CD Club* last an average of about 4 minutes apiece. The club has bids from three possible providers for their long-distance telephone service:



- 1) *Apple Communications* will charge \$0.35 for placing each call and then \$0.15 per minute of time used in the call. \$5 + 15¢
- 2) *Bell Telephone* makes a fixed charge of \$260 per week for access to its long-distance lines, but charges only \$0.10 per minute of time used by the calls. 260 + 10¢
- 3) *Capital Long Distance Services* will make a fixed charge of \$600 per week for unlimited use of its long-distance lines. 600

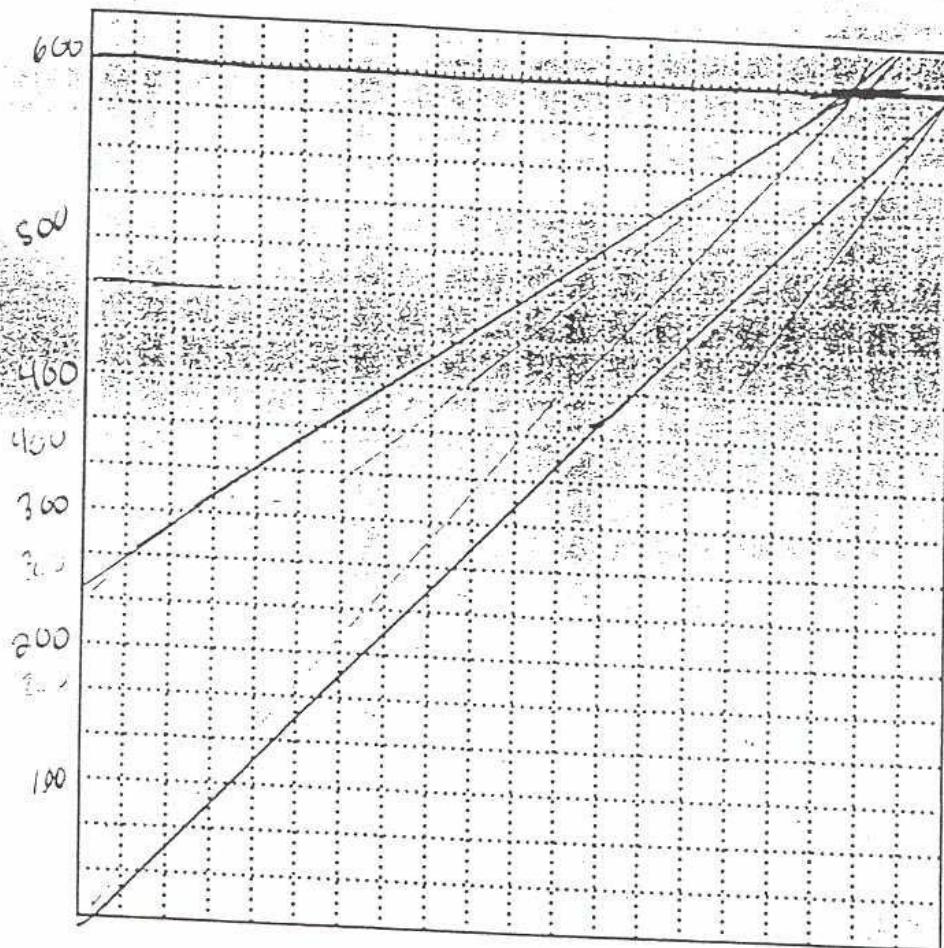
Question: For the *CD Club* the problem is to choose the long-distance service that is least expensive for their business. What advice would you give about the phone company to choose and why?

Conclusions and Reasoning:

The first company would be the best deal until 3998 minutes and if you talk more than that you should go with Plan 3 because at 3998 it is equal to \$600 after that it isn't equal

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cost in \$



minutes on ... machine

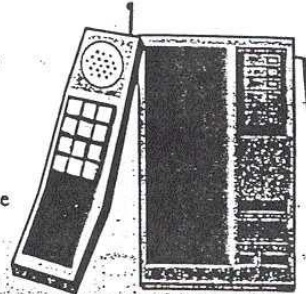
A5

383

442

Selling by Telephone

Many companies sell their products through long-distance telephone calls to customers. For example, the *CD Club* sells music compact discs all across the country from its headquarters in New York. Sales calls made by the *CD Club* last an average of about 4 minutes apiece. The club has bids from three possible providers for their long-distance telephone service:



- 1) *Apple Communications* will charge \$0.35 for placing each call and then \$0.15 per minute of time used in the call. .95
- 2) *Bell Telephone* makes a fixed charge of \$260 per week for access to its long-distance lines, but charges only \$0.10 per minute of time used by the calls.
- 3) *Capital Long Distance Services* will make a fixed charge of \$600 per week for unlimited use of its long-distance lines.

Question: For the *CD Club* the problem is to choose the long-distance service that is least expensive for their business. What advice would you give about the phone company to choose and why?

Conclusions and Reasoning:

$$\begin{cases} .35 + .15(x) = \\ 260 + .10(x) = \\ 600 \end{cases}$$

IF THERE ARE UNDER 474 CALLS PER WEEK
YOU WOULD USE APPLE COMMUNICATIONS
IF THERE ARE UNDER 850 CALLS PER WEEK
BUT OVER 474 YOU WOULD USE BELL TELEPHONE
IF THERE ARE OVER 850 CALLS PER WEEK
YOU WOULD USE CAPITAL LONG DISTANCE SERVICES

