Unit 1 – Patterns & Relations

Grade 7 Mathematics
Exam Review

1. Which number is divisible by 2?
75, 45, 46, 49

2. Which number is divisible by 4?
34, 51, 68, 38

3. Which number is divisible by 8?
1068, 1130, 1104, 1078

4. Which number is divisible by 8?
84, 126, 168, 172

5. Which number is divisible by 5?
84, 63, 105, 126

6. Which number is divisible by 10?
145, 135, 150, 165

7. Which number is divisible by 2 but **not** by 4?
92, 115, 138, 184

8. Which number is divisible by 5 but **not** by 2?
460, 230, 345, 276

9. Which number is divisible by 4 **and** by 5?
210, 630, 420, 315

10. Which number is divisible by 4?
750, 498, 500, 746

11. Use the digits 0 to 9. Which digits could replace c in the number 567c to make the number divisible by 4?

12. What is the least digit you would add to 873 to make the number divisible by 10?

13. Which number is divisible by 3?
127, 124, 123, 130

14. Which number is divisible by 9?
249, 247, 252, 245

15. Which number is divisible by 6?
118, 124, 126, 121

16. Which number is divisible by 9?
436, 428, 435, 432

17. Which number is divisible by 9?
324 581, 324 664, 324 747, 324 867

18. Which number is divisible by 3 **and** by 5?
378, 380, 375, 385

19. Which number is divisible by 3 but **not** by 6?
3422, 3431, 3423, 3427

20. Use the divisibility rules to find all the factors of 102.

21. What is the least number that could replace c to make the number 36c5 divisible by 9?

22. What is the least number that could replace c to make the number 177c divisible by 6?

23. What is the least number you would add to 5780 to make the number divisible by 3?

24. What is the least digit you would add to 5756 to make the number divisible by 9?

25. Identify the numerical coefficient in the algebraic expression $12 + 5x$.

26. Identify the variable in the algebraic expression $5 + 9x$.

27. Identify the constant term in the algebraic expression $13 + 3x$.

28. Write an algebraic expression for the sum of m and 4.

29. Write an algebraic expression for a number decreased by 15.

30. Write an algebraic expression for a number divided by 4.

31. Write an algebraic expression for the difference between a number h and 23.

32. A student earns $6 for each hour she works. Write an algebraic expression for the money earned in t hours.

33. Evaluate the expression by replacing x with 2.
$x + 11$

34. Evaluate the expression by replacing t with 10.
$8t - 3$

35. Evaluate the expression by replacing a with 9.
$a \div 3$

36. A major league baseball player chews 16 pieces of gum per game. Write an algebraic expression to show how many pieces of gum he might chew in *n* games.

37. The cost of a school banquet is $110 for the room rental and $12 per person attending. Write an algebraic expression to represent the total cost of the banquet for *p* people.

38. Evaluate the expression by replacing *c* with 5.

$$\frac{7c + 15}{c}$$

39. If *n* represents any term number, write a relation for the term.

Term Number		1	2	3	4	5	6
Term		3	6	9	12	15	18

40. If *n* represents any term number, write a relation for the term.

Term Number		1	2	3	4	5	6
Term		8	9	10	11	12	13

41. If *n* represents any term number, write a relation for the term.

Term Number		1	2	3	4	5	6
Term		5	10	15	20	25	30

42. If *n* represents any term number, write a relation for the term.

Term Number		10	11	12	13	14	15
Term		24	25	26	27	28	29

43. There are *n* students in a class. Write a relation for the total number of pencils if each student is given 7 pencils.

44. There are *n* students in a class. Write a relation for the total number of crayons if each student is given 9 crayons.

45. There are *n* students in a class. Write a relation for the number of song books if each pair of students share a song book.

46. Brianna earns $11 for each hour she works. Write a relation for her earnings if she works for *n* hours.

47. Write a relation for the perimeter of the rectangle with length (n + 3) cm and width *n* cm.

48. Each ticket for a ride at the fair costs $4. There are n students in the group and each student buys 8 tickets. Write a relation for the total cost of tickets for the group.

49. There are n players on a sports team. Each player gets 4 pairs of sox and 7 pairs are kept in reserve. Write a relation for the number of pairs of sox needed.

50. Complete the table.

Input x	1	2	3	4	5
Output $6x$					

51. Complete the table.

Input p	1	2	3	4	5
Output $p + 6$					

52. Complete the table.

Input m	1	2	3	4	5
Output $14 - m$					

53. Complete the table.

Input x	1	2	3	4	5
Output $4x$					

54. Complete the table.

Input p	1	2	3	4	5
Output $p + 21$					

55. Complete the table.

Input x	1	2	3	4	5
Output $6x + 3$					

56. Use algebra. Write a relation for the Input/Output table.

Input n	1	2	3	4	5
Output	5	10	15	20	25

57. Use algebra. Write a relation for the Input/Output table.

Input p	1	2	3	4	5
Output	9	10	11	12	13

58. Use algebra. Write a relation for the Input/Output table.

Input x	1	2	3	4	5
Output	15	14	13	12	11

59. Use algebra. Write a relation for the Input/Output table.

Input n	1	2	3	4	5
Output	60	120	180	240	300

60. Use algebra. Write a relation for the Input/Output table.

Input p	1	2	3	4	5
Output	11	12	13	14	15

61. Use algebra. Write a relation for the Input/Output table.

Input x	1	2	3	4	5
Output	49	48	47	46	45

62. Complete the Input/Output table.

Input n	1	2	3	4	5
Output $5n$					

63. Complete the Input/Output table.

Input x	1	2	3	4	5
Output $x + 3$					

64. Complete the Input/Output table.

Input p	1	2	3	4	5
Output $4p + 7$					

65. Complete the Input/Output table.

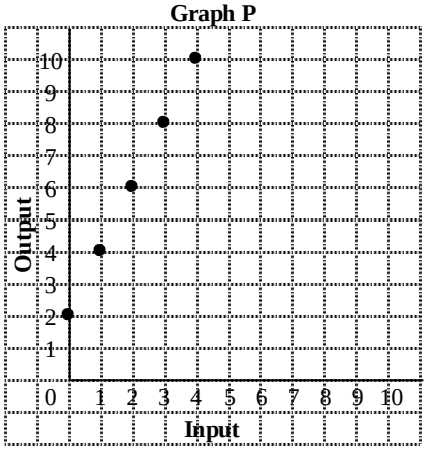
Input q	1	2	3	4	5
Output $11q - 8$					

66. Complete the Input/Output table.

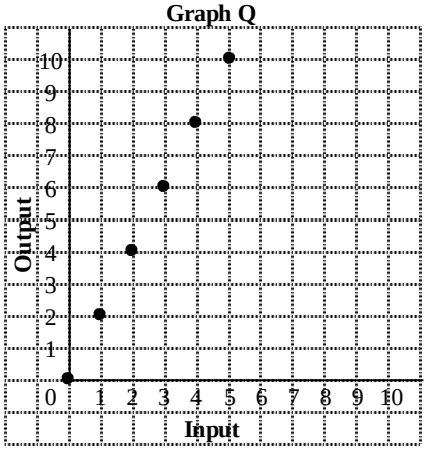
Input x	1	2	3	4	5
Output $13 - 2x$					

67. Which graph shows how $x + 2$ is related to x?

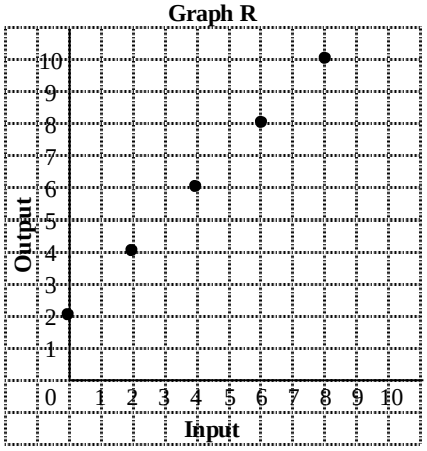
Graph P



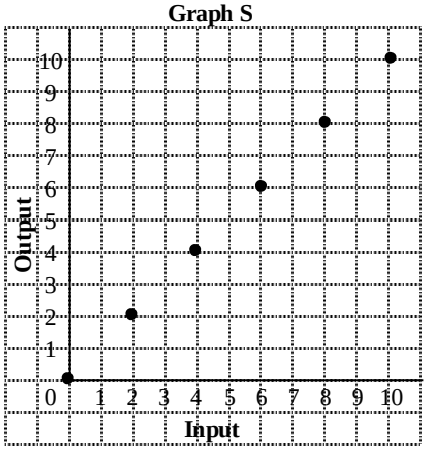
Graph Q



Graph R

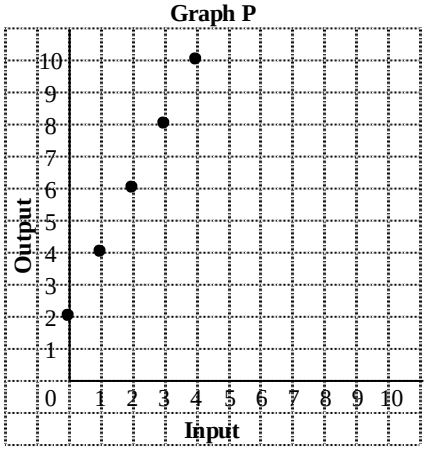


Graph S

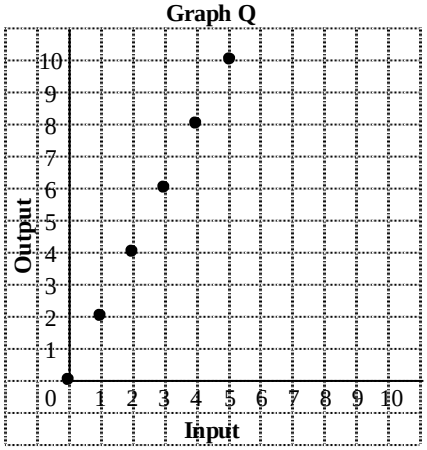


68. Which graph shows how $2x$ is related to x?

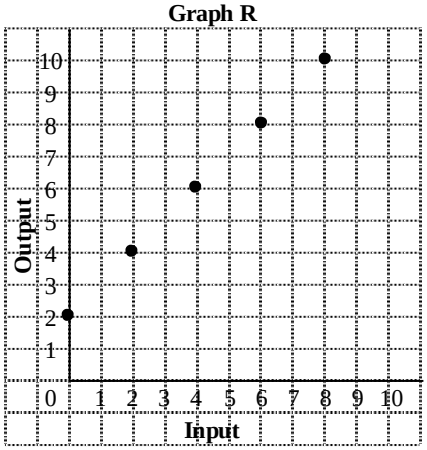
Graph P



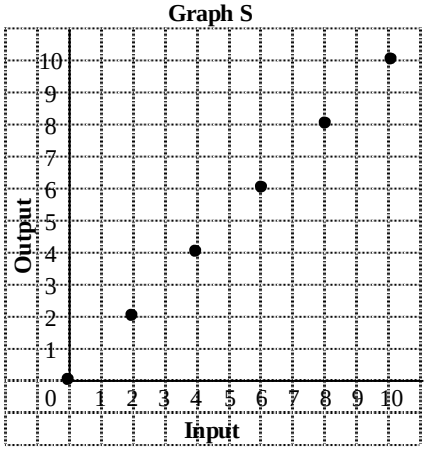
Graph Q



Graph R

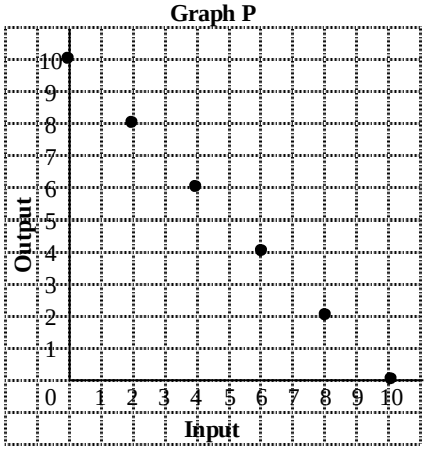


Graph S

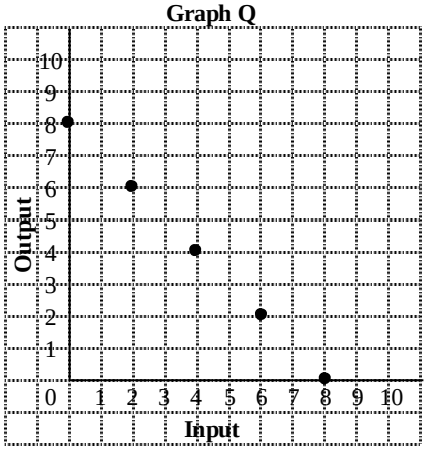


69. Which graph shows how $10 - 2x$ is related to x?

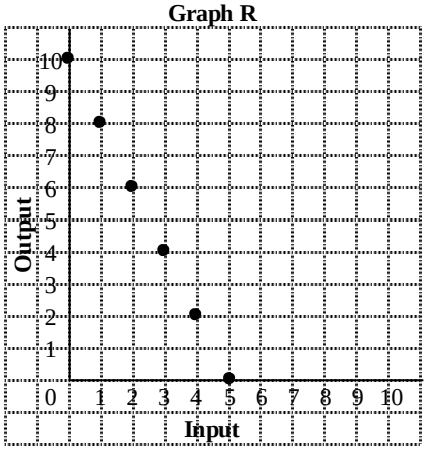
Graph P



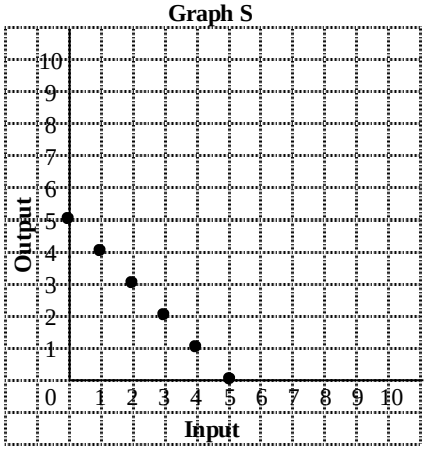
Graph Q



Graph R

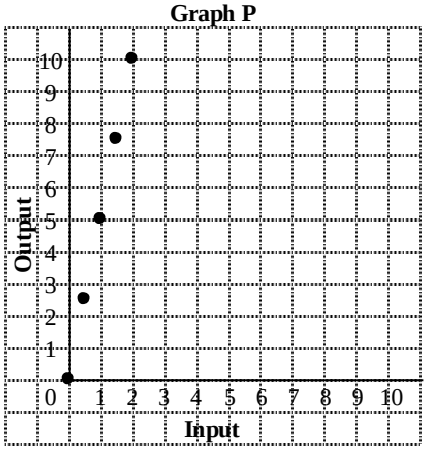


Graph S

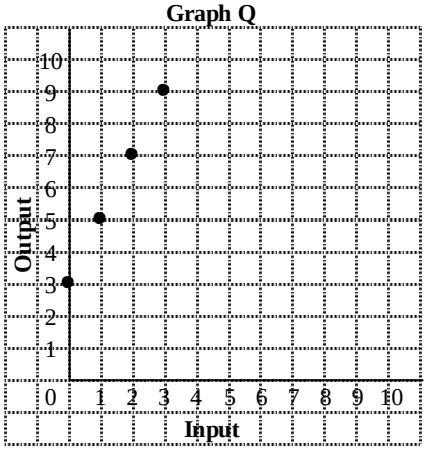


70. Which graph shows how $2x + 3$ is related to x?

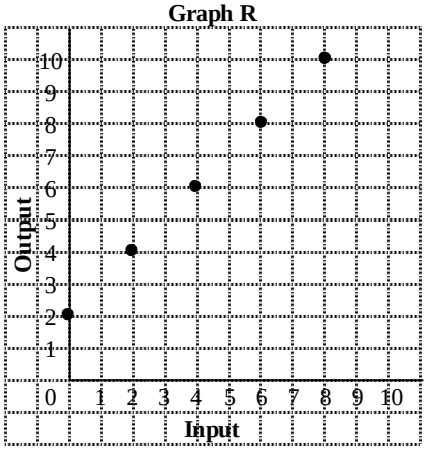
Graph P



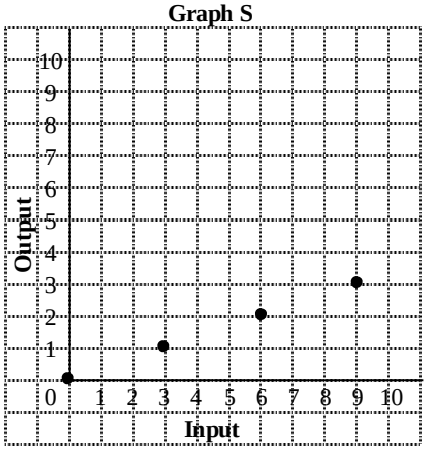
Graph Q



Graph R

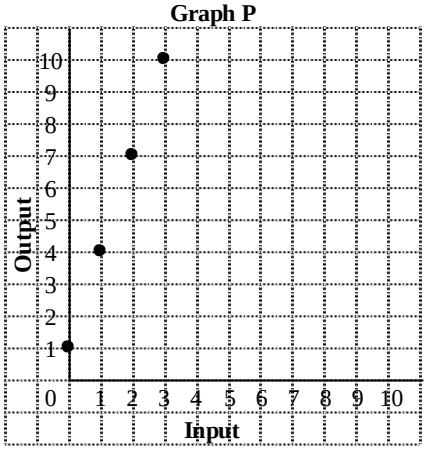


Graph S

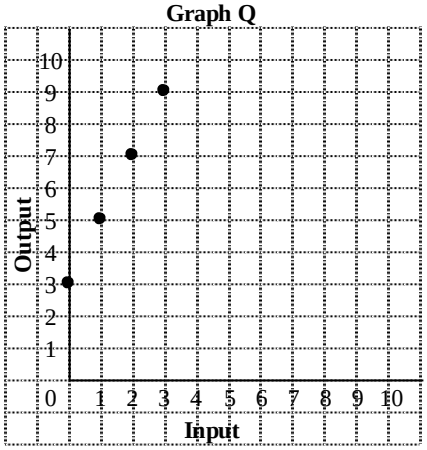


71. Which graph shows how $3x + 1$ is related to x?

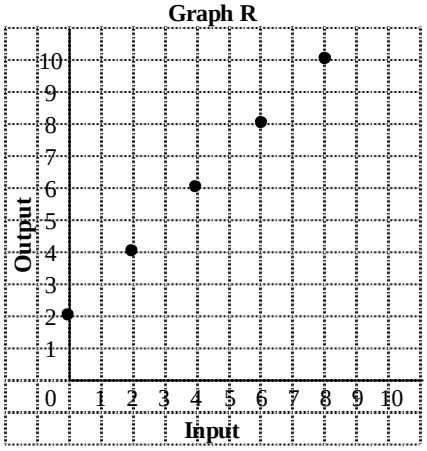
Graph P



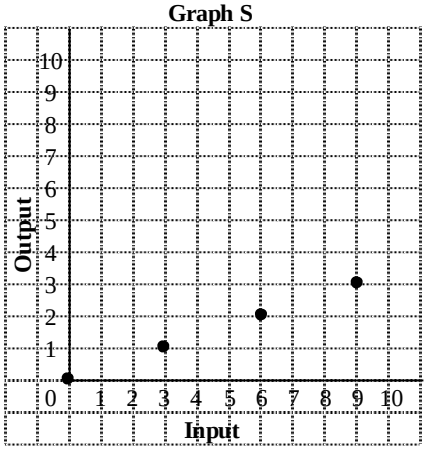
Graph Q



Graph R



Graph S



72. A coach has 40 granola bars and gives 5 bars to each player. Write a relation to show how the number of granola bars that remain is related to the number of players, m.

73. A baker starts off with 8 pies. He bakes 2 additional pies every hour. Write a relation to show how the number of pies is related to the number of hours spent baking.

74. Write an equation for the sentence.
Five more than a number is 18.

75. Write an equation for the sentence.
Three less than a number is 10.

76. Write an equation for the sentence.
A number divided by 4 is 6.

77. Write an equation for "I subtract 14 from a number. The answer is 21."

78. Write an equation for the sentence.
Twenty-seven less than a number is 24.

79. Write an equation for the sentence.
Four added to 4 times a number is 64.

80. Write an equation for the situation.
Patricia has p posters. She sold 9 and has 20 left.

81. Write an equation for the situation.
Each of 5 people contributed x dollars to buy a gift that costs $40.

82. Write an equation for the situation.
A plant was 9 cm tall on June 1. It grew z cm in that month and became 19 cm tall on July 1.

83. A tree was 4 m tall. One year later, the tree grew f m and became 10 m tall. Write an equation for the height of the tree.

84. Brandon has 54 CDs. This number is 2 times as many CDs as Ingrid has. Write an equation you could use to find the number of CDs Ingrid has.

85. Write an equation for "I multiply a number by 3, then add 8. The answer is 17."

86. Identify the numerical coefficient in the equation.
$5x + 3 = 28$

87. Identify the variable in the equation.
$5 + 9x = 68$

88. Use tiles to solve the equation.
$6 + x = 18$

89. Use tiles to solve the equation.
$6x = 24$

90. Use tiles to solve the equation.
$4 + x = 20$

91. Write an equation for the sentence.
Seven more than a number is 15.

92. Write an equation for the sentence.
A number multiplied by 3 is 15.

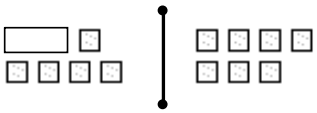
93. Write an equation for the sentence.
The sum of 7 and a number is 26.

94. One book costs $9. How many books could be bought with $63?

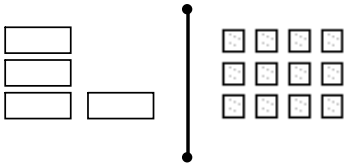
95. Eleven more than 5 times a number is 31. What is the number?

96. Write an equation for the sentence.
A number divided by 4 is 8.

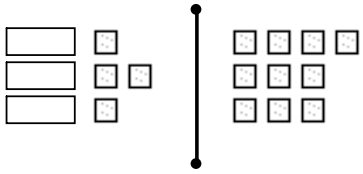
97. Let one white square represent +1 and one white rectangle represent x.
Solve the equation modelled by this set of tiles.



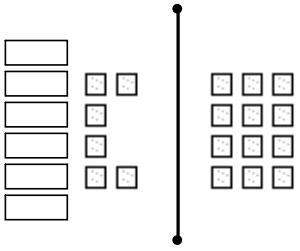
98. Let one white square represent +1 and one white rectangle represent x.
Solve the equation modelled by this set of tiles.



99. Let one white square represent +1 and one white rectangle represent x.
Solve the equation modelled by this set of tiles.



100. Let one white square represent +1 and one white rectangle represent x.
Solve the equation modelled by this set of tiles.



Unit 1- Answer Key

1. 46

2. 68

3. 1104

4. 168

5. 105

6. 150

7. 138

8. 345

9. 420

10. 500

11. 2 or 6

12. 7

13. 123

14. 252

15. 126

16. 432

17. 324 747

18. 375

19. 3423

20. 1, 2, 3, 6, 17, 34, 51, 102

21. 4

22. 6

23. 1

24. 4

25. 5

26. x

27. 13

28. $m + 4$

29. n - 15

30. $\frac{x}{4}$

31. $h - 23$

32. $\$6t$

33. 13

34. 77

35. 3

36. $16n$

37. $110 + 12p$

38. 10

39. $3n$

40. $n + 7$

41. $5n$

42. $n + 14$

43. $7n$

44. $9n$

45. $\frac{n}{2}$

46. $\$11n$

47. $(4n + 6)$ cm

48. $\$32n$

49. $4n + 7$

50.

Input x	1	2	3	4	5
Output $6x$	6	12	18	24	30

51.

Input p	1	2	3	4	5
Output $p + 6$	7	8	9	10	11

52.

Input m	1	2	3	4	5
Output $14 - m$	13	12	11	10	9

53.

Input x	1	2	3	4	5
Output $4x$	4	8	12	16	20

54.

Input p	1	2	3	4	5
Output $p + 21$	22	23	24	25	26

55.

Input x	1	2	3	4	5
Output $6x + 3$	9	15	21	27	33

56. $5n$

57. $p + 8$

58. $16 - x$

59. $60n$

60. $p + 10$

61. $50 - x$

62.

Input n	1	2	3	4	5
Output $5n$	5	10	15	20	25

63.

Input x	1	2	3	4	5
Output $x + 3$	4	5	6	7	8

64.

Input p	1	2	3	4	5
Output $4p + 7$	11	15	19	23	27

65.

Input q	1	2	3	4	5
Output $11q - 8$	3	14	25	36	47

66.

Input x	1	2	3	4	5
Output $13 - 2x$	11	9	7	5	3

67. Graph R

68. Graph Q

69. Graph R

70. Graph Q

71. Graph P

72. $40 - 5m$

73. $8 + 2t$

74. $n + 5 = 18$

75. $n - 3 = 10$

76. $\frac{n}{4} = 6$

77. $n - 14 = 21$

78. $y - 27 = 24$

79. $4 + 4x = 64$

80. $p - 9 = 20$

81. $5x = 40$

82. $9 + z = 19$

83. $4 + f = 10$

84. $2n = 54$

85. $3n + 8 = 17$

86. 5

87. x

88. 12

89. 4

90. 16

91. $x + 7 = 15$

92. $3x = 15$

93. $7 + x = 26$

94. 7

95. 4

96. $\frac{x}{4} = 8$

97. $x = 2$

98. $x = 3$

99. $x = 2$

100. $x = 1$