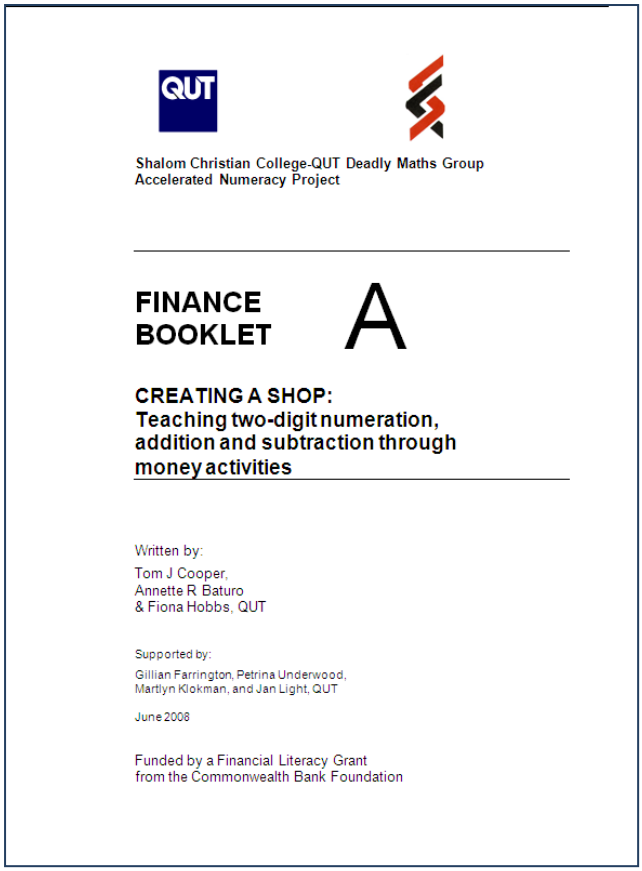
YUMI DEADLY CENTRE
School of Curriculum
Enquiries: +61 7 3138 0035
Email: ydc@qut.edu.au
**http://ydc.qut.edu.au**

# Finance Booklet A

## Creating a shop: Teaching two-digit numeration, addition and subtraction through money activities



Shalom Christian College-QUT Deadly Maths Group
Accelerated Numeracy Project

**FINANCE BOOKLET** A

**CREATING A SHOP:**
**Teaching two-digit numeration, addition and subtraction through money activities**

Written by:
Tom J Cooper,
Annette R Baturo
& Fiona Hobbs, QUT

Supported by:
Gillian Farrington, Petrina Underwood,
Martlyn Klokman, and Jan Light, QUT

June 2008

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YuMi Deadly Maths
Past Project Resource

# Acknowledgement

We acknowledge the traditional owners and custodians of the lands in which the mathematics ideas for this resource were developed, refined and presented in professional development sessions.

# YuMi Deadly Centre

The YuMi Deadly Centre is a Research Centre within the Faculty of Education at Queensland University of Technology which aims to improve the mathematics learning, employment and life chances of Aboriginal and Torres Strait Islander and low socio-economic status students at early childhood, primary and secondary levels, in vocational education and training courses, and through a focus on community within schools and neighbourhoods. It grew out of a group that, at the time of this booklet, was called "Deadly Maths".

"YuMi" is a Torres Strait Islander word meaning "you and me" but is used here with permission from the Torres Strait Islanders' Regional Education Council to mean working together as a community for the betterment of education for all. "Deadly" is an Aboriginal word used widely across Australia to mean smart in terms of being the best one can be in learning and life.

YuMi Deadly Centre's motif was developed by Blacklines to depict learning, empowerment, and growth within country/community. The three key elements are the individual (represented by the inner seed), the community (represented by the leaf), and the journey/pathway of learning (represented by the curved line which winds around and up through the leaf). As such, the motif illustrates the YuMi Deadly Centre's vision: *Growing community through education*.

More information about the YuMi Deadly Centre can be found at http://ydc.qut.edu.au and staff can be contacted at ydc@qut.edu.au.

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School of Curriculum
QUT Faculty of Education
S Block, Room S404, Victoria Park Road
Kelvin Grove Qld 4059
Phone: +61 7 3138 0035
Fax: + 61 7 3138 3985
Email: ydc@qut.edu.au
Website: http://ydc.qut.edu.au

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This booklet was developed using funding from a Financial Literacy Grant from the Commonwealth Bank Foundation, for a 2008 project at Shalom Christian College in Townsville called *Shalom Accelerated Numeracy*. The booklet and accompanying virtual activities are based on financial mathematics material trialled by the researchers as part of a 2007 Australian Studies in Science, Technology and Mathematics (ASISTM) project, *Using finance and measurement applications to improve number understanding of Indigenous students*, conducted at schools in Aboriginal communities in central and southern Queensland.

## CONTENTS

**Page**

**1. Background ..... 3**
1.1 Numeration ..... 3
1.2 Operations ..... 4

**2. Two-digit numbers ..... 6**
2.1 Modelling two-digit numbers through counting ..... 6
2.2 Extending counting ..... 9
2.3 Modelling numbers through separation ..... 13
2.4 Modelling numbers on a line ..... 24

**3. Two-digit addition ..... 29**
3.1 Separation addition ..... 29
3.2 Sequencing and compensation addition ..... 35

**4. Two-digit subtraction ..... 39**
4.1 Separation subtraction ..... 39
4.2 Sequencing and compensation subtraction ..... 43

**5. Rich assessment task: Create a shop ..... 51**
5.1 Pre-assessment tasks: Notes and coins ..... 51
5.2 Rich assessment task: Shopping ..... 52
5.3 Teacher hints and assessment rubric ..... 53

## DEADLY MATHS

Deadly Maths is the name of a group of researchers at QUT, Griffith and ACU in Brisbane who undertake projects in Indigenous schools and Communities to improve mathematics learning outcomes for Indigenous students. Projects focus on enhancing Indigenous students' learning of mathematics, improving teachers classroom practices in mathematics, training Indigenous teacher aides to effectively tutor mathematics and developing materials to improve mathematics learning of Indigenous VET students. For further information, contact Gillian Farrington at 07 3138 0061 or **gh.farrington@qut.edu,au**, or access website http://ydc.qut.edu.au.

## COMMONWEALTH BANK FOUNDATION

This is the first of three booklets, Finance Booklets A, B and C, which, together with six virtual mathematics activities, have been developed by Deadly Maths using funding from a Financial Literacy Grant from the Commonwealth Bank Foundation. The booklets and virtual activities are based on Financial Mathematics material trialled by the authors as part of a 2007 Australian Studies in Science, Technology and Mathematics (ASISTM) project. The aim of the booklets is to use money activities to reteach and reinforce number and operation understandings of Indigenous students at the Indigenous boarding and day school, Shalom Christian College. The three booklets focus on two-digit numbers, addition and subtraction, and the mathematics of shopping (booklet A); three-digit and decimal numbers, the four operations and the mathematics of planning a party (booklet B); and variables, multi-step problem solving and the mathematics of family budgets (booklet C).

# 1. BACKGROUND

## 1.1 NUMERATION

We begin the whole-number numeration sequence by using dollars up to $100 to revise the meanings of number. Modern understanding of number has four components as follows; we will look at these components through money.

**Counting**

Students should understand that, in all place value positions, counting forwards and backwards follows the same sequence of DIGITS regardless of the position. Counting forwards uses the digits in sequence 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Then it moves back to 0 with the left-hand side (LHS) position increasing by 1. Counting backwards uses digits in sequence 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, then it moves back to 9 with position on LHS going back 1. This is called the **odometer principle**.

| Examples: | | | | |
|---|---|---|---|---|
| | 264 | 5 683 | 338 | 4 378 |
| | 274 | 5 783 | 328 | 4 278 |
| | 284 | 5 883 | 318 | 4 178 |
| | 294 | 5 983 | 308 | 4 078 |
| | 304 | 6 083 | 298 | 3 978 |
| | 314 | 6 183 | 288 | 3 878 |

This knowledge/skill is the basis of TWO-DIGIT NUMBERS, sections 2.1 and 2.2.

Materials used are some form of size materials (MAB, building sticks, $100, $10 and $1 sets), place value charts (PVCs), number lines and number tracks, flip charts and calculators.

**Position/Separation**

Students should understand that the size of a digit is related to its position in whole numbers. Ones are on the right hand side of a number, 10s to left, 100s further left and so on. In this component, numbers are considered in a separated form, as 1s, 10s, etc. However, this is the form that enables students to say and write numbers in words and symbols. It is the basis of renaming.

This knowledge/skill is the basis of TWO-DIGIT NUMBERS, section 2.3.

Materials used are size material (MAB, building sticks, $100, $10 and $1 sets) and PVCs, (and calculators for recording). It leads to the "separation" strategy/form of computation.

**Rank**

Students should understand that regardless of their different digits, numbers are a single value on a number line and that these numbers are related (by rank or order) to the numbers around them (on either side). This understanding is the basis of comparison, order and estimation.

This knowledge/skill is the basis of TWO-DIGIT NUMBERS, section 2.4.

The materials are cards, pegs, rope, number tracks and number lines. It leads to the new "sequencing" and "compensation" strategies/forms of computation (also referred to as mental computation).

**Multiplicative Structure**

Students should understand that the relationship between adjacent place value positions is x10 to left and ÷10 to right. This skill is not developed in this booklet as it relates to the structure of the base ten number system and only has multiplication here for $10 being 10 x $1. It will become important when dealing with $100s and dollars and cents.

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# 1.2 OPERATIONS

In modern understandings of operations, the focus is on concepts, strategies (process) and not answers (result). Calculators can find the result but can not tell you what numbers and operations to use and how to use them.

There are three strategies for computation.

**Separation**

This encompasses the traditional algorithm. Both numbers are separated into parts (based on place value), the parts are operated on separately, and then the results are combined. This strategy is a powerful one for the mathematics and life. It is useful in measurement and also algebra.

Examples:

$$\begin{array}{r} {}^{1}36 \\ +\ 27 \\ \hline 63 \end{array} \qquad \begin{array}{r} 36 \\ +\ 27 \\ \hline 13 \\ 50 \\ \hline 63 \end{array} \qquad \begin{array}{r} 36 \\ +\ 27 \\ \hline 50 \\ +\ 13 \\ \hline 63 \end{array} \qquad \begin{array}{r} {}^{6}\not{7}{}^{1}2 \\ -\ 28 \\ \hline 44 \end{array} \qquad \begin{array}{r} 72 \\ -\ 28 \\ \hline 50 \\ \text{Back 6} \\ \hline 44 \end{array}$$

$$\begin{array}{r} 24 \\ \times\ {}_{1}3 \\ \hline 72 \end{array} \qquad \begin{array}{r} 24 \\ \times\ 3 \\ \hline 12 \\ +\ 60 \\ \hline 72 \end{array} \qquad \begin{array}{r} 24 \\ \times\ 3 \\ \hline 60 \\ +\ 12 \\ \hline 72 \end{array} \qquad \begin{array}{r} 28 \\ \hline 3 \mid 84 \\ 60 \\ \hline 24 \\ -\ 24 \\ \hline 0 \end{array}$$

In money, this method/strategy will be used by separating numbers into $10s and $1s on a PVC, using play money and PVC materials.

This knowledge/skill is the basis of TWO-DIGIT ADDITION, section 3.1, and TWO-DIGIT SUBTRACTION, section 4.1.

**Sequencing**

This is a new 'mental-computation' process/strategy in which the first number remains whole, the second number is separated, and pieces operated with the first in a sequence. Once again this is a strategy that helps algebra.

Examples:

$$\begin{array}{r} 36 \\ +\ 27 \\ \hline 56 \\ +\ 7 \\ \hline 63 \end{array} \qquad \begin{array}{r} 72 \\ -\ 28 \\ \hline 52 \\ -\ 8 \\ \hline 44 \end{array} \qquad \begin{array}{r} 37 \\ \times\ 24 \\ \hline 37 \\ \times\ 4 \\ \hline 148 \\ \times\ 6 \\ \hline 888 \end{array} \qquad \begin{array}{l} 936 \div 24 \\ = 936 \div 4 \\ = 234 \div 6 \\ = 39 \end{array}$$

With addition and subtraction, this method/strategy is based on the number line (and 99 board). It also has a second form for subtraction. That is 72-28 is reconsidered as 28 + what = 72

Example:

28
> 2
30
>40
70
> 2
72

44

This was called the shopkeepers' algorithm in the past. Before computers/calculators, it was the method used for change in shops. It solves subtraction by "thinking addition" (like for basic subtraction number facts).

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**Compensation**

This is also a new 'mental-computation' process/strategy in which both numbers remain whole. The computation is changed to a simple form and then the change is compensated for.

Example**:**

| | | | |
|---|---|---|---|
| 36 | 36 | 72 | 72 |
| + 27 | + 27 | − 28 | − 28 |
| 36 | 40 | 72 | 70 |
| − 30 | + 30 | − 30 | − 30 |
| 66 | 70 | 42 | 40 |
| − 3 | − 7 | + 2 | + 4 |
| 63 | 63 | 44 | 44 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | | 37 | x 24 | | 936 | ÷ 24 | | 936 | ÷ 24 |
| x 24 | = | 74 | x 12 | = | 960 | ÷ 24 | = | 468 | ÷ 12 |
| 37 | = | 148 | x 6 | = | 40 | − 1 | = | 234 | ÷ 6 |
| x 25 | = | 888 | | = | 39 | | = | 116 | ÷ 3 |
| 925 | | | | | | | = | 39 | |
| − 37 | | | | | | | | | |
| 888 | | | | | | | | | |

This strategy is based on changing the calculation by adding 0 (e.g., 36−3+27+3 for example 36+27 or 37x25–37 for 37x24) and multiplying by 1 (e.g. 37x2x24÷2 for 37x24). It is the basis of equivalence in algebra. It also uses knowledge of number line and very good multiples of 10 basic facts.

We shall look at these 3 strategies/methods using dollars. We shall focus on the shopkeepers' algorithm for subtraction as this is a successful way to think about subtraction for those with a history of failure.

# 2. TWO-DIGIT NUMBERS

## 2.1 MODELLING TWO-DIGIT NUMBERS THROUGH COUNTING

**Objective** To comprehend money up to $100 in terms of counting by 1s.

**Materials** Play $10 notes and $1 coins, 10s/1s place value chart (PVC), calculator, pen, paper, dice.

**Activities**

1. All students place out 10s/1s PVC. Direct students to see left hand side (LHS) is $10s and RHS is $1s. Ask: "How many 10s and 1s to start with?" All students place left hand on 10s and as move hand to 1s, say: "Zero $10s and zero $1s". Ask all students to repeat with you.
2. Add a $1 coin to 1s place. All students repeat left hand movement and state: "Zero $10s and one $1".
3. Continue, all students moving left hand and stating as add $1 at a time. E.g. "Zero $10 and two $1s", "zero $10s and three $1s" and so on until get to "zero $10s and nine $1s".
4. Ask "what happens when we add another $1 coin?" All students add another coin and replace ten $1s in 1s place with one $10 in 10s place. All students move left hand and state "one $10and zero $1s".
5. Continue all students adding 1 dollar coins, moving left hand and stating; e.g., "one $10 and one $1", "one $10 and two $1s" and so on. Stop at 19 and 29 (if go that far) asking the question: "What happens if we add another $1 coin?"
6. Repeat 1 to 5 but moving backwards. Start with two $10 and five $1 on 10s/1s chart. All students move left hand and say: "two $10s and five $1s". Then remove one $1 coin at a time, all students moving left hand and stating: "two $10s and four $1s", "two $10s and three $1s", and so on. Stop at 20 and 10 to ask question, "what happens when we remove another $1 coin?". All students break a $10 note into ten $1 coins, move coins to 1s place, remove one $1 coin, move left hand and state: "one $10 and nine $1s" and so on.
7. Repeat 1 to 6 moving forward and back but this time, as add or remove $1 coins, move left hand a second time and say the number in normal language e.g. 1st move "two $10s and three $1s"; 2nd move "twenty-three dollars". Also, then, get student to type number into calculator.

**Games**

Destination $34

3-4 students being game with 10s/1s chart, play $10 notes, play $1 coins, calculator, die. In turn, students throw die and add the number of $1 coins on die to chart, moving hands, stating amount in terms of 10s and 1s and formally, and typing number onto calculator. The first player past $34 wins.

First to $100

Repeat rules for "Destination $34" but throw 2 dice and add $1 coins to the sum of the 2 dice. First to $100 wins.

Back from $34

As for "Destination $34" but start with $34 on each chart and remove $1 coins. First to zero wins.

Back from $100

Repeat rules for "Back from $34" but start with $100 and use 2 dice as per "First to $100".

Variation: Students record progress on paper as well as, or instead of, the calculator. Discuss strengths and weaknesses of both forms of recording.

**Questioning**

1. Continuously ask students (in activities and games): "What have you got?" [e.g., "three $10s and four $1s"], "How many $10s do you have?", "How many $1s do you have?".
2. Then ask: "How many to the next $10?" [e.g., $ 6]. If the students throw, e.g., an 8 (from the 2 dice), ask: "Do you have enough for next $10?", "More than enough?", "How many more?".
3. Continue to draw students' attention to language with respect to zero and tens: "Why don't we say twenty zero?", "Why isn't it onety-seven instead of seventeen?", or "Why isn't it onety-one instead of eleven?"

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## PLACE VALUE CHART 1: TENS AND ONES

| TEN DOLLARS | ONE DOLLARS |
| --- | --- |
| | |

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## PLACE VALUE CHART 2: HUNDREDS, TENS AND ONES

Instructions: Photocopy onto white card

| | |
|---|---|
| | HUNDRED DOLLARS |
| | TEN DOLLARS |
| | ONE DOLLARS |

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# 2.2 EXTENDING COUNTING

**Objective** To comprehend money up to $100 in terms of counting by 1s and 10s

**Materials** Play $10 notes and $1 coins, 10s/1s PVC, calculator, pen, paper, dice, coin

**Activities**

1. All students place out 10s/1s chart and obtain $10 and $1. Move left hand and state "zero $10s and zero $1s" followed by a second move next and statement "zero dollars".
2. All students. Add a $10 note to 10s place. Move left hand twice and state "one $10 and zero $1s" and "ten dollars".
3. Continue adding a $10 each time, stating: "two $10s and zero $1s", "twenty dollars"; "three $10s and zero $1s", "thirty dollars"; and so on. Stress that we don't say the zero $1s. Continue until $90.
4. Repeat 1 but starting from $90 and moving backwards, e.g. as move left hand twice, say: "nine $10s and zero $1s", "ninety dollars"; "eight $10s and zero $1s", eighty dollars"; and so on.
5. Repeat 1 and 2 but starting from $4 and $94, e.g. as move left hand twice, say: "zero $10s and four $1s", "four dollars"; "one $10s and four $1s", "fourteen dollars"; and so one until; "nine $10s and four $1s", "ninety four dollars". The go backwards: "nine $10s and four $1s", "ninety four dollars"; "eight $10s and four $1s", "eight four dollars"; and so on.
6. Repeat 1 to 3 but this time, type number into calculator as well and record on paper. Count in $1s up to $10 and back from. Count in $10s up to $100 and back.
7. Throw two dice, one for tens (e.g. 3) and one for ones (e.g. 5). Put dollars on chart to this value (e.g. $35). Get students to say the number both ways, moving left hand each time a number is said, and to type the number into calculator. E.g. "three $10s and five $1s", "thirty-five dollars".
8. Look at seriation. Start with a number, e.g., 35, on the PVC. Add $10 and $1 to this number and subtract $10 and $1 from this number, stating the 4 new numbers two ways (as move hand) and typing the 4 new numbers into calculator. Focus attention on how new numbers relate to original. Record all numbers on a "cross" like this:

| | | |
|---|---|---|
| | 25 | |
| 34 | 35 | 36 |
| | 45 | |

9. Repeat 8 but this time add and subtract 2 $10 and $1 notes, 3 $10 and $1 notes, 4 $10 and $1 notes as appropriate, stating and recording numbers in lines as follows.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 5 | | |
| | 15 | | | | | | | |
| 33 | 35 | 37 | | | 32 | 35 | 38 | |
| | 55 | | | | | | | |
| | | | | | | 65 | | |

Write the missing numbers in.
Count in tens up from numbers like 27 and back from numbers like 82.

10. Complete worksheets 2.2A and 2.2B.

**Games**

<u>Keeping the balance</u>

2-4 players – two dice, calculator, Play Money, PVC.
Start with $50 on chart and 50 written into a calculator.

Players, in turn, throw a die where 4, 5, 6 are counted as 1, 2 and 3 (so only can get numbers 1, 2 or 3 from any throw). For 1st, 3rd, 5$^{th}$, etc. throw, add the number of $10s thrown (and record result on the calculator). For 2nd, 4th, 6$^{th}$, etc. throw, subtract the number of $10s thrown (and record on calculator).

If go below zero tens and above $100, lose. After 10 throws, the person closest to 50 wins.

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Getting there quicker

2-4 players – two dice, calculator, Play Money, PVC.
Start with no $s on chart.

In turn, players throw a coin (H – 1), T – 2) and a die. Add coin $10s and die $1s to chart. State what they have (moving their hands) and record on a calculator and paper.

First to $100 wins.

**Questioning**

Focus on questions that show that (e.g.) $35 + $20 is really counting on twice in the 10s place. That is. "three $10s, four $10s, five $10s". Stress that adding $30 to $46, say, is the same as counting on 3 in the $10s place of $46. E.g.: four $10s and six $1s", "five $10s and six $1s", six $10s and six $1s", and "seven $10s and six $1s". It is the same for subtraction.

Focus on questions that show how counting and addition are similar.

"Can you count on two $10s from $30?"

"Is this the same tens as $30 + $20?"

"Can you count on three $10s from $46?"

"Is this the same tens as $46 + $30?"

"Do the ones change in this situation?"

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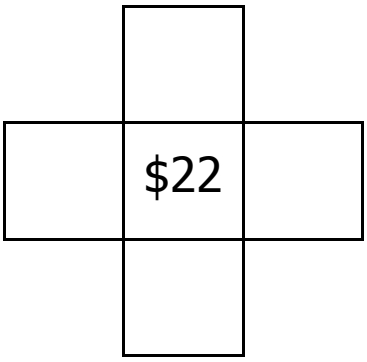
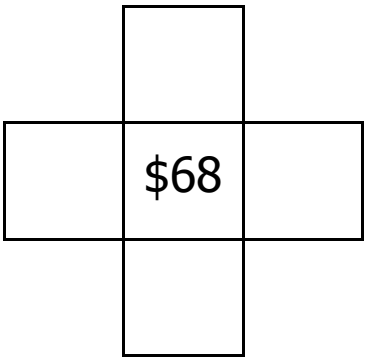
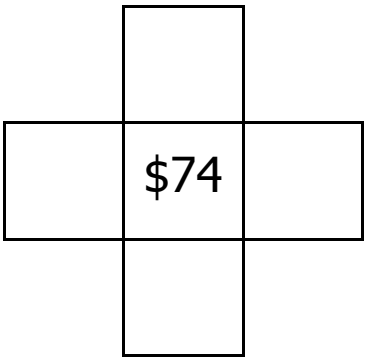
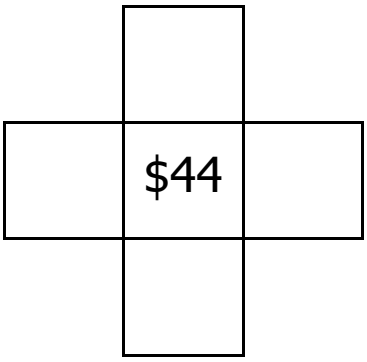
## WORKSHEET 2.2A: SIMPLE HUNDRED BOARD PUZZLES

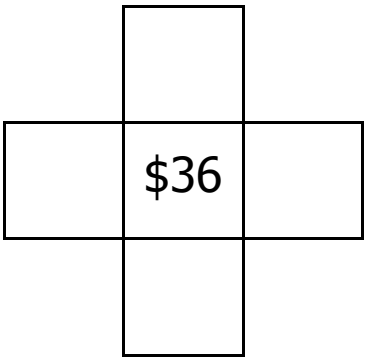
Name: _____ Year: _____ School: _____

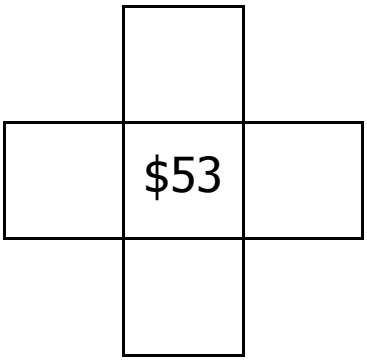


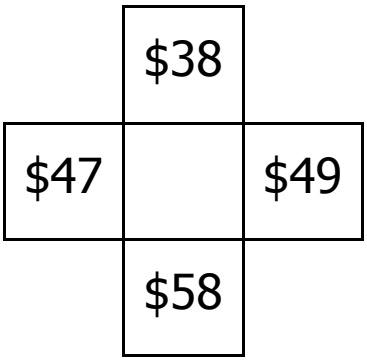



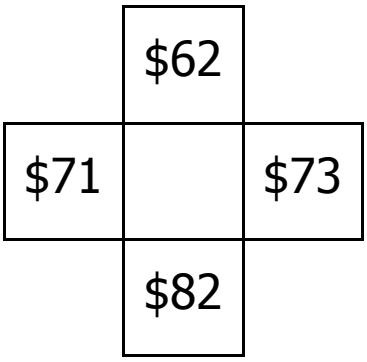



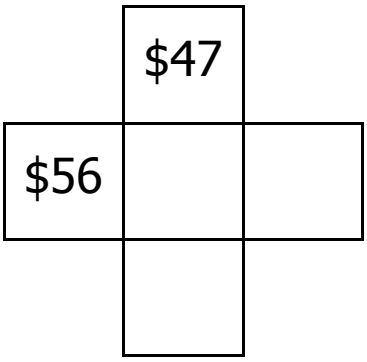



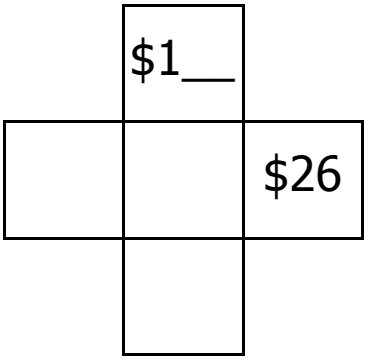



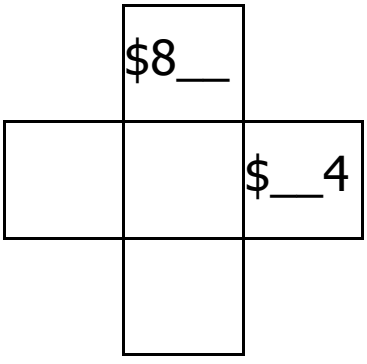



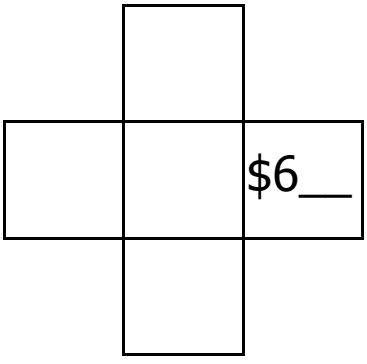



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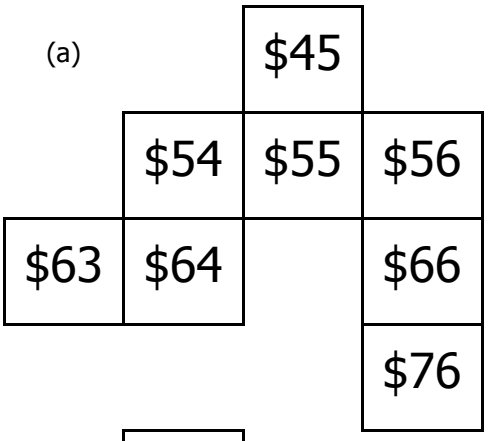
## WORKSHEET 2.2B: COMPLEX HUNDRED BOARD PUZZLES

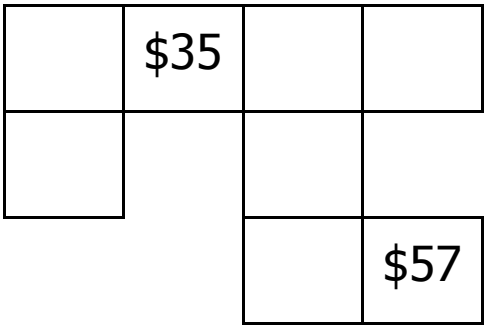
Name: _____ Year: _____ School: _____

Complete the following (the first one is done for you).

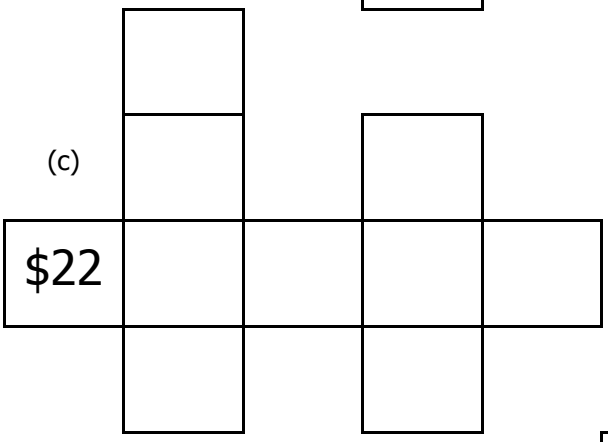
(a)



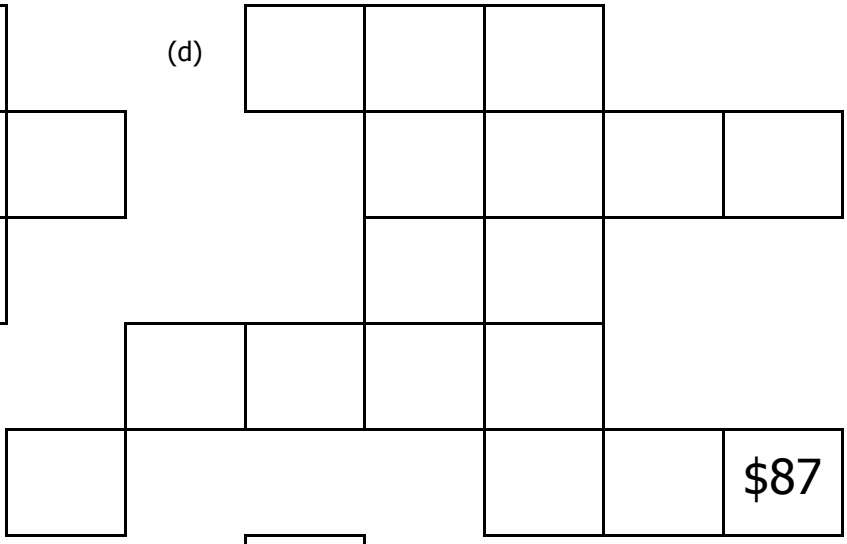

(b)



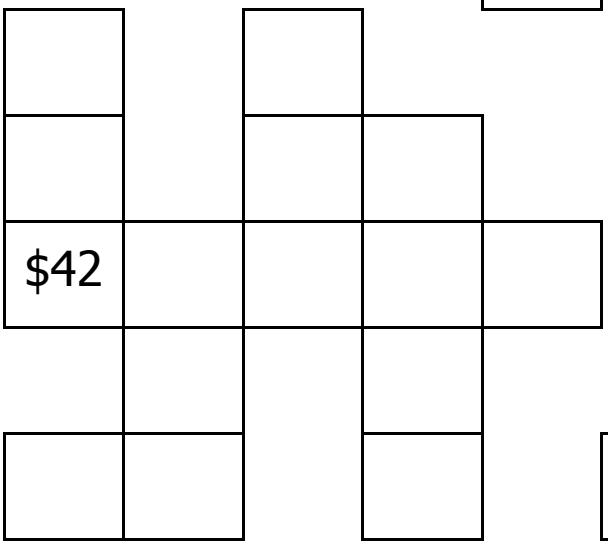

(c)



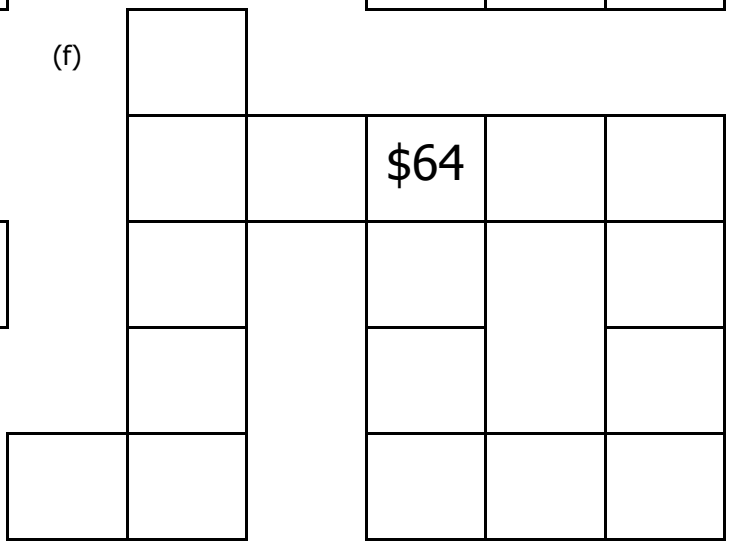

(d)




(e)




(f)



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# 2.3 MODELLING NUMBERS THROUGH SEPARATION

**Objective** To comprehend money up to $100 in terms of place value.

**Materials** Play $10 notes and $1 coins, 10s/1s PVC, calculators, pen, paper.

**Activities**

1. Put three $10 notes and two $1 coins on 10s/1s PVC. Ask: *How many 10s, how many 1s*? Read the number two ways, moving left hand L → R "3 ten and 2 one dollars" "thirty two dollars" type number of $ into calculator and write number on paper.
2. Repeat 1 with 4 $10 notes and 7 $1 coins, 8 $10 notes and 4 $1 coins.
3. Put out "twenty eight dollars" in play money PVC. State the number moving hand, in tens and one dollars. Write the number of dollars on paper and type number into calculator.
4. Repeat 3 for "sixty-three dollars" and "sixteen dollars".
5. Write $48 on board. Ask students to put out this with play money on PVC, and state the number two ways moving hand.
6. Complete worksheet 2.3A

**Games**

Mix and Match

Players – 1 to many.

Cut out, mix up and then sort Mix and Match cards.

Cover the board

Players – 3

Keep the symbols board as a base board. Cut the others into decks of cards. One deck to each of the 3 players (decks of a different colour).

Place base board between the players. In turn, players take top card from their deck and place correctly on board (covering other players' cards, if necessary). Incorrect placement, means miss one turn.

The player with the most cards of their type of cards showing on top of other cards when all cards are played wins.

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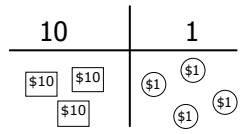
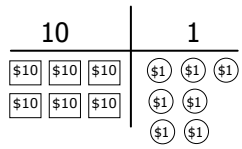
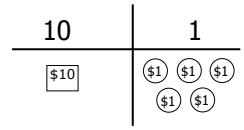
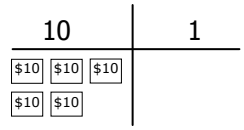
## WORKSHEET 2.3A: SEPARATION

Name: _____ Year: _____ School: _____

Complete the following (the first one is done for you).

| Place Value Chart | Words | Name | Symbol |
|---|---|---|---|
| (a)   | three $10 and four $1 | Thirty-four dollars | $34 |
| (b)   | | | |
| (c)   | | | |
| (d) | seven $10 and two $1 | | |
| (e) | | | $86 |
| (f) | four $10 and zero $1 | | |
| (g) | | | $4 |
| (h) | | | $19 |
| (i)   | | | |
| (j) | one $10 and three $1 | | |

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**MIX & MATCH CARDS**

Instructions: Photocopy all pages onto <u>same</u> colour card



four $1

four dollars

$4

| 10 | 1 |
|---|---|
| | $1 $1 $1 $1 |

seven $1

seven dollars

$7

| 10 | 1 |
|---|---|
| | $1 $1 $1 $1 $1 $1 $1 |

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**MIX & MATCH CARDS**

Instructions: Photocopy all pages onto same colour card


eighty dollars

eight $10 and zero $1

$80

| 10 | 1 |
|---|---|
| $10 $10 $10 $10 $10 $10 $10 $10 | |

thirty dollars

three $10 and zero $1

$30

| 10 | 1 |
|---|---|
| $10 $10 $10 | |

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**MIX & MATCH CARDS**

Instructions: Photocopy all pages onto <u>same</u> colour card



seven $10 and one $1

seventy-one dollars

$71

| 10 | 1 |
|---|---|
| $10 $10 $10 $10 $10 $10 $10 | $1 |

five $10 and five $1

fifty-five dollars

$55

| 10 | 1 |
|---|---|
| $10 $10 $10 $10 $10 | $1 $1 $1 $1 $1 |

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**MIX & MATCH CARDS**

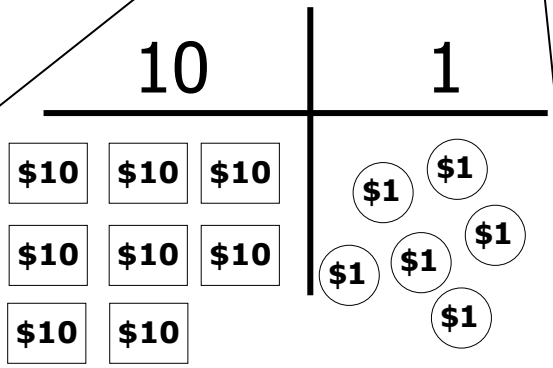
Instructions: Photocopy all pages onto <u>same</u> colour card



eight $10 and six $1

eighty-six dollars

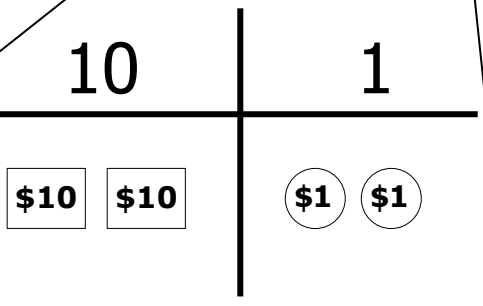
$86




two $10 and two $1

twenty-two dollars

$22



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**MIX & MATCH CARDS**

Instructions: Photocopy all pages onto same colour card



eleven dollars

one $10 and one $1

$11

| 10 | 1 |
|---|---|
| $10 | $1 |

eighteen dollars

one $10 and eight $1

$18

| 10 | 1 |
|---|---|
| $10 | $1 $1 $1 $1 $1 $1 $1 $1 |

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**COVER THE BOARD CARDS**

Instructions: Photocopy all 4 pages on different coloured cardboard



| | | |
|---|---|---|
| $28 | $40 | $71 |
| $63 | $12 | $82 |
| $70 | $56 | $33 |
| $94 | $81 | $17 |

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**COVER THE BOARD CARDS**

Instructions: Photocopy all 4 pages on different coloured cardboard



| | | |
|---|---|---|
| twenty-eight dollars | forty dollars | seventy-one dollars |
| sixty-three dollars | twelve dollars | eighty-two dollars |
| seventy dollars | fifty-six dollars | thirty-three dollars |
| ninety-four dollars | eighty-one dollars | seventeen dollars |

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**COVER THE BOARD CARDS**

Instructions: Photocopy all 4 pages on different coloured cardboard



| | | |
|---|---|---|
| two $10s and eight $1s | four $10s and zero $1s | seven $10s and one $1 |
| six $10s and three $1s | one $10s and two $1s | eight $10s and two $1s |
| seven $10s and zero $1s | five $10s and six $1s | three $10s and three $1s |
| nine $10s and four $1s | eight $10s and one $1s | one $10s and seven $1s |

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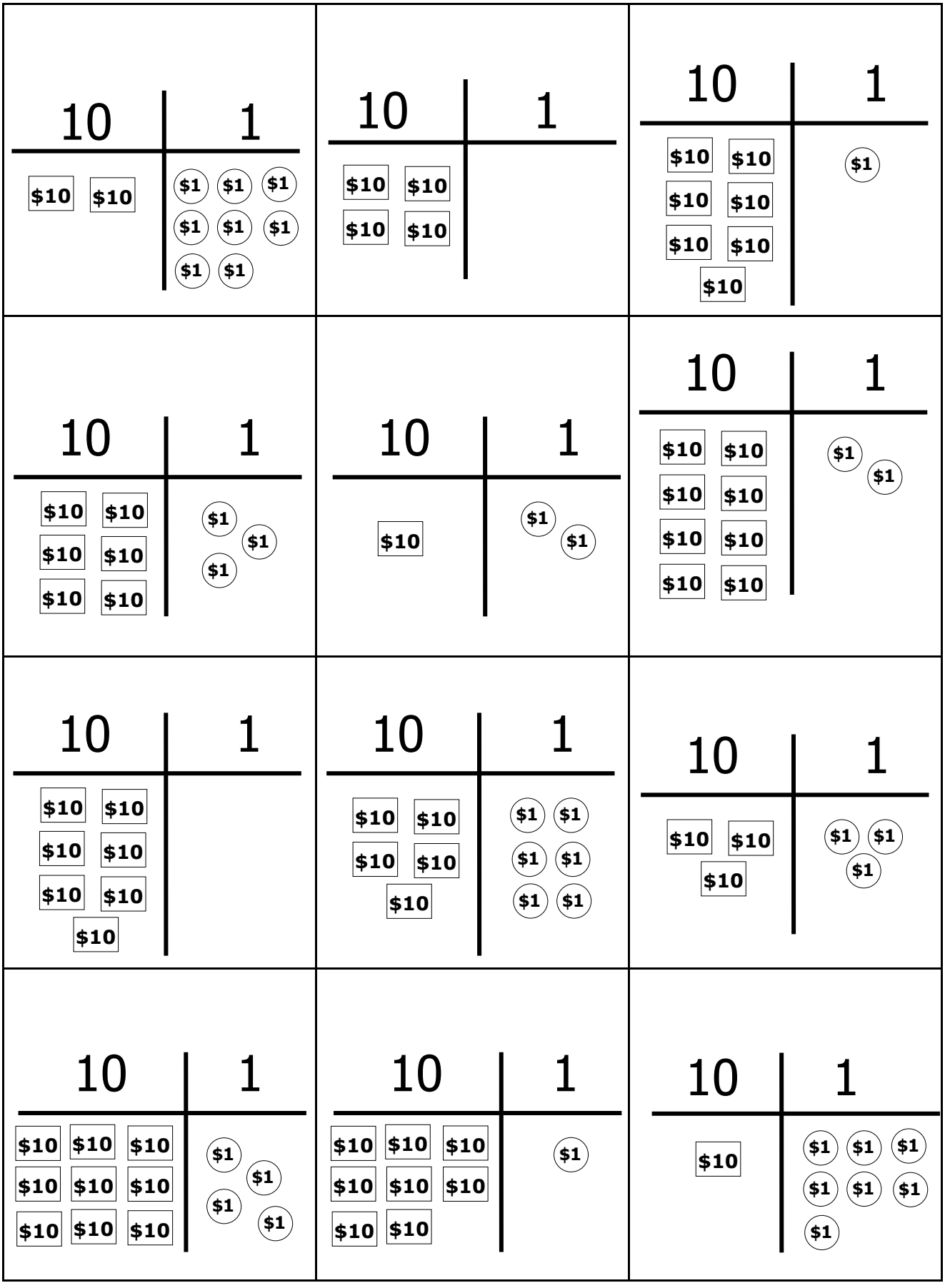
## COVER THE BOARD CARDS

Instructions: Photocopy all 4 pages on different coloured cardboard





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# 2.4 MODELLING NUMBERS ON A LINE

**Objective** To comprehend money up to $100 in terms of position on a number line.

**Materials** Money number line, pen, paper, calculator, card deck, rope, dollar cards, $0 to $100 cards with string to place around neck, pegs.

**Activities**

1. Place $10 notes on floor as a number track. Get students to walk along the track saying "ten dollars, twenty dollars, thirty dollars, etc."
2. Select 2 students to hold ends of rope, hang $0 and $100 on the students. Hand out dollar cards to other students with pegs. In turn, they hang their cards on rope with pegs – discussing where they should be placed to correctly match number line and show order and rank.
3. Select two cards from a deck (without tens) and use them to make a two-digit number. Mark where on the number line this is. Repeat this for four selections. Insure the students place a teen number on the line
4. Find position $4 on line and get all students to count one in $10s stating: "four dollars, fourteen dollars, twenty four dollars, and so on". Repeat this for 6 and 9.
5. Complete worksheet 2.4A

**Games**

Jump to 40

2-4 players. Start at $0 on number line. Select a card and move along line distance shown. State number that finish on and type this number into calculator (or record on paper). First person to 40 wins.

Back from $40

Same as "Jump to $40" except start at $40 and subtract number on card shown. First to $0 wins.

Big $100

Same as "Jump to $40" but choose two cards and move the sum of the two cards. First to $100 wins.

Back $100

Same as "Big $100" but going back from $100. First to $0 wins.

Three together

2-3 players. 2-3 different coloured pens (one to each player). Each player selects 3 cards (1 to 9) and determines all possible two-digit numbers (there are 6 possible when select 3 cards). Player selects one of these numbers and marks it on number line. (If select a number another person has, can cross/rub them out and replace with your number.)

The first player to get 3 numbers within $10 of each other wins.

**Questioning**

Ask students where the number is:

"What $10s are you between?"

"How many to the next $10s?"

"How far from previous $10?"

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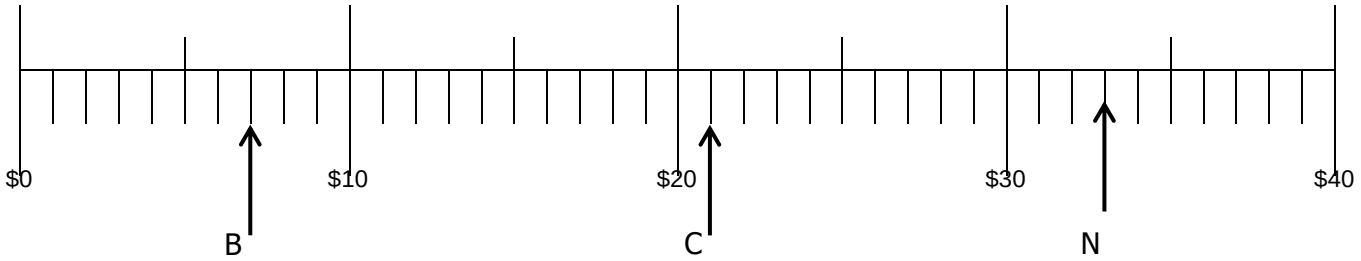
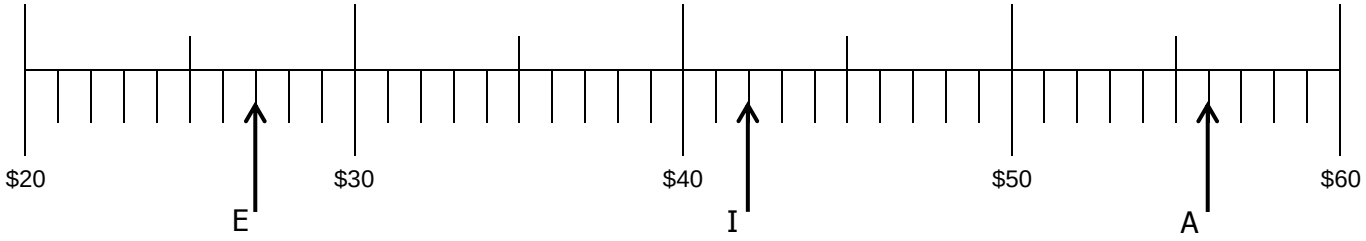
## WORKSHEET 2.4A: WHAT IS LARGE, PRICKLY AND GOOD TO EAT?

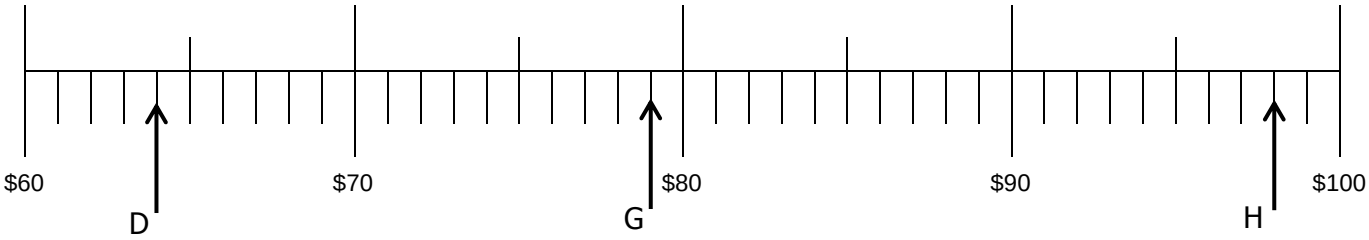
Write the numbers shown to answer the question!




B _____ C _____ N _____




E _____ I _____ A _____




D _____ G _____ H _____

**What is large, prickly and good to eat?**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ___ | ___ | ___ | | ___ | ___ | ___ | ___ | ___ | ___ | ___ |
| 7 | 42 | 79 | | 27 | 21 | 98 | 42 | 64 | 33 | 56 |

Draw it here:

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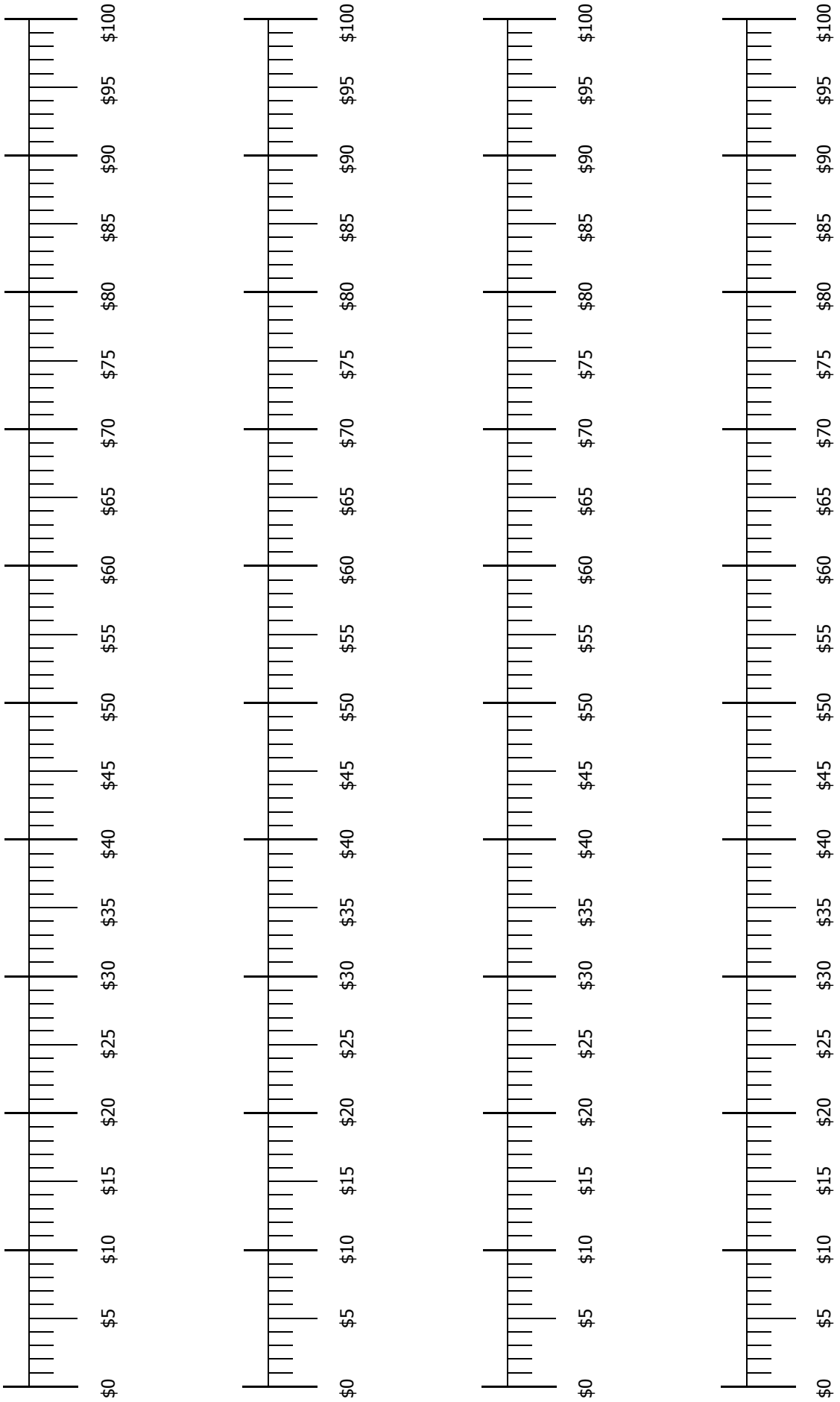
# DOLLAR NUMBER LINES



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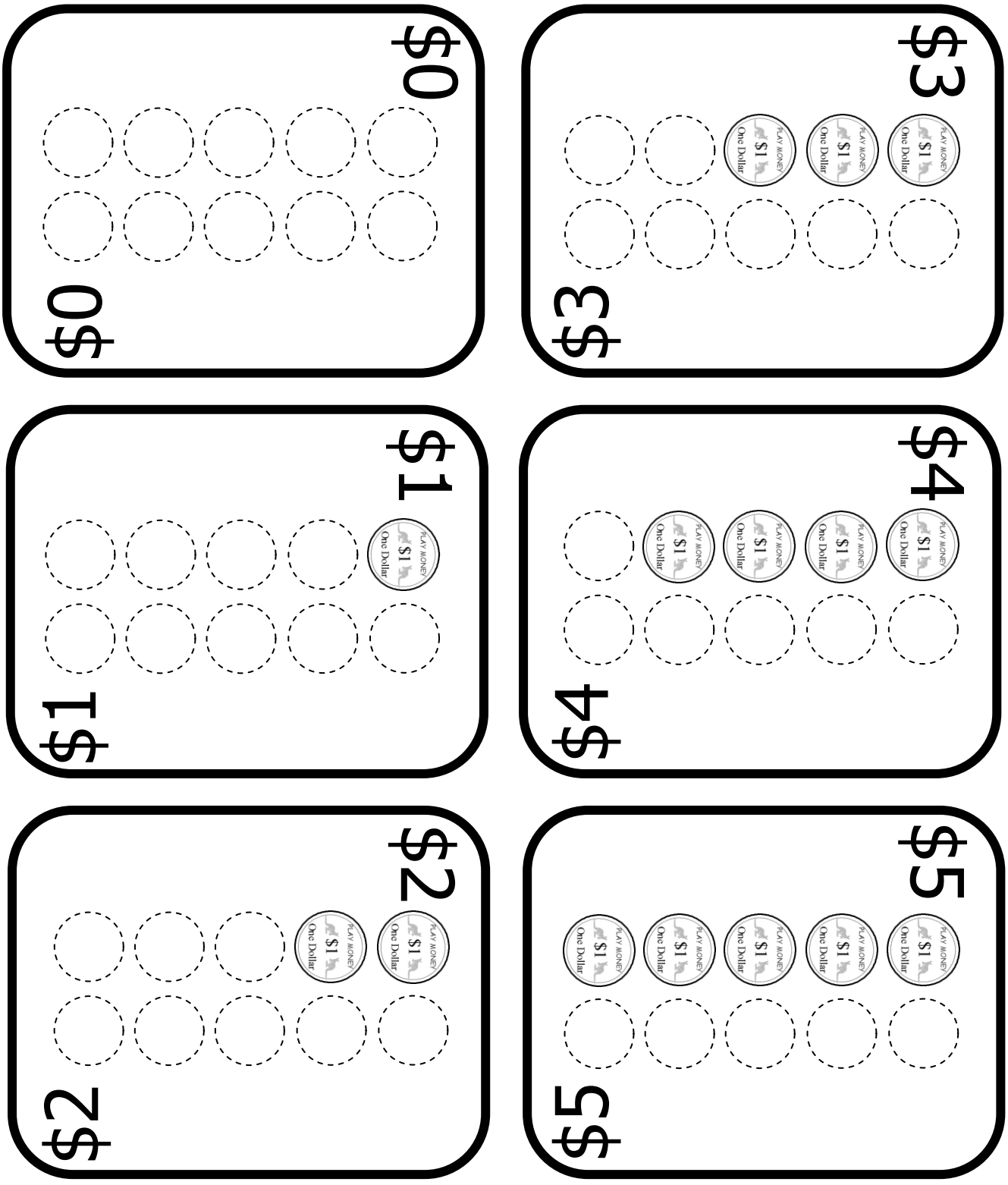
## DOLLAR CARDS

Instructions: photocopy 2 pages on 4 different colour cardboard to make up a deck of 4 copies of each card

Page 1 of 2



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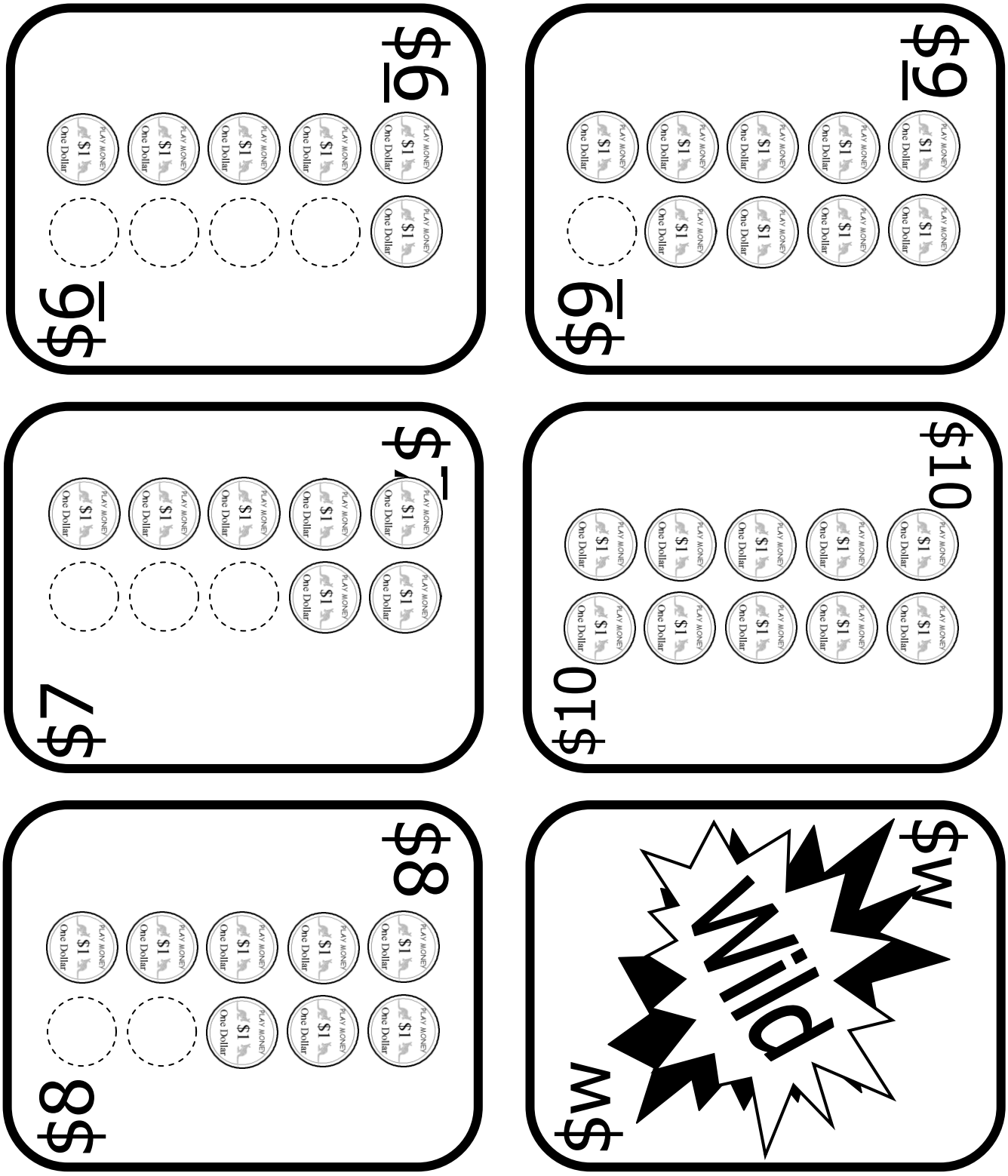
## DOLLAR CARDS

Instructions: photocopy 2 pages on 4 different colour cardboard to make up a deck of 4 copies of each card





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# 3. TWO-DIGIT ADDITION

## 3.1 SEPARATION ADDITION

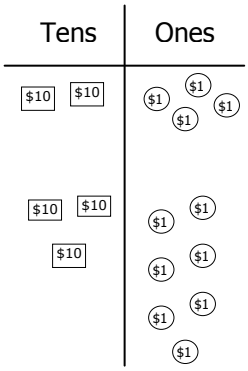
**Objective** To comprehend addition in $s in terms of separation.

**Materials** Play money $10 notes and $1 coins, PVC, pen, paper, calculator, dollar cards, shop cards, coin, dice.

**Activities**

1. Ask students to consider they are buying $24 food and $37 clothes and working out how much to pay in total. Put out money for each amount with $10 notes and $1 coins on 10s/1s PVC. Ask students to tell you how many $10 notes and $1 coins for both numbers. Ask students to record with symbols on a small PVC.

   Example:




NEW

| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| | |

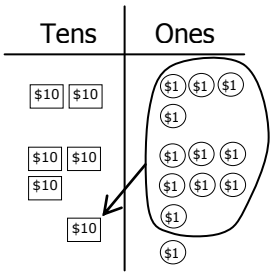
TRADITIONAL

| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| | |

2. Ask students what to add first. (Can be done with either tens or ones first). Join whatever they can (if they say both, do both). For the ones say do we have enough for $10 note? If we have, make the change. Then join the other position. Ask how many ten dollars and 1 dollars in total. Get all students to record on paper what they do with the materials.

   Example:

   <u>Ones First</u>

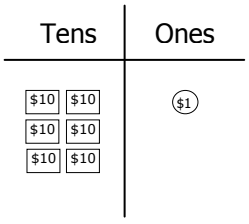



NEW

| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| 1 | 1 |

TRADITIONAL

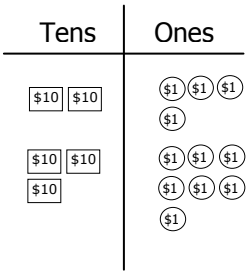
| Tens | Ones |
|---|---|
| $^{1}2$ | 4 |
| + 3 | 7 |
| | 1 |



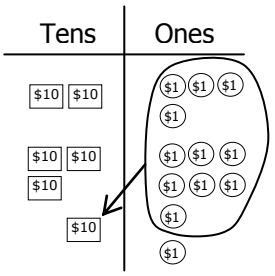

| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| 1 | 1 |
| + 5 | 0 |
| 6 | 1 |

| Tens | Ones |
|---|---|
| $^{1}2$ | 4 |
| + 3 | 7 |
| 6 | 1 |

Tens First




| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| 5 | 0 |




| Tens | Ones |
|---|---|
| 2 | 4 |
| + 3 | 7 |
| 5 | 0 |
| + 1 | 1 |
| 6 | 1 |

3. Discuss what the answer was and the procedure for getting there. Check with calculator. If two ways have been done, discuss which is best. Look at the regrouping of ten $1 coins as one $10 note. Discuss when this happens.
4. Repeat steps 1, 2 and 3 for two cards from shop cards. Then repeat again for a second two cards. Think about how you would do those sums without the play money – what would you think?
5. Complete worksheet 3.1A and 3.1B.

**Games**

Money to $100:

2 players. Players in turn throw a coin and a die. Coin gives tens (H – 1 ten, T – 2 tens) and die ones. Players take $10 notes and $1 coins to value of their coin and die and add to previous amount (changing ten $1 coins for one $10 note where required). Amount typed into calculator and written on paper. First to $100 wins

Partners for addition:

4 players – opposite player are partners. All players select/dealt two cards – first card tens, second card ones. Partners add their new numbers. Partners with highest score win a point. First partners to 5 points wins. Partners check scores by taking $10 notes and $1 coins to value of cards. Then combine $10s and $1s.

**Questioning**

Always ask:

How many $10s and $1s do I have?

How many to next $10?

Do I have enough to make another $10?

How many $10s is this?

How many $1s left over?

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# WORKSHEET 3.1A: WHERE DO FISH KEEP THEIR MONEY?

Name: _____ Year: _____ School: _____

Complete the following to solve the puzzle

1. Kade bought lunch for $12 and a drink for $3. How much did Kade spend? _____**= K**

2. Ellie gave $4 to her cousin and $15 to her aunty. How many dollars did Ellie give away? _____**= A**

3. Michael bought a football for $22 and a pair of footy socks for $4. How much did Michael spend?

_____**= I**

4. Crystal spent $11 on fruit and $2 on a chocolate bar. How much did Crystal spend? _____**= E**

5. Courtney bought a shirt for $34 and a pair of shoes for $60. How much did Courtney spend?

_____**= N**

6. Alex gave his brother $55 and bought a CD for $24. How much money did Alex give away and spend in total?

_____= **B**

7. Mona spent $58 on a tennis racquet and $11 on tennis balls. How many dollars did Mona spend?

_____= **R**

8. Reuben spent $25 on dinner and $32 on tickets on a date with Courtney. How much money did he spend?

_____= **T**

**Where do fish keep their money?**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | H | | | |
| | | $26 | $94 | | $57 | | $13 | | |
| | | V | | | | | | | |
| $69 | $26 | | $13 | $69 | | $79 | $19 | $94 | $15 |

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## WORKSHEET 3.1B: WHAT COULD THE MAD AUSTRALIAN SKIER NOT FIND?

Name: _____ Year: _____ School: _____

Complete the following to solve the puzzle

1. Jack bought drinks for $17 and dinners for $28. How much did Jack spend? _____ **= W**

2. Bob bought a coat for $56 and pants for $38. How much did Bob spend? _____ **= L**

3. Del bought a DVD for $27 and a CD for $13. How much did Del spend? _____ **= A**

4. Wayne bought meat for $36 and vegetables for $18. How much did Wayne spend?

   _____ **= T**

5. Howie gave Joe $26 and bought groceries for $46. How much money did Howie give away and spend in total?

   _____ **= E**

6. Tania gave Sue and Jenn both $37. How much did Tania give away? _____ **= P**

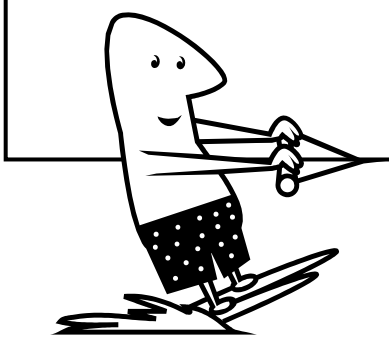
7. Pearl spent $63 on a radio and $8 on chocolates. How much did Pearl spend? _____ **= K**

8. Sue gave Jenn $38 and spent $29 on cosmetics. How much money did Sue give away and spend in total?

   _____ **= S**

### What could the mad Australian skier not find?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | I | | H |
| $40 | $94 | $40 | $71 | $72 | | $45 | | $54 | |
| | | | | | | O | | | |
| | | $40 | | $67 | $94 | | $74 | $72 | |



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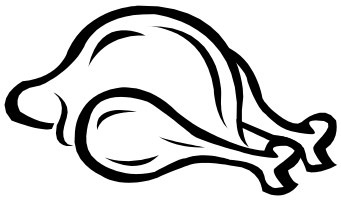
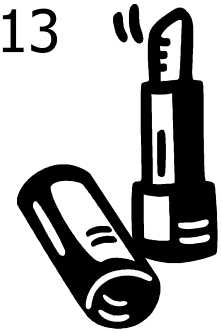
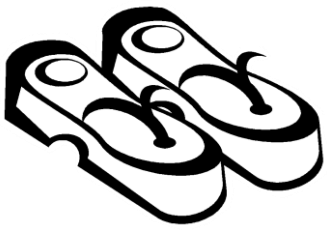
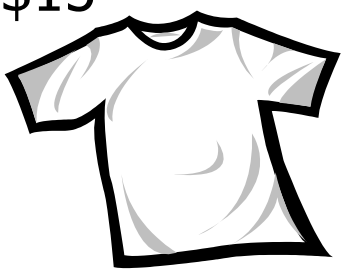
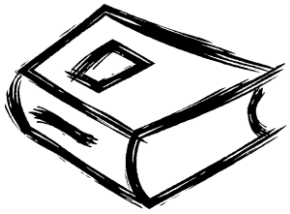
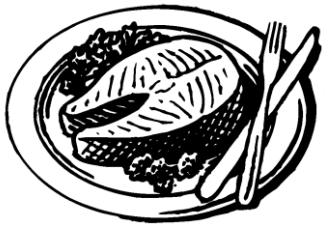
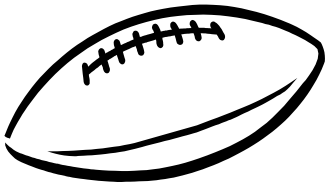
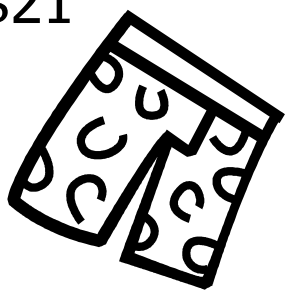
**SHOP CARDS**



| | | |
|---|---|---|
| $11 Super supreme pizza | $12  A roast chicken | $13  Lipstick |
| $14  A pair of thongs | $15  T-Shirt | $16 A kilogram of steak |
| $17 Cap | $18  Book | $19  Restaurant meal |
| $20  Football | $21  Board shorts | $22 A kilogram of prawns |

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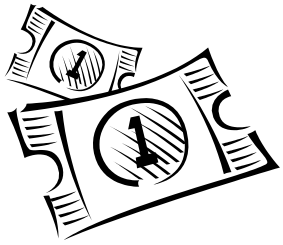
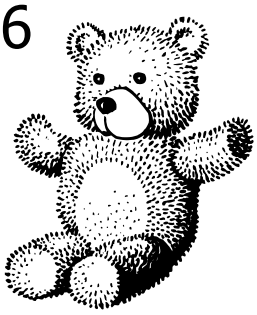
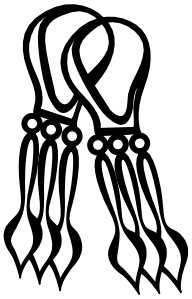
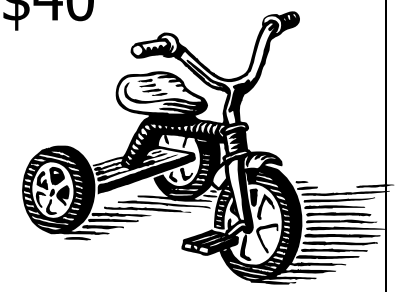
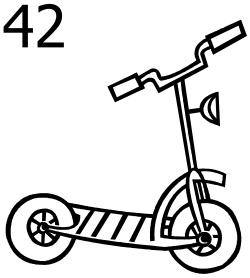
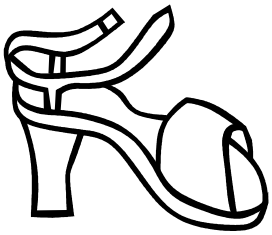
**SHOP CARDS**



| | | |
|---|---|---|
| $24  Movie tickets | $26  Huge teddy bear | $27 CD |
| $31  Earrings | $36 Bikini | $39 Jumper |
| $40  Tricycle | $42  Scooter | $43 Boxing gloves |
| $47 Watch | $48 Footy boots | $50  Party shoes |

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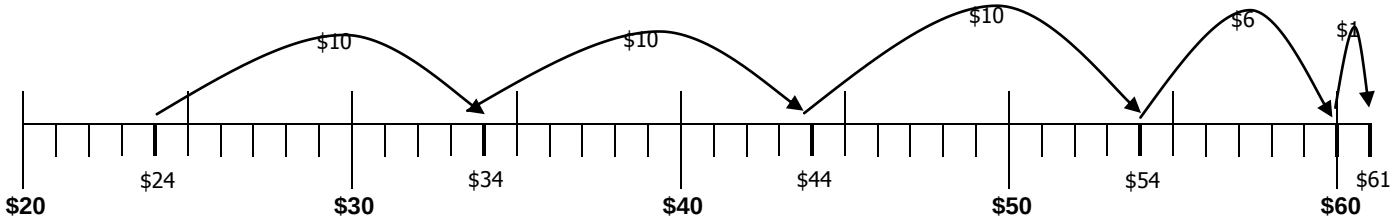
# 3.2 SEQUENCING AND COMPENSATION ADDITION

**Objective** To comprehend addition of $'s in terms of sequencing and compensation.

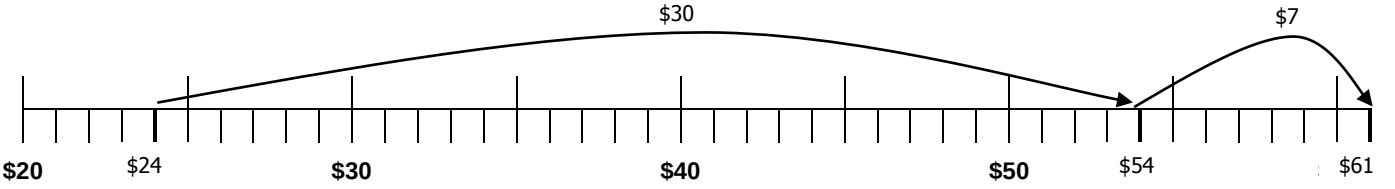
**Materials** Money number line, pen, paper, calculator.

**Activities**

1. Ask students to reconsider buying $24 food and $37 clothes in light of number line. Mark where $24 is on number line, then hop on $37 first as $10's and then as $15. (Ask how many $10 and $1 in $37) Ask students to show different ways to do things. Ask students to record what they do on paper.




```
  24
+ 10
+ 10
+ 10
  54
+  6
+  1
  61
```




```
  24
+ 30
  54
+  7
  61
```

2. Repeat step for 2 cards from shop cards. Do this 3 times. Discuss being efficient. Think about how you would do these sums without the number line. What would you think of?
3. Complete worksheet 3.2A
4. Reconsider $24 and $37. Look at both on number line. What is the next $10 for each of them. If we added this extra $10, how much too much? Consider only had $10 notes. Act out paying too much in a shop with $10 notes and discuss how much too much.

| Example: | $24 | $30 | |
|---|---|---|---|
| | +$37 | $40 | How much too much? |
| | | $70 | |

5. Repeat 4 for 2 cards from shop cards. Do two more after this. When does method work well?
6. Repeat 5 but look at $10 below.

| Example: | $22 | $20 | |
|---|---|---|---|
| | +$33 | $30 | How much too little? |
| | | $50 | |

7. Complete worksheet 3.2B

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**Games**

Above yourself:

Dollar card deck: 2 players

Each player in turn takes 2 cards from deck and makes up a number (1st card $10's, 2nd card $1's) Says the $10 above and how far above. (e.g. Says the $37, say $40, 3 above) If correct, scores 1 point. 1st player to 5 points wins.

Spend to $100:

2-4 players, 2 dice. Players start at $0 on dollar number line. Players in turn throw 2 dice – 1st die tens (4, 5, 6 are replaced by 1, 2 3), 2nd ones. Players move forward the number tossed on the number line. 1st player to $100 wins.

Big and Small:

Use two decks of dollar cards – 7, 8, 9 in one deck; 1, 2, 3 in the other. 4 players – opposite players are partners. Each player in turn takes 2 cards from each deck and makes up 2 numbers (tens 1, 2, 3 and ones 7, 8 and 9) Partner determines $10 above for each number and adds these two numbers. Original player says how many the real sum is below this addition. If correct scores 1 point. 1st set of partners to 5 points wins.

**Questioning**

For sequencing, always ask:

How much to the next $10?

Do we have enough?

Just enough or some left over?

How much left over?

For compensation, always ask:

How much did we increase to go to next $10?

What do we do about this increase to compensate?

Would it be better to go down to $10 below?

Questions should always focus on thinking – the method/strategy of the lesson. This (and not answers) is the focus.

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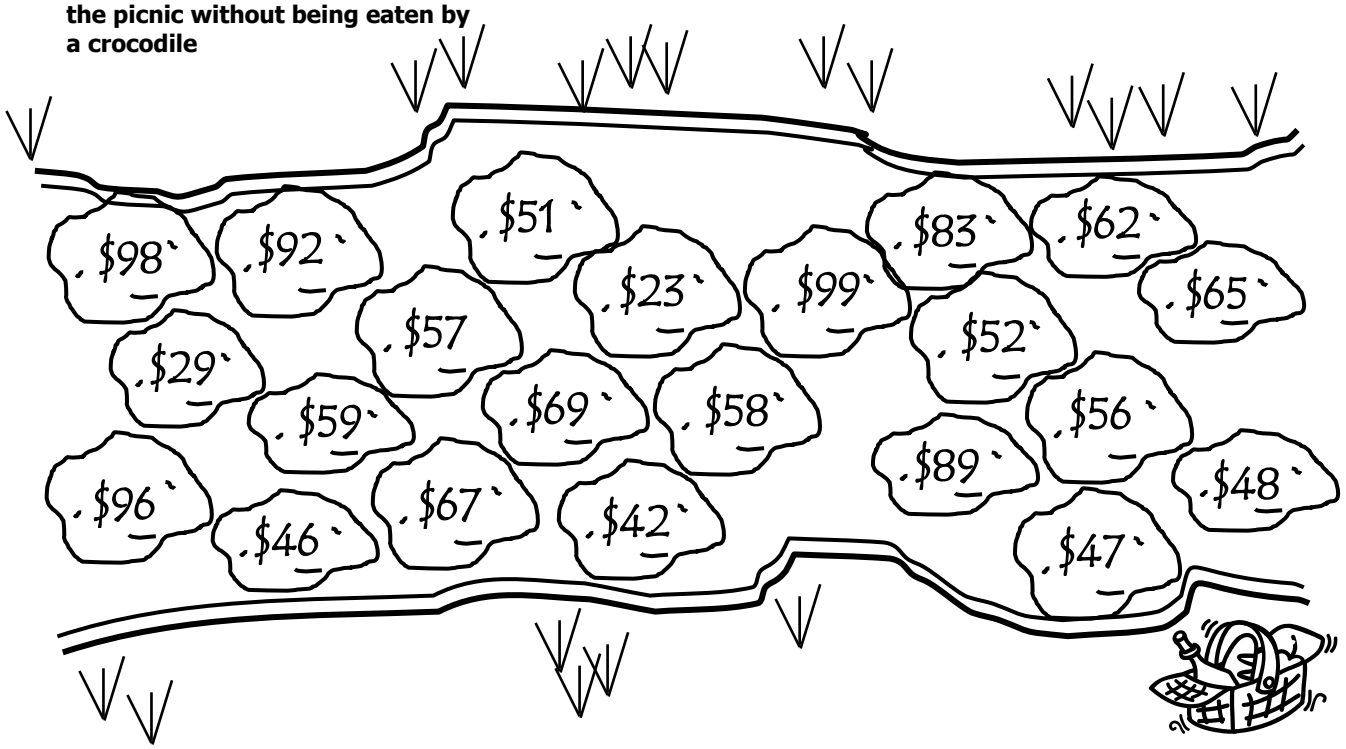
## WORKSHEET 3.2A: CROSS THE RIVER

Name: _____ Year: _____ School: _____

**Use a number line to do these word problems. . Crocodiles are lurking under some of the rocks. Can you make it across the rocks to the picnic without being eaten by a crocodile?**

1. Georgia has $40 in notes and $12 in coins. How much money does she have altogether? _____
2. Billy bought a CD for $27 and some speakers for $32. How much did Billy spend? _____
3. Charlotte gave $35 to her brother and $23 to her sister. How many dollars did she give away? _____
4. Rose bought a box of chocolates for $12 and a bunch of flowers for $45 for her sick mother. How much money did she spend? _____
5. Eddie bought a pair of board shorts for $21 and a beach towel for $48. How much did Eddie pay? _____
6. Jordan paid $34 for vegetables and $22 for steak. How much did the food cost? _____
7. Shania spent $33 on skin care products and $65 on a haircut. How much did Shania spend? _____
8. Andrew bought a cricket bat for $87 and a cricket ball for $12. How many dollars did Andrew spend? _____
9. Elvis and Lucy went to lunch. They paid $26 for food and $21 for drinks. How much did Elvis and Lucy pay? _____
10. Rachael paid $16 for a teddy bear and $13 for a pair of booties for her sister's new baby. How much did Rachael spend? _____

**Colour your answers to see if you can make it across the river to the picnic without being eaten by a crocodile**



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## WORKSHEET 3.2B: NEAR TENS

Name: _____ Year: _____ School: _____

1. Use the left hand side to do the exercise on the right hand side

| | | |
|---|---|---|
| (a) $30 + $40 = $70 → $31 + $42 | (b) $50 + $40 = $90 → $53 + $42 | (c) $20 + $50 = $70 → $23 + $53 |
| (d) $30 + $40 = $70 → $29 + $38 | (e) $50 + $40 = $90 → $48 + $39 | (f) $20 + $50 = $70 → $17 + $48 |
| (g) $30 + $30 = $60 → $28 + $27 | (h) $40 + $60 = $100 → $39 + $56 | (i) $40 + $20 = $60 → $36 + $15 |

2. Do these four problems using the same method.

   (1) Albert had $28 in his wallet. Gina gave him $19. How much money does Albert have altogether?

   (2) Felix bought his father a pair of shoes for $51 and a pair of socks for $11. How much did he spend?

   (3) Jessma paid $58 for her share of the phone bill. She paid $38 for electricity. How much money did she pay?

   (4) Karl's jeans cost $49 and his shirt cost $47. How much did he spend on new clothes?

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# 4. TWO-DIGIT SUBTRACTION

## 4.1 SEPARATION SUBTRACTION

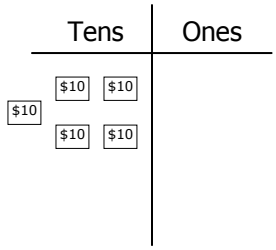
**Objective** To comprehend subtraction in $'s in terms of separation.

**Materials** Play money ($10 notes, $1 coins), PVC, pen, paper, calculator, dollar cards, shop cards, dice.

**Activities**

1. Ask students to consider they pay for $37 clothes with $50. How much change would they get? Direct students to put out 5 $10 notes onto tens position of PVC. Ask students to record with symbols on a wall PVC.

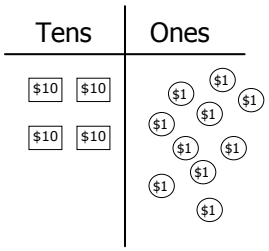
Example:




| Tens | Ones |
|---|---|
| 5 | 0 |
| – 3 | 7 |

2. Ask students now to give "the shopkeeper" $37. Discuss why this is not possible. Ask what could be done. (a $10 note could be exchanged for ten $1 coins) Direct the students to do the exchange and record the result on small PVC.

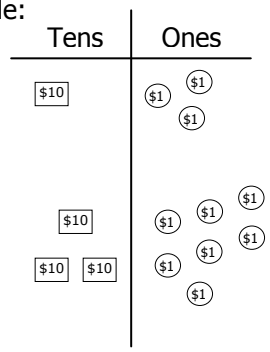
Example:




| Tens | Ones |
|---|---|
| $^{4}\cancel{5}$ | $^{1}0$ |
| – 3 | 7 |

3. Then ask the students to "give the shopkeepers" their $37 by sliding seven $1 coins and 3 $10 notes down the chart. Get all students to record on paper what they do with materials.

Example:




| Tens | Ones |
|---|---|
| $^{4}\cancel{5}$ | $^{1}\cancel{0}$ |
| – 3 | 7 |
| 1 | 3 |

4. Discuss what the answer and how it was achieved. Check with calculator. Recap the first step (regrouping) and the second step (subtracting). Discuss what other ways it could be thought of.

Example:

| Tens | Ones |
|---|---|
| 5 | 0 |
| – 3 | 7 |
| 2 | 0 |
| Down 7 | |
| 1 | 3 |

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5. Repeat steps 1 to 4 for one card from shop cards.
6. Discuss what happens if we pay for a $23 shirt with $45. Look at subtraction when the large number is not a multiple of $10.
7. Complete worksheets 4.1A and 4.1B.

**Games**

Losing $100:

2 players. Players in turn throw a coin and a die (coin gives tens, H – 1 ten, T – 2 tens and die ones). Players start with $100 (ten $10 notes) they remove the value of their coin toss and die throw, regrouping where necessary. Amount is typed into calculator and written on paper. First to $0 wins.

Pattern for subtraction:

4 players – opposite pairs are partners. All players select/are dealt 2 cards from $dollar deck (no $10) – First card is tens, second card is ones. Partners subtract their numbers. Partners with highest score win a point. First partners to 5 points win.

Playing shop:

One student acts as shopkeeper. Other students are given $50. They approach shopkeepers select a shop card and pay for this with $50. Have to correctly calculate change?

**Questioning**

Always ask:

Do you have enough $1 coins to subtract the $1s?

If not, what do you do?

How many $1s does this give you?

How many $10s?

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## WORKSHEET 4.1A: WHICH MONTH HAS 28 DAYS?

Name: _____ Year: _____ School: _____

Complete the following to solve the puzzle

1. Rebecca bought tray of mangoes for $20. What change did she get from $50? _____ **= L**
2. Russell bought a CD for $20. He gave the shopkeeper $40. How much change did he get?

   _____ **= T**
3. Jake bought a pair of jeans for $73. How many dollars in change did the shopkeeper give Jake from $75?

   _____ **= A**
4. Louise paid $42 for a plant as a housewarming gift for her friend. She gave the shopkeeper $65. How much change did she get?

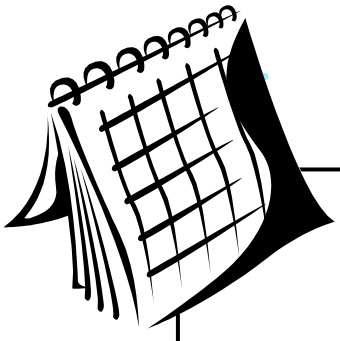
   _____ **= E**
5. Ally ordered a pizza for $11. How much change will she get from $15?

   _____ **= H**
6. Peter bought groceries for $74. What was his change from $85?

   _____ **= O**
7. Madeleine paid $31 for art materials. How much change did she get from $65?

   _____ **= M**
8. Philip bought a new tank for his goldfish. It cost $80. How much change did he get from $90?

   _____ **= F**



**Which month has 28 days?**

| | | | | | |
|---|---|---|---|---|---|
| _____ | _____ | _____ | | _____ | _____ |
| **$2** | **$30** | **$30** | | **$11** | **$10** |
| | | | | | **!** |
| | _____ | _____ | _____ | _____ | _____ |
| | **$20** | **$4** | **$23** | **$34** | |

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## WORKSHEET 4.1B: WHAT GETS WETTER THE MORE IT DRIES?

Name: _____ Year: _____ School: _____

Complete the following to solve the puzzle

1. Sebastian paid $39 for his new shoes. What change did he get from $50? _____ **= O**

2. Hooper bought some fruit for $16. He gave the shopkeeper $45. How much change did he get?

   _____ **= E**

3. Emma bought a skirt for $26. How many dollars in change did the shopkeeper give her from $50?

   _____ **= R**

4. Zac paid $86 for a new CD player. He gave the shopkeeper $100. How much change did he get?

   _____ **= L**

5. Kelly paid $13 for her lunch at the snack bar. How much change will she get from $40?

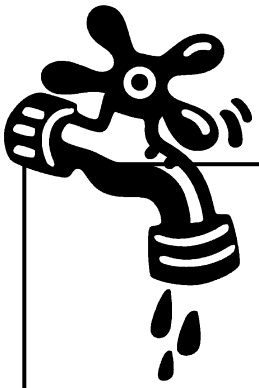
   _____ **= T**

6. Mavis bought groceries for $88. What was her change from $94? _____ **= W**

7. Ethan paid $46 for paint. How much change did he get from $64? _____ **= S**

8. Barbara bought a new pair of thongs. They cost $7. She had $15 in her purse. How much change did she get?

   _____ **= C**



**What gets wetter the more it dries?**

**A**

| ____ | ____ | ____ | ____ | ____ | ____ |
|---|---|---|---|---|---|
| | **$27** | **$11** | **$6** | **$29** | **$14** |

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# 4.2 SEQUENCING AND COMPENSATION SUBTRACTION

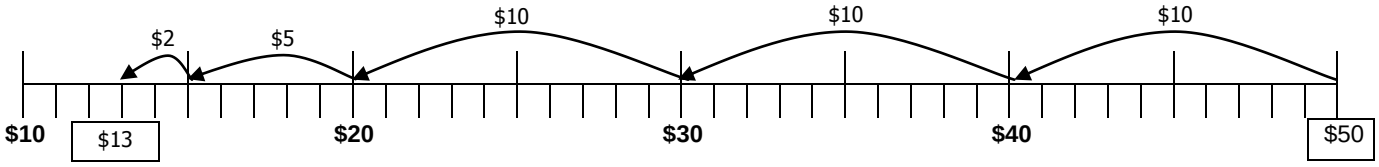
**Objective** To comprehend subtraction of $'s in terms of sequencing and compensation.

**Materials** Money number line, pen, paper, calculator.

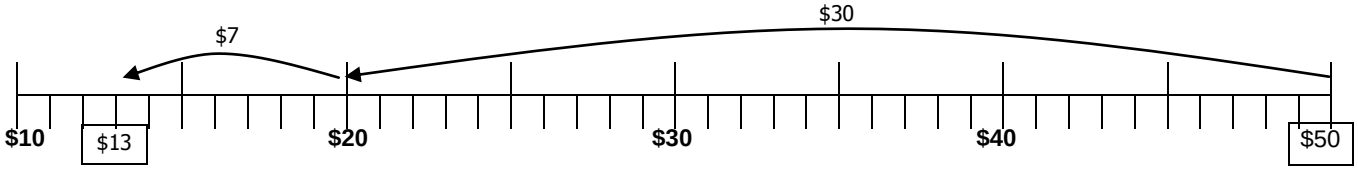
**Activities**

1. Ask students to reconsider finding change when buying $37 clothes with $50 by using a number line. Make $50 on number line. Hop back $37, first $10's, then $1's. (Remember how many $10's and $1's in $37?) Ask the students to show different ways of doing this. Ask students to record what they do on paper.

   Examples:




$$\begin{array}{r} 50 \\ -\ 10 \\ -\ 10 \\ -\ 10 \\ \hline 20 \\ -\ 5 \\ -\ 2 \\ \hline 13 \end{array}$$




$$\begin{array}{r} 50 \\ -\ 30 \\ \hline 20 \\ -\ 7 \\ \hline 13 \end{array}$$

2. Repeat step 1 for cards from shop cards and spending $60. Do this 3 times. Discuss how to be efficient. Say: Think about how you would do these subtractions without the number line. What would you think of?
3. Complete worksheet 4.2A.
4. Reconsider taking $37 from $50. Look at $37 on number line. What is the next $10 ($40). What if we subtracted $40 from $50? How wrong would we be? What would we have to compensate?

   Example:

| | | |
|---|---|---|
| $50 | $50 | Is this too low |
| −$37 | −$40 | or too high? |
| | $10 | What is the correct Answer? |

5. Repeat step 4 for 2 other cards from shop cards giving the shopkeeper $70. Discuss when the method works well. Discuss what would happen if we take off the ten below

| | | | |
|---|---|---|---|
| Example: | $50 | $50 | Is this too low |
| | −$37 | −$30 | or too high? |
| | | $20 | What is the correct Answer? |

6. Complete worksheet 4.2B.

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**Games**

Spending spree:

2-4 players, 2 die. Players start at $100 on dollar number line. Players in turn throw two dice – 1st dice is 10s with 4,5 and 6 as 1,2 and 3 (no number higher than 3 can be thrown), 2nd ones (all numbers 1-6 are allowed). Player moves back the number tossed on number line. 1st player to $0 wins.

Spending $80:

4 players, opposite players' partners. Each player in turn throws 2 dice – 1st dice tens (4, 5, 6 are allowed as 40, 50, 60 in this game), 2nd dice ones - and writes down number in $'s. The players Partner changes this number to next $10 (e.g. if the number is $34, the partner will make it $40) and subtracts this number (e.g. the $40) from $80. Original player has to say how much the partner's answer ($40 for this example) is below the correct answer. If correct 1 point, first set of partner's to 5 points wins.

Example: Suppose the player throws $46 (4 on the first die and 6 on the second die). The partner would then raise this to $50 (the next ten), subtract this from $80 to give $30. To be correct the original player needs to recognise that $30 is $4 below the correct answer for 80-46 (which is $34).

**Questioning**

For sequencing always ask:

How much is $10 down?

How much are well below the $10? What will this leave us with?

For compensation, always ask:

How much do we need to go to the next $10?

If we subtract this next $10, does this mean we are not getting enough change?

What do we add?

Questions should always focus on thinking. That is, the method or strategy being used. Strategies not answers should be the focus of the lesson.

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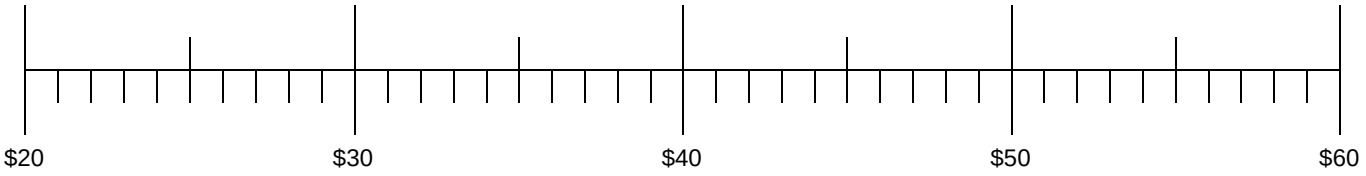
## WORKSHEET 4.2A: JOSH AND HIS DIRT BIKE

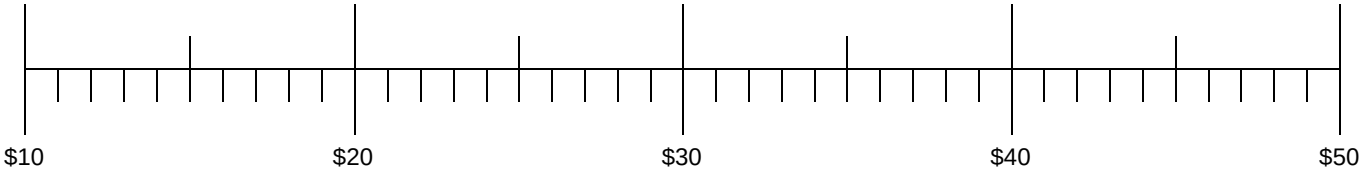
Name: _____ Year: _____ School: _____

**Use the number line to solve these word problems.**

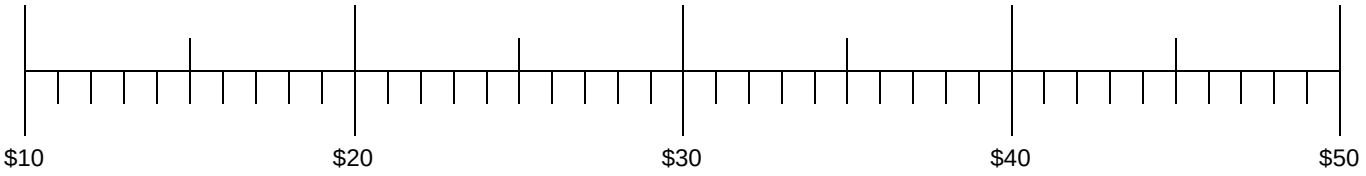
(a) Jackie and Brad paid $32 for a gift for their uncle. How much change did they get from $55?



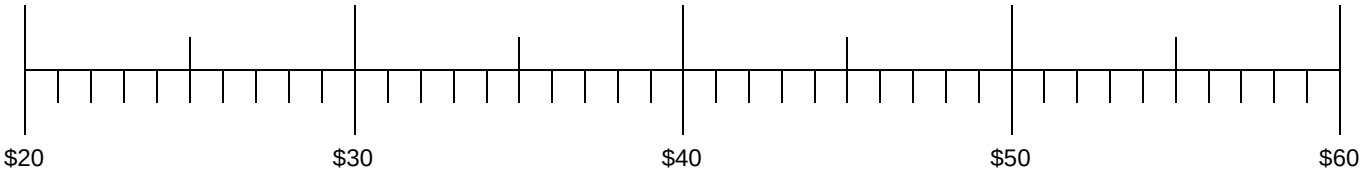

(b) Rosie bought seeds for her vegetable garden for $14. What was the change from $25?



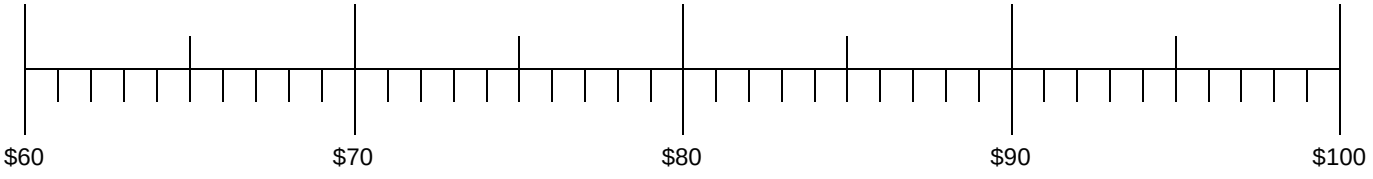

(c) Alexis bought her dog a new collar. It cost her $12. How much change was she given from $46?




(d) Warwick had $96 in his wallet. He gave $82 to his brother. How much money did he have left?




(e) Suzanne paid $67 for her groceries. How much change should she get from $100?



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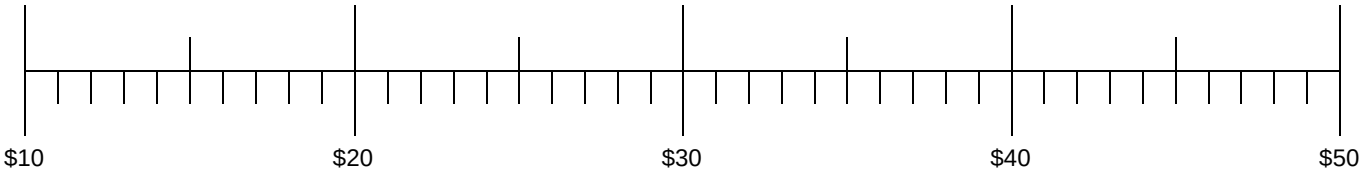
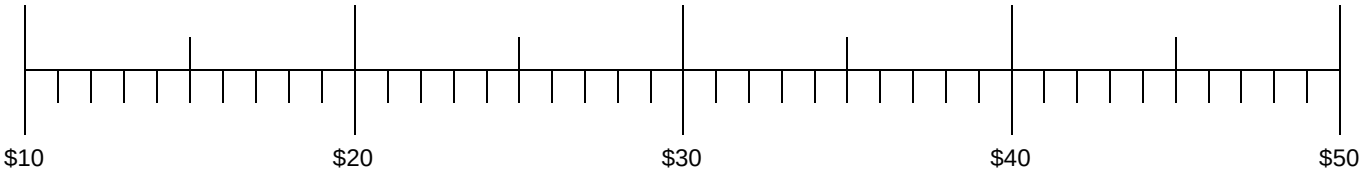
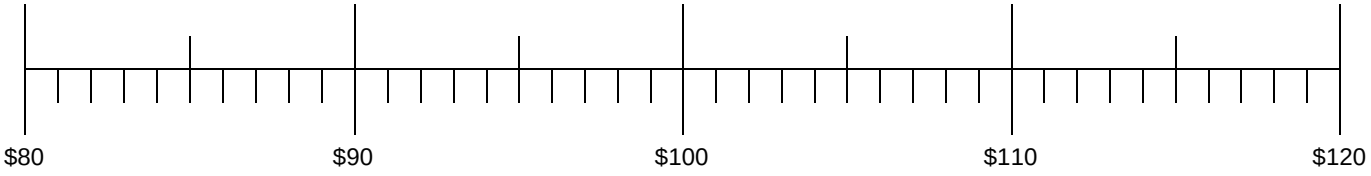
(f) Brad had $44 in his holey pants pocket. $26 fell through the hole. How much money did he have left?




(g) Jarred bought sausages for $17. How much change should he get from $35?

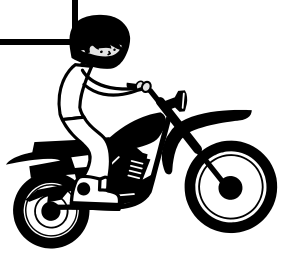



(h) Josh owed the mechanic $88 for repairing his dirt bike. How much change should he expect from $110?




Help Josh finish his homework so he can ride his dirt bike. Colour in the squares with the correct answers.

| | | | | | |
|---|---|---|---|---|---|
| $14 | $15 | $98 | $37 | $43 | $45 |
| $83 | $18 | $23 | $19 | $39 | $16 |
| $29 | $14 | $35 | $34 | $32 | $81 |
| $31 | $10 | $17 | $56 | $11 | $12 |
| $24 | $91 | $10 | $48 | $22 | $33 |



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## WORKSHEET 4.2B: SUBTRACTION AS COMPENSATION

Name: _____ Year: _____ School: _____

1. Use the left hand side to do the exercise on the right hand side.

   * hard ones – be careful

| | | |
|---|---|---|
| (a)<br>$50 − $20 = $30 → $50 − $19 | (b)<br>$60 − $30 = $30 → $ 6 − $28 | (c)<br>$70 − $10 = $60 → $70 − $ 7 |
| (d)<br>$80 − $40 = $40 → $80 − $35 | (e)<br>$60 − $40 = $20 → $60 − $36 | (f)<br>$80 − $50 = $30 → $80 − $44 |
| (g)<br>$70 − $40 = $30 → $70 − $33 | (h)<br>$70 − $10 = $60 → $70 − $ 6 | (i)*<br>$60 − $20 = $40 → $60 − $24 |
| (j)<br>$80 − $40 = $40 → $80 − $45 | (k)<br>$70 − $40 = $30 → $72 − $45 | (l)<br>$60 − $20 = $40 → $61 − $26 |

2. Do these four problems using the same method:

   (1) What change would I get if I had $50 and spent $28 on shoes?

   (2) Heather paid $41 for gardening equipment. What was her change from $100?

   (3) Simon had $31 in his wallet. He bought ice-creams for his family for $1. How much money did he have left?

   (4) Tiffany paid $27 for a CD. She gave the shopkeeper $40. What was her change?

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# 4.3 ADDITIVE SUBTRACTION

**Objective** To comprehend subtraction using the additive sequencing method/strategy.

**Materials** Number lines, calculators, pen paper.

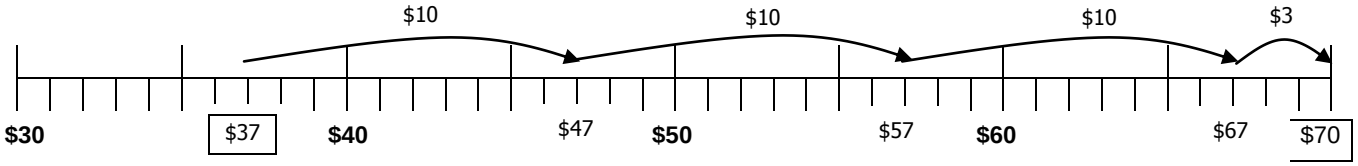
**Activities**

1. Ask students to consider the problem of change if spend $37 and pay $70 from a different point of view. Say: Suppose we build from $37 to $70.

   Ask to put both $37 and $70 on number line

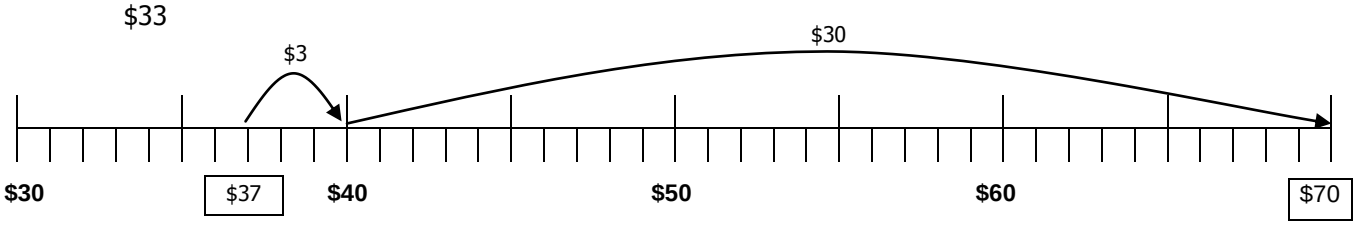
Then hop from $37 to $70. Discuss different ways – write a record of what doing.

Examples:




$37 = 10 → $47 = 10 → $57 = 10 → $67 = 3 → $70

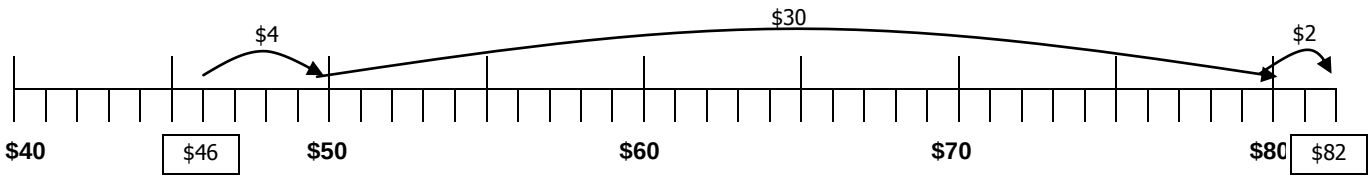
$33

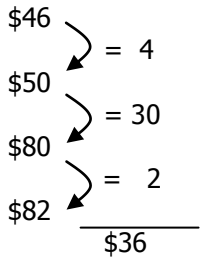



$37 = 3 → $40 = 30 → $70

$33

2. Repeat step 1 for $82 subtract $46






3. Repeat for two more examples

   $74 subtract $29

   $861 subtract $34

   Ask students to think how they would do it without number line.

4. Play shop: give a student six $10 notes and ask him to buy from shop (select a card). Ask a student to be shopkeeper – to hand over card then count out money from card amount to $60 using shopkeeper's method E.g. buying something for $18.

   So count out
   - $2 makes $20
   - $10 makes $30
   - $10 makes $40
   - $10 makes $50
   - $10 makes $60

   That's $42 change.

5. Complete worksheet 4.3A.

**Game**

Getting closer

2 players – first player selects a number between 11 and 40 and another number between 60 and 99 and gives to 2nd player. Second player does same for first number. Both players have to build from 1st number to 2nd number by adding on sum of digits of previous number. Lose if go past 2nd number. Win if closest to 2nd number.

Example: Sue: 26 & 25 Joan: 38 & 67

| | |
|---|---|
| **26** | **38** |
| Add 2 + 6 → 34 | Add 3 + 8 49 → |
| Add 3 + 4 → 41 | Add 4 + 9 62 → |
| Add 4 + 1 → 46 | |
| Add 4 + 6 → 56 | |
| Add 5 + 6 → 67 | |

**Questioning**

Focus on questions as follows:

Put numbers on dollar number line.

How many from smaller to larger number?

Does it help if you increase to a multiple of 10 first?

How many to the next $10?

How many $10s after that?

Are there any $1s still to go?

Did you keep a record of what you added on?

Could you do this in your head?

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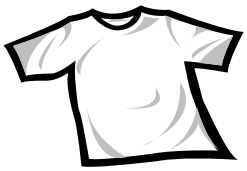
## WORKSHEET 4.3A: WHY COULDN'T THE BICYCLE STAND UP?

Name: _____ Year: _____ School: _____

Find the change to break the code



T-shirt $26
Paid $40
How much change? _____ **= W**

Cap $17
Paid $50
How much change? _____ **= T**

Earrings $31
Paid $40
How much change? _____ **= E**

2 movie tickets $24
Paid $30
How much change? _____ **= S**

Football $20
Paid $50
How much change? _____ **= A**

Par of thongs $14
Paid $50
How much change? _____ **= I**

A kilogram of prawns $22
Paid $25
How much change? _____ **= R**

Super supreme pizza $17
Paid $40
How much change? _____ **= O**

Restaurant meal $19
Paid $60
How much change? _____ **= D**

Watch $47
Paid $100
How much change? _____ **= Y**

**Why couldn't the bicycle stand up?**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| _____ | _____ | | _____ | _____ | _____ | | | | |
| $36 | $33 | | $14 | $30 | $6 | | | | |
| _____ | _____ | _____ | | _____ | _____ | _____ | _____ | _____ | |
| $33 | $14 | $23 | | $33 | $53 | $3 | $9 | $41 | |

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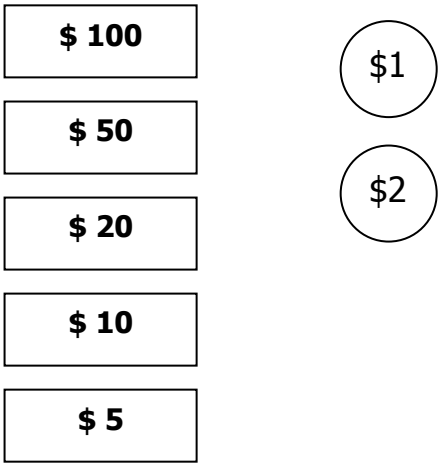
# 5. RICH ASSESSMENT TASK: CREATE A SHOP

## 5.1 PRE-ASSESSMENT TASKS: NOTES AND COINS

The first assignment in finance requires you the student to familiarise yourself with all of the notes and coins. In Booklets A and B, we have looked at $10 notes and $1 coins with values up to $100. However in reality, there are more notes and coins.

Examples: NOTES COINS




**Written Tasks:**

1. Write down 10 ways you can make $50.

2. Give the correct money for these two amounts added together. Draw notes and coins.

   (a) $16, $32

   (b) $68, $19

   (c) $37, $45

3. What change would you get if you paid for the amounts below with a $100 note? Draw the change.

   (a) $27

   (b) $61

   (c) $48

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# 5.2 RICH ASSESSMENT TASK: SHOPPING

This assignment in finance requires you, the student, to engage in shop activities.

## 1. Setting up a shop

Decide on a focus of the shop. Collect pictures of a variety of things that could be sold in the shop. (Use Internet)

Prepare a "shop front" display with the name of the shop and pictures/objects and prices (whole dollars only) of at least 20 things you have for sale. Restrict your shop to things that cost between $11 and $99.

## 2. Running your shop

Obtain play money and sell the objects in your shop. Give the correct change. Calculate the price of two things for the customers.

Keep a record of sales and change given.

## 3. Inspecting other shops

Become a shop inspector. Go to other shops.

Buy things (two if the total cost is less than $99). Pay in large bills. Check the shopkeeper's calculations for two things and change for one and two things.

Keep a record of your purchases and change given.

## 4. Reporting on shopping

Write a report describing your shop, how you calculated the totals and change, your recording method as a shopkeeper and an inspector, and what you think is the best shop.

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## 5.3 TEACHER HINTS AND ASSESSMENT RUBRIC

### Teacher hints

The idea here is for students to practise calculating the cost of two items and giving of change using any method they wish. Give number lines or allow students to use money on PVC if this will help.

Organise so that all prepare a shop (groups may be necessary). Get half to buy from others and vice versa. Need to be organised here.

Encourage students to be creative and artistic in the presentation of the shop but also to be well structured.

Check students' method of recording sales/change before start of activity.

### Assessment rubric

| Activity | Excellent (A) | Good (B) | Satisfactory (C) | Effort shown (D) | No effort shown - unsatisfactory (E) |
|---|---|---|---|---|---|
| **Shop** | Excellent structure, creativity and presentation | Good structure, creativity and presentation | Adequate structure, creativity and presentation in most areas | Does not meet adequate standards but effort shown | Inadequate and no effort shown |
| **Record-ing form** | Well thought out recording forms | Useable recording forms | Forms able to be used in most situations | Inadequate forms but effort shown | Inadequate and no effort shown |
| **Shop keeping** | All correct calculations | Nearly all calculations are correct | Mostly correct calculations | Mostly incorrect calculations but effort shown | Incorrect and no effort shown |
| **Inspect-ions** | All correct checking | Nearly all correct checking | Mostly correct checking | Inadequate checking but effort shown | Inadequate and no effort shown |
| **Report** | Explains clearly with much detail | Explains clearly with some detail | Readable report | Does not meet requirements but effort shown | Does not meet requirements, no effort shown |