

## GRADE 8 GRID-IN SAMPLE PROBLEMS

**DIRECTIONS:** Solve each question. You can use the extra grid-in answer sheet on page 254 to record your answers. Print only one number or symbol in each box. Under each box, fill in the circle that matches the number or symbol you wrote above. **DO NOT FILL IN A CIRCLE UNDER AN UNUSED BOX. DO NOT LEAVE A BOX BLANK IN THE MIDDLE OF AN ANSWER.**

1. On a practice test, there are 3 essay questions for every 7 multiple-choice questions. If there are a total of 420 questions on this test, how many of those are essay questions?

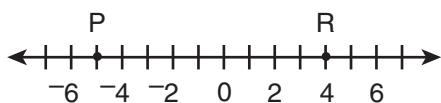
2.  $|19 - 21| + |1.9 - 2.1| - x = 10$

In the equation above, what is the value of  $x$ ?

3.  $\frac{0.21}{0.33} = \frac{x}{1.10}$

What is the solution to the equation above?

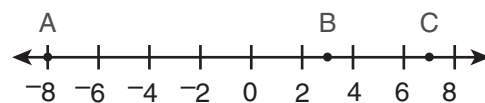
4.



Point Q is to be placed on the number line one-third of the way from Point P to Point R. What number will be at the midpoint of segment PQ?

5. How many ways can the letters in the word RAIN be arranged horizontally so that the vowels (A and I) are always immediately next to each other (either AI or IA)?

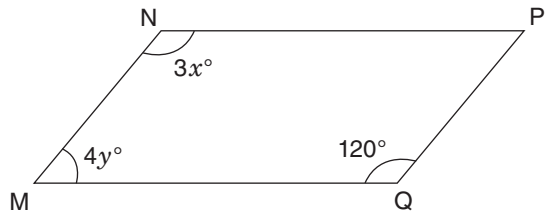
6.



On the number line above, D (not shown) is the midpoint of  $\overline{AB}$ , and E (not shown) is the midpoint of  $\overline{BC}$ . What is the midpoint of  $\overline{DE}$ ?

7. A box contains 11 marbles: 7 red and 4 green. Five of these marbles are removed at random. If the probability of drawing a green marble is now 0.5, how many red marbles were removed from the box?

8.



MNPQ is a parallelogram. The measure of  $\angle MQP$  is  $120^\circ$ . What is the value of  $x + y$ ?

9. Maria is now 16 years old. In 6 years, she will be twice as old as her brother will be at that time. How old is her brother now?

10.  $\frac{4.5}{0.1} \times 0.22 =$

1. **(126)** There are 3 essay questions for every 7 multiple-choice questions, for a total of 10 questions. The proportion of essay questions is  $\frac{3}{10}$ . Multiply the fraction of essay questions by 420 to find the total number of essay questions:  
 $420 \times \frac{3}{10} = \frac{1260}{10} = 126$   
 Since the answer is a positive whole number, skip the first column and place one in the second column on the left-hand side.

	1	2	6	
-	.	.	.	.
	0	0	0	0
●	1	1	1	1
2	●	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	●	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

2. **(-7.8)**  $|19 - 21| + |1.9 - 2.1| - x = 10$   
 $|-2| + |-0.2| - x = 10$   
 $2 + 0.2 - x = 10$   
 $x = -7.8$

Since the answer is a negative, begin filling out the grid with the negative sign in the first column. The answer contains a negative sign, a whole number, a decimal point, and a digit in the tenths place. Each part of the answer, including the decimal point, should be placed in a separate column, with no blank spaces between them.

-	7	.	8	
●	.	●	.	.
	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
●	7	7	7	7
8	8	●	8	8
9	9	9	9	9

3. (0.7)  $\frac{0.21}{0.33} = \frac{x}{1.10}$

Multiply the numerators and denominators of all the fractions by 100 to eliminate the decimals:

$$\frac{21}{33} = \frac{100x}{110}$$

Simplify the fractions:

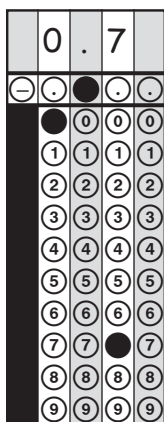
$$\frac{7}{11} = \frac{10x}{11}$$

$$7(11) = 10x(11)$$

$$7 = 10x$$

$$x = \frac{7}{10} = 0.7$$

Since the answer is a positive decimal, skip the first column and place the zero in the second column on the left-hand side.



4. (-2) Find the length of  $\overline{PR}$ :  $4 - (-5) = 9$  units

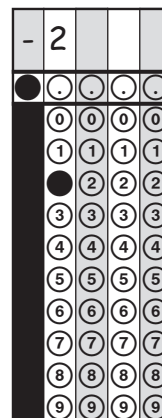
Point Q is located  $\frac{1}{3}$  of the way from P to R, so calculate where that point would be:

$$9 \times \frac{1}{3} = 3 \text{ units}$$

Point Q is located at  $4 - 3 = 1$ . Calculate the midpoint of  $\overline{PQ}$ :

$$\text{Midpoint } \overline{PQ} = \frac{-5 + 1}{2} = -2$$

Since the answer is a negative single-digit, fill in the negative sign in the first column and the second column contains the digit, 2.



5. **(12)** There are three positions for the letters AI in the four letter combinations: AI \_\_ , \_ AI \_\_ , and \_\_ AI

For each of those positions of A and I, there are two combinations of the letters R and N: AIRN, AINR, RAIN, NAIR, RNAI, NRAI. So, for the letters AI (in that order), there is a total of 6 combinations. The question mentions that IA is also possible, so there are also additional combinations with the letters in the order IA. The total number of combinations is  $6 + 6 = 12$

Since the answer is a positive whole number, skip the first column and begin placing the one in the second column.

	1	2		
⊖	⊙	⊙	⊙	⊙
●	0	0	0	0
	●	1	1	1
	2	●	2	2
	3	3	3	3
	4	4	4	4
	5	5	5	5
	6	6	6	6
	7	7	7	7
	8	8	8	8
	9	9	9	9

6. **(1.25)** Calculate the midpoints of  $\overline{AB}$  and  $\overline{BC}$  to find the locations of D and E, respectively:

Find the midpoint for  $\overline{AB}$  (Point D):

$$D = \frac{-8 + 3}{2} = \frac{-5}{2} = -2.5$$

Find the midpoint for  $\overline{BC}$  (Point E):

$$E = \frac{3 + 7}{2} = 5$$

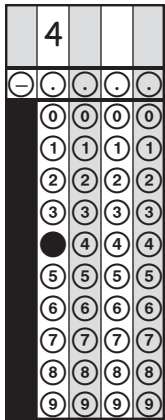
Now, find the midpoint of  $\overline{DE}$ :

$$\frac{-2.5 + 5}{2} = \frac{2.5}{2} = \frac{5}{4} = 1.25$$

Since the answer is a positive decimal, skip the first column and the first digit, number one, begins in the second column on the left-hand side.

	1	.	2	5
⊖	⊙	●	⊙	⊙
●	0	0	0	0
	●	1	1	1
	2	2	●	2
	3	3	3	3
	4	4	4	4
	5	5	5	●
	6	6	6	6
	7	7	7	7
	8	8	8	8
	9	9	9	9

7. **(4)** There were 11 marbles in the box. After 5 marbles were removed, the total number of marbles in the box is now 6. The probability of drawing a green marble is now  $\frac{1}{2}$ , which is equivalent to  $\frac{3}{6}$ , thus, 3 green marbles remain in the box. Originally, there were 7 red marbles in the box. Since there are now 6 total marbles, there are now 3 red marbles. Meaning 4 red marbles were removed from the box. Since the answer is a positive single-digit whole number, skip the first column and the response, four, begins on the second left-hand column.



8. **(55)** In a parallelogram, opposite angles are congruent. Since the question states that angle MQP is  $120^\circ$ , then angle MNP must also be  $120^\circ$ . Use this information to find  $x$  :

$$3x = 120$$

$$x = 40$$

Adjacent angles in a parallelogram are supplementary (sum of  $180^\circ$ ), so the sum of angle MQP and angle NMQ is equal to  $180^\circ$ . Use this information to find  $y$  :

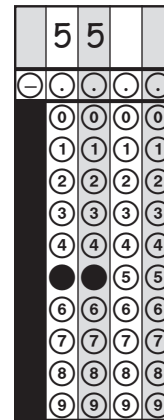
$$4y + 120 = 180$$

$$4y = 60$$

$$y = 15$$

The question asks for the value of  $x + y$ , so  $x + y = 40 + 15 = 55$

Since the answer is a positive whole number, skip the first column and place the first digit to the answer, five, in the second column on the left-hand side.



9. (5) When Maria is 22, she will be twice as old as her brother.

Let  $x$  = the age of Maria's brother when Maria is 22.

$$2x = 22$$

$$x = 11$$

To find Maria's brother's current age, subtract  $11 - 6 = 5$ .

Maria's brother is currently 5 years old.

Since the answer is a positive single-digit whole number, skip the first column and the response begins in the second left-hand column.

	5			
−	.	.	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
●	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

10. (9.9) In order to solve this problem, convert  $\frac{4.5}{0.1}$  to a whole number by multiplying the numerator and denominator by 10 to get  $\frac{45}{1}$  which is 45. Multiply:

$$45 \times 0.22 = 9.9$$

Since the answer is a positive whole number with a decimal, skip the first column and place the first digit, 9, of the answer starting in the second column on the left-hand side.

	9	.	9	
−	.	●	.	.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
●	9	●	9	9

### Answer Key for Grid-In Mathematics

- |         |         |
|---------|---------|
| 1. 126  | 6. 1.25 |
| 2. -7.8 | 7. 4    |
| 3. 0.7  | 8. 55   |
| 4. -2   | 9. 5    |
| 5. 12   | 10. 9.9 |