Reviewing Skills and Examination Practice

The Problem Solving Cycle

IDENTIFY THE TASK	• What is it you have to find out? • What rules or information do you need to watch out for?
GATHER INFORMATION	• What do you already know? (Can you eliminate answers?) • What else do you need to know?
MODEL IN MATHS	• What maths is involved? (Do you have to work it out?)
CHECK YOUR ANSWER fits the PROBLEM	• Does the answer look about right? (Does it make sense in the real world?)

Checking Calculations

Reversing what you have done.

The table shows prices given in a sandwich bar
You buy 1 drink, a roll and 2 biscuits for £4

rolls	£1.60
drinks	£1.00
biscuits	£0.70

To get the answer = £1 + £1.60 + 70p + 70p = £4

REVERSE CHECK = £4 - £1 - £1.60 – 70p – 70p

Rounding to see if your answer is 'in the right region'

A farmer owns a piece of land that measures 4.7m by 2.3m. He calculates the area as 10.81 square metres.

To get the answer = 4.7 x 2.3 = 10.81

ROUNDING CHECK = 5 x 2 = 10

Inverse check

Coffee is served at a charity sing-along for £1.60.   73 people buy coffee and £ 116.80 is collected.
How can they check that this amount is correct?
To get the answer = 173 x £1.60 = £276.80

INVERSE OPERATION = £116.80 ÷ 173

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Skills required	Level 1 N2/L1.2 Find parts of whole number L1.3 Fractions MSS1/L1.3 Calculate using time

The Question

3. Janine is paid for each complete quarter hour she works.

She works 7 hours 40 minutes on one day. **How long will she be paid for?**

A $7\frac{1}{2}$ hours   **C** $7\frac{3}{4}$ hours

B   7 hours   **D**   8 hours

Problem Solving Cycle – Strategies

IDENTIFY THE TASK	● What is it you have to find out?	How long will she be paid for?
	● What rules or information do you need to watch out for?	Complete quarter hours
GATHER INFORMATION	● What do you already know? (Can you eliminate answers?)	Time worked = 7 hours 40 minutes Whole hours worked = 7 You should know 60 minutes = 1 hour There are 4 quarters in 1 hour ¼ + ¼ + ¼ + ¼ 15 minutes = ¼ 30 minutes = ½ hour = ¼ + ¼ Your answer cannot be D (only complete ¼s are counted and she has not worked more than 8 hours) Your answer cannot be B (She has worked more than 7 hours 15mins)
	● What else do you need to know?	What part hours will she be paid for? how many complete ¼hours in 40 minutes or how many lots of 15 minutes in 40 minutes
MODEL IN MATHS	● What maths is involved? (Do you have to work it out?)	40 ÷15 15 + 15 = 30 she will get paid for these 30 + 15 = 45 too high . She won't get paid for the 10 mins. Total Hours = 7 + ¼ + ¼ = 7 〰 = 7 ½
CHECK YOUR ANSWER fits the PROBLEM	● Does the answer look about right? (Does it make sense in the real world?)	7 hours 30 minutes is only 10 minutes less than 7 hours 40 minutes – this answer looks OK.

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Now your turn.

For each question complete the cycle to get the right answer.

Jessica is paid for each complete half hour she works. She starts work at 9am has a 30 minute lunch break at 12pm and goes home at 4.30pm each day. How many hours does she get paid for each day?

A	6 ½ hours		B	7 ½ hours
C	7 hours		D	6 hours

Peter works odd days for a builder. He gets paid for each complete quarter hour that is worked. On Monday he worked 3 hrs 25 mins, on Wednesday he did 4 hrs 50 mins and on Friday he did 2 hours 25 mins. How many hours altogether will he get paid?

A	10 hours		B	9 ½ hours
C	10 ¼ hours		D	10 ½ hours

Tom has to clock in and out for work each day. The table below is a record of his work over one week. He only gets paid for each complete quarter hour worked.

	Monday	Tuesday	Wednesday	Thursday	Friday
start	9.05	9.10	9.00	9.00	9.10
finish	5.30	5.35	4.30	5.45	6.00
total	8hr 25min	8hr 25min	7hr 30 min	8hr 45 min	8hr 50 min

On which days did he work the exact hours he got paid for?

A	Wednesday and Friday		B	Monday, Tuesday and Friday
C	Wednesday and Thursday		D	Wednesday, Thursday and Friday

David only gets paid for each complete quarter hour he works. On Saturday David worked 6 hours and 20 minutes. How many hours would he get paid for?

A	6 hours		B	6 ½ hours
C	7 hours		D	6 ¼ hours

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Skills required	N2/L1.3 Recognise equivalences between fractions
	Know that <u>out of</u> in 1 out of 4 is a way of saying ¼ and interpret this in other situations.
	The denominator = total (with information in tables sometimes you will need to calculate this total)

The Question

10 out of 50 patients had head injuries. What fraction of patients is this?

A $\dfrac{1}{3}$ **B** $\dfrac{1}{5}$

C $\dfrac{1}{4}$ **D** $\dfrac{1}{10}$

IDENTIFY THE TASK	• What is it you have to find out?	What fraction of patients have head injuries?
	• What rules or information do you need to watch out for?	None in this question.
GATHER INFORMATION	• What do you already know? (Can you eliminate answers?)	10 out of 50 is the same as writing $\dfrac{10}{50}$
	• What else do you need to know?	How to find an equivalent fraction as this is not given as a possible answer
MODEL IN MATHS	• What maths is involved?	The numbers we have are bigger than the fractions given in the answers.
	(Do you have to work it out?)	This means reducing our fraction by dividing both top and bottom by the same number. 10 and 50 can be divided by 10 (they both end in 0) $\dfrac{10}{50}$ now becomes $\dfrac{1}{5}$
CHECK YOUR ANSWER fits the PROBLEM	• Does the answer look about right? (Does it make sense in the real world?)	I know that ¼ would be about 12 ½ patients and that ¼ is a bit bigger than $\dfrac{1}{5}$ so it looks about right. NOTE: with fractions the bigger the number at the bottom (denominator) the smaller the fraction.

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Reviewing Skills and Examination Practice

Now your turn.

Twenty out of fifty people say they do exercise more than once a week. What fraction of people exercise more than once a week?

A $\dfrac{1}{2}$ B $\dfrac{1}{5}$ C $\dfrac{1}{10}$ D $\dfrac{2}{5}$

Julian is saving towards buying a car. He puts his money in a saving account each week as follows:

£35   £40   £52   £45   £36   £48   £45   £42

What fraction of his savings are less than £40?

A   1/8   B   3/8   C   1/4   D   2/7

At a charity fund raising event 1000 raffle tickets are sold. There are 25 prizes to be won. What fraction of tickets will win a prize?

A   1/4   B   1/5   C   1/40   D   5/10

The following table shows the number of people attending a local football match. Of those attending on Saturday 3rd 120 were from the away team.

Sat 5th	Sat 12th	Sat 19th	Sat 26th	Sat 3rd
234	350	428	239	240

What fraction of supporters was this?

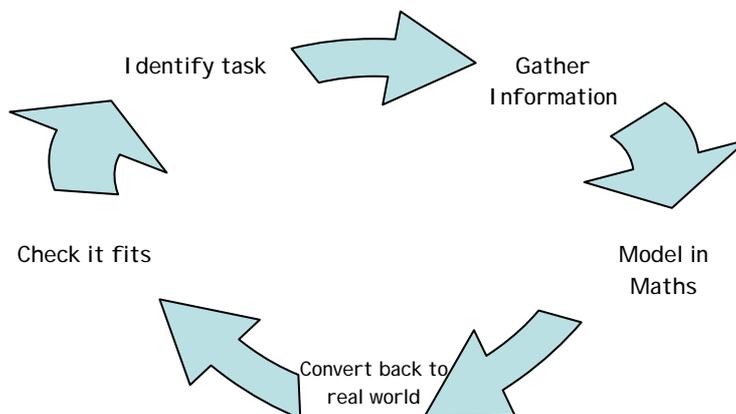A   1/60   B   2/6   C   1/20   D   1/2

Suggestions and Background to the Review Sheets

This resource was contributed by Jean Thomas, tutor from The Henley College, who says:

Most of my dyslexic students find the wordiness of the questions a real challenge. They can often do the maths once the question is explained. The problem solving cycle is used as steps to work through that help to break the task down – particularly when it seems overwhelming – and to get them to check for sense at the end.

Introduce the cycle

The problem solving cycle is first explained, with a diagram, as steps to work through to solve a problem. It is just as relevant to non-dyslexic students and adults.

Identify task → Gather Information → Model in Maths → Convert back to real world → Check it fits →

Step 1

Students were given an example problem and asked to first identify the task (question posed). Discuss key words – how many, what, which, calculate, give, etc.

Remind them about scanning to locate these words. They should find the posed question before reading for meaning. This is particularly important as lots of questions add information that is not needed to solve the problem and some problems split up the information from the main question.

They then read the question through with a clearer idea of the information they might need to find.

Step 2

Q&A around class for the information that will be needed to solve this particular problem. Then they are asked to obtain the correct data – (gather the data). Write this up on the board. Do remind them to check for special rules or conditions. (see example on sheet)

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Step 3

Ask students to explain what maths they need to do - Model in Maths – **some things to consider**.

- ❑ What operation is needed – are your students clear about signs + and x + and ÷ are often confused.
- ❑ Using elimination - it is reassuring to go from possible answers and this is a popular strategy but encourage caution and checking! In the first example (page 2) one student gave the answer 7 ¾ he said because he knew that 30 minutes made ½ and 40 minutes was ¾.
- ❑ Do they need to work it out at all? – I always get them to look at the answers as well as the question!

Step 4/5

I then wrote up A B C D on the board and recorded the number of students who had given each answer. (You do need to have the confidence of your class for this – exposing mistakes can be tricky but as I make them all the time my students quickly learn how helpful mistakes are). This is often surprising especially if you listen to the students reasoning. We then discuss the answers, i.e. – why is it no-one went for? How could we check which one of these is right? This is the 'putting the answer back into the real world' and 'checking it makes sense' and the bit my students would otherwise avoid.

NOTE

I encourage them to go from their answer back to the task originally set (hence a problem cycle) and check if their answer matches the problem given before marking their paper.

Again using the first example:

They may have done some maths and got an answer
$$\begin{array}{r} 15 \\ 15 \\ + \underline{15} \\ \underline{45} \end{array}$$

this might mean ¾ of an hour – but is it what you trying to establish?

Dyslexic students often lose their way in a question. They especially need to check back once they have done some maths.

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