Level 3

Functional
Mathematics

WORKSHEETS

SAMPLE!

Contents

Sample!

Assignment Brief 1

Module: Title: Mathematics
Module Code: 3N0929
Assessment Technique: Collection of work
Title: Number
Weighting: 100% Collection of Work

Guidelines:

In this assignment you will be expected to:
1. Describe the role and impact of number on daily.
2. Describe the concepts of natural numbers (N), integers (Z), rational numbers (Q) and real numbers (R).
3. Describe the properties of addition and multiplication.
4. Describe the concept of number bases and their application in daily life.
5. Describe the concepts of part—whole, fractions, and decimals.
6. Demonstrate equivalence between simple fractions, decimals and percentages.
7. Express simple ratios as fractional ratios e.g. 1:2=1/3:2/3.
8. Calculate solutions to real life mathematical problems.
9. Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key.
10.   Give approximations to real life mathematical problems.
11.   Solve routine problems by making sense of the situations mathematically.

Assessment Criteria:

▪   All calculations must be accurate to two decimal places.
▪   All working out must be shown.
▪   All worksheets must be clearly and neatly completed.

Sample!

- The correct order of operations must be followed.
- Show the application of principal mathematical functions: addition, multiplication, subtraction and division.
- Approximations can include estimation, significant figures and rounding off large natural numbers.
- Numbers you work with include natural numbers (N), integers (Z), rational numbers (Q) and real numbers (R).
- Use correct mathematical vocabulary.
- Answers must be in their simplest form and be accompanied by appropriate units.
- Formulas must be displayed.
- When solving problems, make an initial model of the situation, decide on the mathematical techniques and tools to use, apply mathematical techniques, examine patterns, relationships and assumptions and make adjustments to see your effect on the initial model, and discuss and present results and conclusions in relation to the situation.

Date Brief issued: Submission Date:

I confirm that this is my own work.

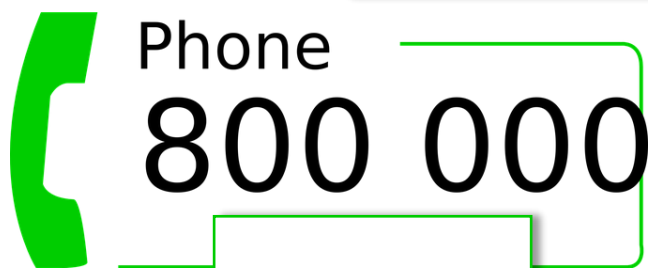Signed: [   ]   Date: [   ]

Sample!

1. What do these real-life numbers represent?

SEASIDE HIGHWAY

Sandy Beach	5
Bill's Lagoon	9
Sandstone Cliffs	22
Golden Blue Beach	45

Phone

800 000

iBANK

ENTER PIN

Sample!
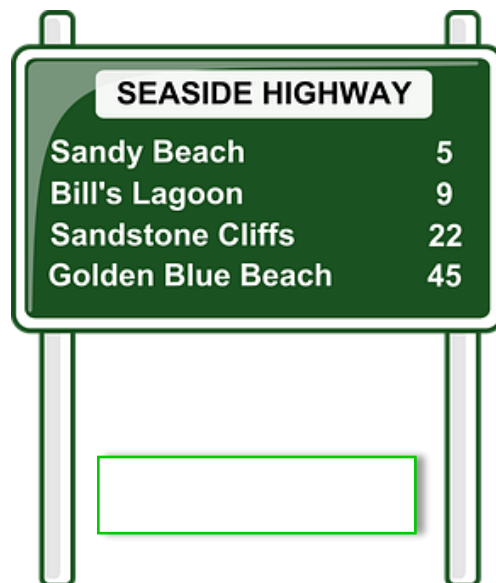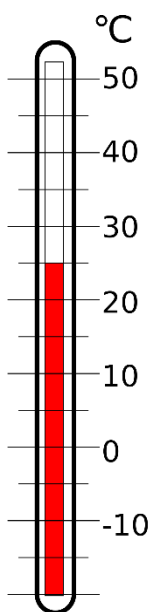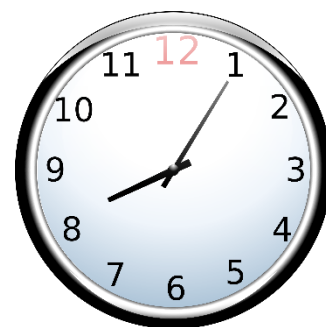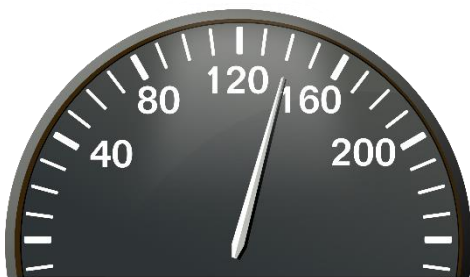
2. Name the roles numbers play in each of these situations:

a) Chatting on your mobile phone

_____

_____

b) Cooking in the kitchen

_____

_____

c) Gardening

_____

_____

d) Your hobby

_____

_____

e) Keeping a diary

_____

_____

f) Planning an outing

_____

_____

g) Banking

_____

_____

h) Decorating your home

_____

_____

i) Using social media

_____

_____

j) Attending a class

_____

_____Functional_Maths_____

Sample!

1. Complete the table:

Number	What kind of number is it?
a) 0.45	
b) 3.1415926535............	
c) 3.14159	
d) 0	
e) 5/3	
f) 1 2/3 = 5/3	
g) $\sqrt{2}$ = 1. 41421356......	
h) $-\sqrt{81}$ = -9	
i) -9/3	
j) $\sqrt{25}$ = 5	
k) 9/3 = 3	
l) -3/4	
m) π = 3.1428571...	
n) 3.144444......	

2. Explain a difference between a rational and irritational number.

_____
_____
_____
_____
_____
_____
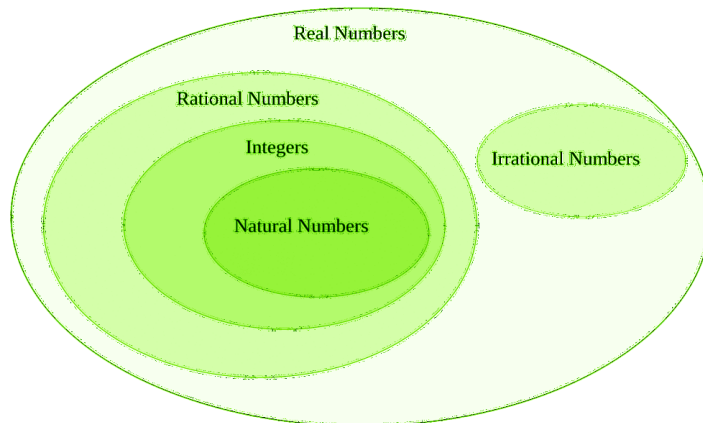
1. You are trying to cut down on using Facebook. If the colour yellow represents the fraction of the day you spend on Facebook, what fraction of your day are you spending on Facebook?

Monday	Tuesday	Wednesday

Thursday	Friday	Saturday
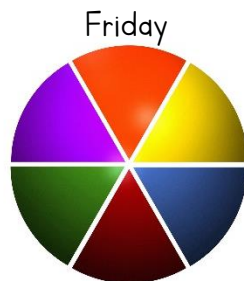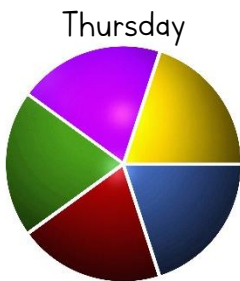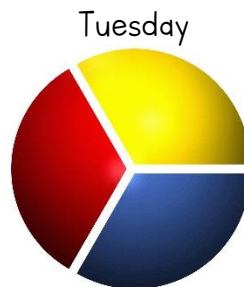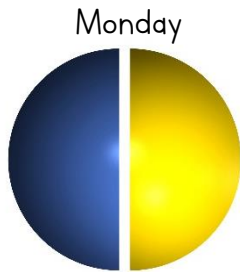
Monday: _____   Tuesday: _____   Wednesday: _____

Thursday: _____   Friday: _____   Saturday: _____

Write the fractions described here:

a) You bought four bottles of water and you drank one of them. What fraction shows how much water you drank?

b) My neighbour had eight large trees and he cut down three of them. What fraction shows how many trees he cut down?

c) You had €10 and you spent €9 on lunch. What fraction shows how much money you had left?

d) You spent nine hours at work. What fraction of the day did you spend at work?

Sample!

1. The recipe below serves 4 people. Calculate the quantities for 2, 8, and 6 people and write them in the columns on the right for each ingredient.

Quantity	Ingredients	For 2	For 8	For 14
4	Chicken breasts	2	8	14
2	Tablespoons of olive oil			
1/2	Teaspoon of black pepper			
1/4	Pound of prosciutto			
3	Small zucchinis			
1	Clove of garlic			

 Hint: Notice that the relationship between the different quantity does not change. e.g. no matter how many people are to be served, the number of chicken breasts is also twice the number tablespoons of olive oil and there are always three times more zucchinis than cloves of garlic.

Use this space below for your working out:

_____

_____

_____

_____

_____

_____

_____

_____

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Sample!

1. Identify the properties of addition:

Commutative Property, Associative Property, Additive Identity Property, Distributive Property

a)   The sum of two numbers times a third number is equal to the sum of each addend times the third number. For example: $a \times (b + c) = a \times b + a \times c$ _____

b)   When three or more numbers are added, the sum is the same regardless of the grouping of the addends. For example: $(a + b) + c = a + (b + c)$ _____

c)   Adding 0 to any number leaves it unchanged. For example: $a + 0 = a$. _____

d)   Adding 0 to any number leaves it unchanged. For example: $a + 0 = a$. _____

e)   When two numbers are added, the sum is the same regardless of the order of the addends.
For example: $a + b = b + a$ _____

f) When two numbers are added, the sum is the same regardless of the order of the addends.
For example: $a + b = b + a$ _____

g) The sum of any number and zero is the original number.
For example: $a + 0 = a$. _____

h) The sum of two numbers times a third number is equal to the sum of each addend times the third number.
For example: $a \times (b + c) = a \times b + a \times c$

_____

i) When three or more numbers are added, the sum is the same regardless of the grouping of the addends.
For example: $(a + b) + c = a + (b + c)$

_____

j) The sum of any number and zero is the original number.
For example: $a + 0 = a$. _____

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Sample!

2. Choose the correct answers:

a) Which equation shows the identity property of addition?
☐ 8 + 7 = 7 + 8
☐ 4 = 1 + 2 + 3
☐ 0 + 3 = 3
☐ 6 + 7 = 7 + 6

b) Which equation shows the commutative property of addition?
☐ 1 + 0 = 1
☐ 5 + 6 = 6 +5
☐ 7 = 4 + 3 + 1
☐ 9 + (4 + 5) = (9 + 4) + 5

c) Which equation shows the associative property of addition?
☐ 1 + (2 + 3) = (1 + 2) + 3
☐ 6 + 7 = 8 + 9
☐ 6 + 0 = 6
☐ 4 + 8 = 8 + 4

d) Which property of addition is represented by the following equation?

t + 0 = t

☐ associative
☐ commutative
☐ identity

Sample!

1. Determine which letter best represents the property listed.

a) Distributive
☐ $5 \times 1 = 5$
☐ $5 \times (3 + 7) = (5 \times 3) + (5 \times 7)$
☐ $5 \times 3 = 3 \times 5$
☐ $5 \times (3 \times 7) = (5 \times 3) \times 7$

b) Identity
☐ $8 \times (9 \times 5) = (8 \times 9) \times 5$
☐ $8 \times (9 + 5) = (8 \times 9) + (8 \times 5)$
☐ $8 \times 1 = 8$
☐ $8 \times 9 = 9 \times 8$

c) Distributive
☐ $3 \times 7 = 7 \times 3$
☐ $3 \times (7 \times 2) = (3 \times 7) \times 2$
☐ $3 \times 1 = 3$
☐ $3 \times (7 + 2) = (3 \times 7) + (3 \times 2)$

d) Associative
☐ $5 \times (9 \times 4) = (5 \times 9) \times 4$
☐ $5 \times 1 = 5$
☐ $5 \times 9 = 9 \times 5$
☐ $5 \times (9 + 4) = (5 \times 9) + (5 \times 4)$

e) Distributive
☐ $4 \times 9 = 9 \times 4$
☐ $4 \times (9 + 2) = (4 \times 9) + (4 \times 2)$
☐ $4 \times 1 = 4$
☐ $4 \times (9 \times 2) = (4 \times 9) \times 2$

f) Associative
☐ $9 \times 1 = 9$
☐ $9 \times 6 = 6 \times 9$
☐ $9 \times (6 \times 3) = (9 \times 6) \times 3$
☐ $9 \times (6 + 3) = (9 \times 6) + (9 \times 3)$

12

A. Read about Base 8:

An older computer-based number system is "octal", or base eight. The digits in octal math are 0, 1, 2, 3, 4, 5, 6, and 7. The value "eight" is written as "1 eight and 0 ones", or 10_8.

B. Convert the given Decimal number to its Octal equivalent.

a) $49_{(10)}$ = _____ (8)

b) $21_{(10)}$ = _____ (8)

c) $28_{(10)}$ = _____ (8)

d) $2_{(10)}$ = _____ (8)

e) $57_{(10)}$ = _____ (8)

f) $20_{(10)}$ = _____ (8)

g) $63_{(10)}$ = _____ (8)
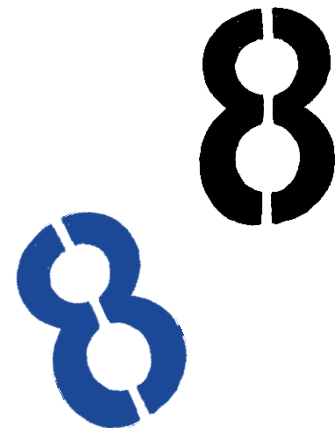
C. Convert the given Octal number to its Decimal equivalent.

a) $7_{(8)}$ = _____ (10)

b) $32_{(8)}$ = _____ (10)

c) $72_{(8)}$ = _____ (10)

d) $13_{(8)}$ = _____ (10)

e) $45_{(8)}$ = _____ (10)

f) $3_{(8)}$ = _____ (10)
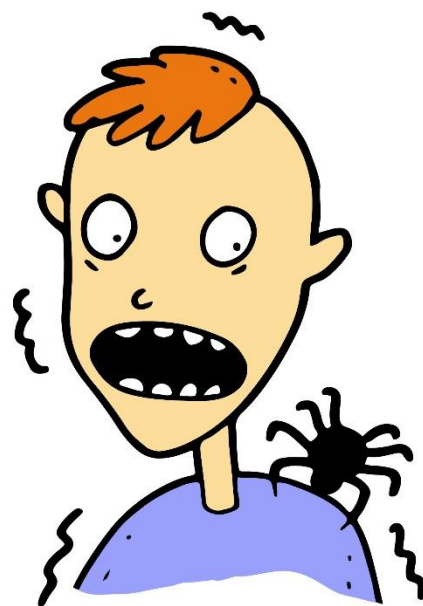
1. Round numbers to the nearest 10:

10

a. 465 _____   b. 945 _____

c. 902 _____   d. 123 _____

e. 834 _____   f. 391 _____

g. 498 _____   h. 854 _____

9. Round numbers to the nearest 100:

100

a. 125 _____   b. 96 _____

c. 919 _____   d. 728 _____

e. 53 _____   f. 353 _____

g. 980 _____   h. 263 _____

Examples:
235 to the nearest 10 is 240
678 to the nearest 100 is 700
4219 to the nearest 1000 is 4000

A. Look for a pattern. Can I see something happening over and over again? Will the pattern help me solve the problem?

A group of businessmen were at a networking meeting. Each businessman exchanged his business card with every other businessman who was present.

a) If there were 16 businessmen, how many business cards were exchanged?

_____

_____

_____
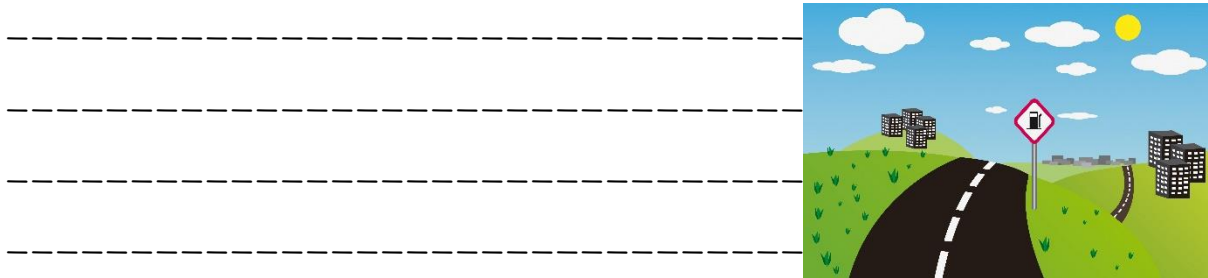
_____

_____

_____

b) If there was a total of 380 business cards exchanged, how many businessmen were at the meeting?

_____

_____

_____

_____

_____

_____

Sample!

B. Make a model. Can I use paper, blocks or other objects to help me find the answer?

A highway has petrol station every 2 kilometres, rest area every 4 kilometres, and shop every 3 kilometres. Where is the closest petrol station, rest area, and shop all at the same time?

_____

_____

_____

_____

C. Ignore irrelevant information. Sometimes information that does not relate directly to the problem is included. Score out such information so it does not cause confusion.
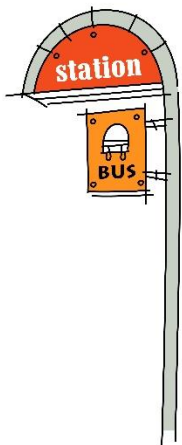
When bus 13A leaves the station, there are 14 people on board. At the first stop, 10 people get on. At the second stop, 8 people get on and 4 people get off. At the third stop, 9 people get off. How many people are on the bus after the first stop?

_____

_____

_____

_____

16

Sample!

a) There are 60g of pasta in one portion. How many portions are there in a 3kg bag of pasta?

_____

_____

_____
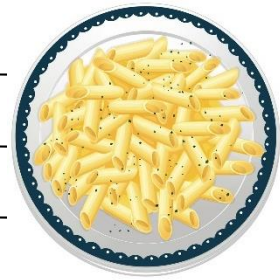
b) I have a packet of 20 biscuits. I give $\frac{3}{4}$ of the biscuits to my visitors. How many biscuits do I have left?

_____

_____

_____

c) Joan needs to be at work by 9:00 a.m. It takes her 10 minutes to warm up her car, 25 minutes to prepare for the day, and 35 minutes to drive to work. What time should she wake up so she can get to work on time?

_____

_____

_____

Sample!

A. Properties of linear equations

1. Read the information:

Addition property of linear equations: If any number is added to both sides of an equation, then the equality of the equation remains unchanged, for example, if x = y then x + a = y + a

Subtraction property in solving linear equations: If any number is subtracted from both sides of an equation, then the equality of the equation remains unchanged, for example, if x = y, then x - a = y - a

Multiplication and division property: If a = b, then a × c = b × c and a ÷ c = b ÷ a, where a is a non-zero constant

2. Solve the equations:

a) 9 = 11 - w   _____

b) 4 = 5 - v   _____

c) 6 + t = 11   _____

d) 4 = t + 1   _____

e) x - 11 = 8   _____

f) 2k = 1   _____

g) 12 = b - 9   _____

h) $1 = \frac{y}{9}$ _____

i) 2 + k = 4   _____

j) 2 = 9x   _____

k) t + 9 = 11   _____

l) v - 8 = 5   _____

Sample!

B. Simplifying expressions

1. Simplify the expressions.

a) c + (–9c) + c + c + c + c = _____

b) 3 z + 3 z = _____

c) m + 4m + m + m = _____

d) –4 z – z = _____

e) v + 10v + v + v = _____

f) –y + 10 y = _____

g) 7 z + 3 z = _____

h) –4 – 8 n – 7 + 2 n = _____

i) 6p – 1 + 1 + 3 p = _____

j) 8 p – p = _____

k) –6 – 9 w – 6 + 8 w = _____

l) 5 – 9 a – 2 a + 1 – 6 a = _____

m)   z + (–3z) + z + z = _____

n) 9 x + (–3) x = 9x –3x = _____

Examples:

6x + 2 x = 8x

b + 2b + b + b = 5b

–3 – 3 + d + 6d = –6 + 7d

7p – p – 2p = 4p

Keep it simple.

1. Solve the equations.

a) x + 3 = 5

_____
_____

b) x + −6 = 9

_____
_____

c) 4x = 16

_____
_____

d) 10x = 130

_____
_____

e) 46 = 47 + −1x

_____
_____

f) −3 + 2x = 11

_____
_____

g) 15 + 5x = 0

_____
_____

h) x + 9 = 18 + −2x

_____
_____

i) 2x + 6 = 4x + −2

_____
_____

j) $\frac{x}{6} = 20$

_____
_____

C. Linear Inequalities

1. Translate each verbal phrase into an algebraic expression (linear inequalities)

a) The quotient of x and 3 is less than or equal to 5

_____

b) The difference between x and 4 is greater than 10

_____

c) The product of x and 7 is not greater than 21

_____

d) x reduced by 13 is at least 15

_____

e) x take away 5 is less than 8

_____

f) The ratio of x to 4 is not less than 9

_____

g) x multiplied by 11 is less than or equal to 22

_____

h) 13 more than x is greater than 14

_____

i) 2 subtracted from x is almost 3

_____

j) A total of six and x is less than 20

_____

Sample!

Mapping of learning outcomes

Number

1. Describe the role and impact of number on daily life Pages 13 to 22 (number in everyday life)
2. Describe the concepts of natural numbers (N), integers (Z), rational numbers (Q) and real numbers (R) Pages 23 to 44 (N, Z, Q, R)
3. Describe the properties of addition and multiplication Pages 45 to 49 (properties of addition), Pages 50 to 56 (properties of multiplication)
4. Describe the concept of number bases and their application in daily life Pages 59 to 67 (number bases)
5. Describe the concepts of part—whole, fractions, and decimals Pages 30 to 33 (fractions), Pages 34 to 37 (decimals)
6. Demonstrate equivalence between simple fractions, decimals and percentages Pages 38 to 40 (equivalences)
7. Express simple ratios as fractional ratios e.g. 1:2=1/3:2/3 Pages 41 to 44 (ratios)
8. Calculate solutions to real life mathematical problems following the correct order of operations when applying the principal arithmetic operations, i.e. addition, subtraction, multiplication, division, to natural numbers (N), integers (Z), rational numbers (Q) and real numbers (R) Pages 57 and 58 (order of operations)
9. Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key Pages 68 to 69 (calculator skills), using calculator throughout the course
10. Give approximations to real life mathematical problems by using strategies including estimation, significant figures and rounding off large natural numbers Pages 70 to 76 (approximations)
11. Solve routine problems from a limited range of meaningful, real life situations by making sense of the situations mathematically, making an initial model of the situation, deciding on appropriate mathematical techniques and tools to use in the situation, applying mathematical techniques, examining patterns, relationships and assumptions and making adjustments to see their effect on the initial model, and discussing and presenting results and conclusions in relation to the situation. Pages 77 to 92 (everyday problem—solving)

Algebra

1. Describe the concept of algebra and its similarity to arithmetic Page 96 (introduction to algebra), Page 97 (arithmetic and algebra)
2. Describe the properties of linear expressions, linear equalities and linear inequalities Page 100 (linear equations), Pages 110 to 118 (linear inequalities)
3. Write algebraic expressions for familiar real—life situations Pages 98 and 99 (writing algebraic expressions), Page 103 (everyday algebra)
4. Use language appropriate to algebra Pages 96 to 128 (reading and writing algebra)

Sample!

5. Simplify basic algebraic expressions by applying the principal arithmetic operations of addition, subtraction, multiplication, and division to algebraic expressions of one or two variables Pages 101 to 102 (simplifying algebraic expressions)
6. Solve simple algebraic equations and inequalities of 1 variable Page 104 (finding the value), Pages 105 and 106 (solving equations),
7. Transpose formulae and equations Pages 107 to 109 (changing the subject of a formula)
8. Solve simultaneous equations Pages 119 to 122 (simultaneous equations)
9. Solve routine problems from a limited range of meaningful, real life situations by making sense of the situations mathematically, making an initial model of the situation, deciding on appropriate mathematical techniques and tools to use in the situation, applying mathematical techniques, examining patterns, relationships and assumptions and making adjustments to see their effect on the initial model, and discussing and presenting results and conclusions in relation to the situation. Pages 123 to 128 (everyday problem-solving)