

Practice Materials for Algebra 1 Mathematics

The following prompt, rubric, and sample student work can be used by educators with either the Student Work Analysis Protocol or the Calibration Protocol for Scoring Student Work.¹ In addition, since these samples have been scored and annotated, they can be used to help guide educators with aligning their scoring to these anchor samples developed by the original group of scorers. Follow the protocol(s) when using these materials.

Student work samples from the Rhode Island Interim Assessment Mathematics Algebra 1 Assessment

Math Selection: "Jess' Business Cards"

Prompt:

Jess plans to have new business cards designed and printed. She will use one of the following companies.

- Company P charges a \$20 design fee and \$15 per 200 cards printed.
- Company Q charges a \$50 design fee and \$7.50 per 200 cards printed.

At both companies, the number of cards printed must be in batches of 200.

- a. Write an expression to represent the cost of printing business cards at each company. Use n to represent the number of batches of 200 cards printed. Be sure to clearly label each expression with the correct company.
- b. Jess wants 1000 cards printed. Show which company is less expensive.
- c. For what **number of cards** printed, if any, is the cost of printing the cards the same for both companies? Show your work or explain how you found your answer.

¹ Both protocols can be found on the RIDE website at www.ride.ri.gov/EdEval-OnlineModules
Rhode Island Department of Education & the National Center for the Improvement of Educational Assessment, Inc.

Rubric: The rubric used for this task is a holistic rubric, therefore educators will decide on an overall score for the response.

Score	Description
4	5 Points
3	4 Points
2	2 or 3 Points
1	1 Point
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Training Notes: The following information should be used to guide the discussion of what constitutes a proficient response on this assessment.

Part a. 1 point for two correct expressions, correctly labeled (see sample response)

Part b. 2 points for correct demonstration that company Q is less expensive, with sufficient explanation or work shown to indicate correct strategy

OR

1 point for correct cost for each company with insufficient or no explanation or work shown

or

for correct strategy with incorrect or no answer

Part c. 2 points for correct answer, **800** (cards), with sufficient explanation or work shown to indicate correct strategy

OR

1 point for correct answer with insufficient or no explanation or work shown

or

for correct strategy with incorrect or no answer

Student Work: The following are samples of student work in response to this prompt. Anchor scores and annotations are included on a separate page for the facilitators use with the protocols.

Student Work Sample a:

7.

a. Company P: $20 + 15n$
Company Q: $50 + 7.50n$

b. Company P: $20 + 15(5)$ Company Q: $50 + 7.50(5)$
 $20 + 75$ $50 + 37.5$
 P: 95 Q: 87.5
 less expensive

cards	Price	cards	Price
200	35	200	57.5
400	50	400	65
600	65	600	72.5
800	80	800	80
1000	95	1000	87.5
1200	110	1200	95

800 cards is the same price for both companies

Educator Notes:

Student Work Sample B:

A) co.P - $20 + 15n$
co.Q - $50 + 7.50n$

B) co.P- $20 + 15(5) = 95$
co.Q- $50 + 7.50(5) = 87.50$
Company Q is less expensive

C) If Jess wanted 800 cards printed the prices from both companies would be the same. Both would cost her \$80. This is because for co.P $15(4) = 60 + 20 = 80$. For co.Q $7.50(4) = 30 + 50 = 80$ as well.

Educator Notes:

Student Work Sample C:

a. company p: $15n+20$
 company q: $7.5n+50=$

b. company p: $15(5)+20=95$
 company q: $7.5(5)+50=87.5$

c. 800 cards $15(4)+20=80$
 $7.5(4)+50=80$

Educator Notes:

Student Work Sample D:

a.)	B.)
$p = 20 + 15(200) = \$35$	$P = \$95$
$q = 50 + 7.50(200) = \$57.50$	$Q = \$87.50$ Q is cheaper

C.) 800 cards
 is the same

Educator Notes:

Student Work Sample E:A

Company P $20+15(n)$

Company Q $50+7.50(n)$

B

$20+15(500)$ $20+7500=\$7520$ company P

$50+7.50(500)$ $50+3750=\$3400$ company Q

C

$20+15n=50+7.50n$ $20+7.5n=50$ $7.5n=30$ $n=4$ batches

Educator Notes:

Student Work Sample F:

7.

$P=20+15n$

$Q=50+7.50n$

$P=20+15(5)$

$Q=50+7.50(5)$

$P=95$

$Q=87.50$

Company Q is the cheaper option.

You would need to buy 6 of company Q, in order for it to equal the same amount as buying 5 for company P.

Educator Notes:

Student Work Sample G:

$$P; 20+15(n)$$

$$Q; 50+7.50(n)$$

$$p; 20+15(500)$$

$$20+7500= 7520$$

$$Q; 50+7.50(500)$$

$$50+3250= 3300$$

Company Q is cheaper

Educator Notes:

Student Work Sample H:

$$20+200n$$

company P

$$50+200n$$

company Q

Educator Notes:

Student Work Sample I:

$$20 + 15n$$

Educator Notes:

Student Work Sample J:

$$p = 20 + 15x$$

$$Q = 50 + 7.50x$$

$$P = 20 + 15 \times 5 = 95$$

$$Q = 50 + 7.50 \times 5 = 87.5$$
$$0$$

Educator Notes:

Student Work Sample K:

Company P:
 $20 + 15n$

A.

B. $20 + 15n$

Company Q:
 $50 + 7.50n$

Educator Notes:

Student Work Sample L:

A. $P=15n+20$
 $Q=7.50n+50$

company Q was
 cheaper when
 printing 1000
 cards.

B. $P=15(5)+20$
 $75+20$
 95

B.
 $Q=7.50(5)+50$

$37.50+50$

38.00

Educator Notes:

Student Work Sample M:

A) $C = \text{cards}$
 $c = 20(15 \times 200)$
 $C = 50(7.50 \times 200)$

C) 800 cards,
 both prices
 are 80\$.

B) $200 \times 5 = 1000$
 $15 \times 5 = 75\$ + 20\$ = 95\$$
 5\$ (company p)
 $7.50 \times 5 = 37.50 + 50\$ = 87.50$
 0 (company q)
 company q is
 cheaper.

Educator Notes:

Student Work Sample N:

a: $P = 20 + 15n$
 $Q = 50 + 7.50n$

b: $20 + 15(5) = \$95$
 $50 + 7.5(5) =$
 $\$87.50$

c: 800 cards

Educator Notes:

Student Work Sample O:

A: company p:
 $c=200n+20$

company q:
 $c=200n=50$

B: company p:
 $200*5=1000$
 $20+15*5=95$

dollars

company p is
 more expensive

company q:
 $200*5=1000$
 $50+7.50*5=$
87.50 Dollars

C.

800 cards
 companies have
 the same
 amount

$200*4=800$
 $20+15*4=80$
 dollars
 (company p)

$200*4=800$
 $50+7.50*4=80$
 dollars
 (company q)

Educator Notes:

Student Work Sample P:

a) company p
 $\$20+\$15n$
 Company Q
 $\$50+\$7.50n$

b) $20+15(5)$
 $20+75$
 95
 $50+7.50(5)$
 $50+37.50$
 87.50
 Company P
 would be less
 expensive

c) $20+15(4)$
 $20+60=80$

 $50+7.50(4)$
 $50+30=80$
 If they
 printed 800
 cards the cost
 would be the
 same for both
 companies.

Educator Notes:

Student Work Sample Q:

7.

Company P = $15x + 20 = 200$ A
 Company Q = $7.5x + 50 = 200$

Company P = $15(1000) + 20 = 200$ B
 $= 15000 + 20 = 200$
 $= 15020 = 200$

Educator Notes:

Student Work Sample R:

A.7.

Company P: $20 + (15 \cdot n)$ Company Q: $50 + (7.50 \cdot n)$

B. $20 + (15 \cdot 5)$
 P: $20 + 75 = 95$

Q: $50 + (7.50 \cdot 5)$
 $50 + 37.50 = 87.50$

Company a is less expensive.

C.

Educator Notes:

Facilitator Notes: These samples of student work have been scored and annotations have been provided. See below to help guide educators with aligning their scoring to these anchor samples developed by the original group of scorers.

Sample A**Score:** 4*A-1 B-2 C-2 =5pts***Annotation:****Sample B****Score:** 3*A-1 B-2 C-1 =4pts*

Annotation: *In Parts A and B, the student is using dashes between the company label and the expressions, and not negative signs. Part C is a correct answer only, as the work only verifies the answer is correct (does not show where 4 comes from)*

Sample C**Score:** 3*A-1 B-2 C-1 =4pts*

Annotation: *Part B has the correct costs, with sufficient work shown. Part C is a correct answer without work or explanation.*

Sample D**Score:** 2*A-0 B-1 C-1=2pts*

Annotation: *Part A is incorrect, as there are no variables used. Part B has the correct costs for each company without work. The work shown in A is incorrect, as it is set equal to incorrect amounts. Part C is answer only.*

Sample E**Score:** 2*A-1 B-0 C-1 =2pts*

Annotation: *Part A is correct. Part B is incorrect. Uses 500 instead of 5. Part C shows correct strategy in solving, but leaves the answer as batches, and not number of cards.*

Sample F**Score:** 2*A-1 B-2 C-0 =3pts*

Annotation: *In Part A, the expressions are clear, despite not being labeled Part A. Part B has the correct company totals, with work shown. Part C is incorrect.*

Sample G**Score:** 1*A-1 B-0 C-0 =1pt*

Annotation: *Part A is correct. Part B is incorrect. While student has Q being cheaper, there is no correct work shown, and no correct company totals are given.*

Sample H**Score:** 0*A-0 B-0 C-0 =0pts;*

Annotation: *Part A has incorrect expressions. Parts B and C are not attempted.*

Sample I**Score:** 0*A-0 B-0 C-0 =0pts*

Annotation: *Only having 1 correct expression in Part A is insufficient for credit.*

Sample J**Score:** 2*A-1 B-2 C-0 =3pts*

Annotation: *In Part A, the use of x instead of n is fine. Part B has the correct costs with sufficient work shown. Part C is not attempted.*

Sample K**Score:** 1*A-1 B-0 C-0 = 1pts*

Annotation: *Part A has two correct expressions. Part B makes no attempt to solve, and Part C is not attempted.*

Sample L**Score:** 2*A-1 B-1 C-0 =2pts*

Annotation: *Part A is correct. Part B has correct strategy shown, with a computation error in the total for Company Q. Part C is not attempted.*

Sample M**Score:** 2*A-0 B-1 C-1 =2pts*

Annotation: *Part B has correct costs for each company, but the work shown involves incorrect math notation (run on equal signs), so no work credit. Part C has a correct answer only. The cost is not enough explanation.*

Sample N**Score:** 3*A-1 B-2 C-1 =4pts*

Annotation: *Part B has correct costs, with sufficient explanation shown. Part C is answer only.*

Sample O**Score:** 3*A-1 B-2 C-1 =4pts*

Annotation: *Part A has correct answers. Setting them equal to C is fine. Part B is correct. Part C has a correct answer, but insufficient explanation. Only proves the answer is correct, and does not show how the answer was found.*

Sample P**Score:** 2*A-1 B-1 C-1 =3pts*

Annotation: *Part A is correct. Part B determines the correct costs for each company, but then says that P is cheaper. Correct strategy only. Part C has a correct answer, but does not show how the answer was found.*

Sample Q**Score:** 0*A-0 B-0 C-0 =0pts***Annotation:****Sample R****Score:** 2*A-1 B-2 C-0 =3pts***Annotation:**