Relations **Name** . . . . . .

1. Complete the following:

A ***relation*** is . . . . . which allows us to find the . . . . . of one . . . . . if we know the . . . . . of another . . . . . A relation can be expressed as a . . . . . , a . . . . . ., a . . . . . or a . . . . . .

The quantities in a relation can take on various values and so are called . . . . . or just . . . . . .

The . . . . . is the one that you would normally use the relation to find. In a set of ordered pairs it is the . . . . . number in each pair; in a table it is the . . . . . row or column, in a graph, it id plotted on the . . . . . axis. The other variable is the . . . . . .

Some relations have a ***pattern***; some don't. Those that do can also be expressed as a . . . . . .

Relations can be expressed as . . . . . in multiple ways.

In a formula, the variable by itself on one side of the = sign is the . . . . . variable.

A variable is . . . . . if it can take on only certain values, with values in between not being allowed. Otherwise it is . . . . . .

Number of people is a . . . . . variable because its value can be 3 or 4, but nothing in between. Mass is a . . . . . variable because its value can be 3 or 4 or anything in between. A relation is . . . . . if its . . . . . variable is discrete and vice versa. Discrete relations are graphed as . . . . . ; a continuous relationship is graphed as a . . . . . or . . . . . .

2. Express the following relation as a graph.

(0, 0), (1, 20), (2, 40), (3, 50), (4, 60), where the first element is the number of children, the second element is the cost of joining the play group in dollars.

Revision Sheet A1-1 Name . . . . . .

Q1. For each of the following sequences,
(i) say whether it has a pattern
(ii) if it has a pattern, describe the pattern
(iii) if it has a pattern, write the next three numbers

(a) 14, 16, 18, 20, 22 . . . .

(b) 3, 7, 4, 3, 7, 4, 3, 7, 4, 3 . . . . .

(c) 25, 26, 34, 36, 43, 48, 49, 60 . . . .

Q2. For each of the following tables, find the rule for getting the numbers in the bottom row from the numbers directly above them in the top row.

(a)

4	7	1	0	12	5
12	21	3	0	36	15

(b)

9	3	4	5	6	7
7	1	2	3	4	5

(c)

15	10	25	21	14	60
30	25	40	36	29	75

Q3. Insert a number to complete each of the following statements.

(a) __ + 5 = 14 ÷ 2 (b) __ – 5 = 2 × 3

(c) 16 – 4 = __ × 3 (d) 20 – 12 = 16 ÷ __

(e) 3 × 4 = 2 × __ (f) 15 ÷ 5 = 9 ÷ __

Q4. *Solve the following by writing and solving an equation.

(a) Mary thought of a number, divided it by 4, then subtracted 6. This gave her 3. What number did she start with?

(b) Bruce had some money on Monday, On Tuesday he had two times as much. On Wednesday he had $7 more. If he had $19 on Wednesday, how much did he have on Monday?

Revision Sheet A1-2 Name . . . . . .

1. For each of the following sequences,
   (i) say whether it has a pattern
   (ii) if it has a pattern, describe the pattern
   (iii) if it has a pattern, write the next three numbers

   (d) 10, 12, 14, 16, 18, 20 . . . .

   (e) 67, 60, 53, 46, 39 . . . .

   (f) 5, 10, 20, 40, 80, 160 . . . .

2. For each of the following tables, find the rule for getting the numbers in the bottom row from the numbers directly above them in the top row.

(d)

6	30	27	15	42	72
2	10	9	5	14	24

(e)

1	2	3	4	5	6
4	8	12	16	20	24

(f)

4	5.5	7	10	12.5	13
6.5	8	9.5	12.5	15	15.5

3. Insert numbers to complete each of the following statements.

   (g) $3 \times 4 = 2 \times \_\_$ (h) $15 \div 5 = 9 \div \_\_$

   (i) $8 + 6 = 20 - \_\_$ (j) $4 + 12 - 6 = \_\_ \times 2$

   (k) $2 \times 7 + 1 = \_\_ \times 3$ (l) $10 - 6 = \_\_ \div 3$

4. *Solve the following by writing and solving an equation.

   (a) Teetee thought of a number, added 20, then divided the result by 6. This gave her 5. What number did she start with?

   (b) Karl was part way up a hill at 9 a.m. At 10 a.m. he was 120 m higher. At 11 a.m. he was 1.5 times as high as at 10 a.m. If he was 500 m up at 11 a.m., how high was he at 9 a.m.?

. . . . . .

Revision Sheet A1-3 Name . . . . . .

Q1. For each of the following sequences,
(iv) say whether it has a pattern
(v) if it has a pattern, describe the pattern
(vi) if it has a pattern, write the next three numbers

(g) 14, 23, 34, 36, 44, 48, 49, 60 . . . .

(h) 67, 60, 53, 46, 39 . . . .

(i) 21, 25, 32, 42, 55, 71, 90 . . .

Q2. For each of the following tables, find the rule for getting the numbers in the bottom row from the numbers directly above them in the top row.

(a)

1	2	3	4	5	6
4	8	12	16	20	24

(b)

4	5.5	7	10	12.5	13
6.5	8	9.5	12.5	15	15.5

Q3. Insert numbers to complete each of the following statements.

(a) $16 - 4 = \_\_ \times 6$ (b) $20 - 12 = 16 \div \_\_$

(c) $8 + 6 = 20 - \_\_$ (d) $4 + 12 - 6 = \_\_ \times 2$

(e) $2 \times 7 + 1 = \_\_ \times 3$ (f) $10 - 6 = \_\_ \div 3$

Q4. *Solve the following by writing and solving an equation.

(a) Tatiana thought of a number, divided it by 4, then subtracted 6. This gave her 3. What number did she start with?

(c) Kasha thought of a number, added 27, then divided the result by 6. This gave her 13. What number did she start with?

(d) JJ had the measles. On Friday she had only half as many spots as on Thursday and on Saturday she had 24 less than on Friday. If she had 57 on Saturday, how many did she have on Thursday?

Revision Sheet A1-4 Name . . . . . .

Q1. For each of the following sequences,

(vii) say whether it has a pattern

(viii) if it has a pattern, describe the pattern

(ix) if it has a pattern, write the next three numbers

(j) 5, 10, 15, 20, 25, 30 . . . .

(k) 4, 9, 16, 25, 36, 49, 64 . . . .

(l) 1, 3, 7, 15, 31, 63, 127 . . . .

Q2. For each of the following tables, find the rule for getting the numbers in the bottom row from the numbers directly above them in the top row.

(b)

2	3	4	5	6	7
0	1	2	3	4	5

(d)

6	30	27	15	42	72
2	10	9	5	14	24

(e)

1	2	3	4	5	6
4	8	12	16	20	24

Q3. What number needs to be inserted to complete each of the following arithmetic statements?

(a) $3 \times 4 = 2 \times \_\_$

(b) $15 \div 5 = 9 \div \_\_$

(c) $8 + 6 = 20 - \_\_$

(d) $4 + 12 - 6 = \_\_ \times 2$

(e) $2 \times 7 + 1 = \_\_ \times 3$

(f) $10 - 6 = \_\_ \div 3$

Q4. *Solve the following by writing and solving an equation.

(a) Perri thought of a number, added 27, then divided the result by 6. This gave her 13. What number did she start with?

(b) Katie had chicken pox. On Friday she had only half as many scabs as on Thursday and on Saturday she had 16 less than on Friday. If she had 57 on Saturday, how many did she have on Thursday?

Revision Sheet A1-5 Name . . . . . .

Show working on the back of this sheet for the questions marked with a *.

1. Complete this table. (3Aa)

5	11	9	12	20	16	
0	6	4				8

2. Complete this statement: $8 \div 4 + 1 = 12 - \_\_\_\_$ (7Ab)

3. * Jojo thought of a number, added 7, then divided the result by 3. This gave him 8. What number did he think of? . . . . . (7Ab)

4. The cost of a children's party at Sanjay's depends on the number of children as follows.

Children	2	3	4	5	6	7
Cost ($)	40	50	60	65	70	74

   (a) What is the cost for 4 children? . . . . . (8Aa)

   (b) How many children can go for $70? . . . . . (8Aa)

   (c) Which is the independent variable? . . . . . (8Ab)

   (d) Write the relation as a set of statements. (8Ab)

   (e) Write the relation as a set of ordered pairs. (8Ab)

   (f) Can the relation be expressed as a formula? . . . . . (8Ac)

   (g) Is the relation discrete or continuous? . . . . . (8Ad)

5. The amount of pocket money (in dollars) Claudette got per year was given by the formula

   $money = age \times 20 - 30$

   * How much did she get when she was 15 years old? . . . . . (8Ae)

6. Use the formula $height = 400 - width \times 4$ to find the height for each of the following widths:

   (a) 7 . . . . . (b) 15 . . . . . (c) 100 . . . . . .

Revision Sheet A1-6 Name . . . . . .

Show working on the back of this sheet for the questions marked with a *.

1. Write the next three numbers in this sequence: 12, 13, 15, 19, 27, ... (7Aa)

2. Complete this statement: $12 \div 2 + 1 = 20 - \_\_\_\_$

3. Josh has twice as much money as Sven. Sven has $26 more than Harriet. If Josh has $120, how much does Harriet have?

4. The relation between number of children from a family attending an amusement park and the discount given is as follows: (1, 0), (2, 10), (3, 20), (4, 30), (5, 40), where the first number is the number of children and the second number is the discount as a percent.

   (a) What discount is given for 4 children? . . . . . (8Aa)

   (b) How many children must go to get a 20% discount? . . . . . (8Aa)

   (c) Which is the independent variable? . . . . . (8Ab)

   (d) Write the relation as a table. (8Ab)

   (e) Write the relation as a graph. (8Ab)

   (f) Can the relation be expressed as a formula? . . . . . (8Ac)

   (g) Is the relation discrete or continuous? . . . . . (8Ad)

5. The number of peas Hamish was forced to eat with his dinner was given by the formula

   $number = age \times 3 + 7$

   * How many peas did he eat with dinner when he was 11 years old? . . . . . (8Ae)

Name . . . . . .

Revision Sheet A1-7 – Relations

1. The relation between number of children from a family attending an amusement park and the discount given is as follows: (1, 0), (2, 10), (3, 20), (4, 30), (5, 40), where the first number is the number of children and the second number is the discount as a percentage.

   (h) What discount is given for 4 children?

   (i) How many children must go to get a 20% discount?

   (j) Which is the independent variable?

   (k) Express the relation as a table.

   (l) Express the relation as a graph.

   (m) Can the relation be expressed as a formula?

   (n) Why?

   (o) Is the relation discrete or continuous?

   (p) How can you tell?

2. The number of peas Hamish was forced to eat with his dinner was given by the formula

   $number = age \times 3 + 7$

   How many peas did he eat with dinner while he was 11 years old?

Name . . . . . .

Revision Sheet A1-8 – Relations

1. The cost of a children's party at Sanjay's depends on the number of children as follows.

Children	2	3	4	5	6	7
Cost ($)	40	50	60	65	70	74

   (a) What is the cost for 4 children?

   (b) How many children can go for $70?

   (c) Which is the independent variable?

   (d) Express the relation as a set of ordered pairs.

   (e) Express the relation as a graph.

   (f) Can the relation be expressed as a formula?

   (g) Why?

   (g) Is the relation discrete or continuous?

   (i) How do you know?

2. The amount of pocket money (in dollars) Claudette got per year was given by the formula

   $money = age \times 20 - 30$

   * How much did she get when she was 15 years old?

3. Use the formula $height = 400 - width \times 4$ to calculate the height for each of the following widths:

   (a) 7

   (b) 15

   (c) 100