Problem Solved

Essential Problem Solving Practice For All Children

6

NATIONAL MATHS PROBLEMS

Greg Purcell

Problem Solved 6

Essential Problem Solving Practice For All Children

The four books in this series contain challenging problems that cover all strands of the mathematics curriculum. They reflect the way mathematics is encountered in real-life situations. The problems encourage children to apply their knowledge and general numeracy skills. The ability to *work mathematically* is the key element of all books within the series. The activities presented have been chosen to enhance and enrich each student's mathematical experiences.

The problem solving activities work towards developing strategies such as:

- ✓ estimating
- ✓ modelling
- ✓ analysing
- ✓ measuring
- ✓ calculating

The content works towards achievement of the outcomes presented in the Australian Curriculum and the descriptions described in each state syllabus.

Each book has 40 units.
An answer section is included.

Level 1

1. If 29 777 was multiplied by 10, would the product be closer to 300 000 or 30 000?

2. One number is missing in Emma's pattern of square numbers. Her numbers are 25, 36, ___, 64, 81. What number is missing?

3. How many times larger is the '5' in the thousands column than the '5' in the tens column in the number 785 954?

Level 2

1. Rockhampton's population is about double that of Orange. Estimate Rockhampton's population if Orange is 40 000.

2. If I rounded 136 840 to the nearest thousand, would I write 137 000 or 140 000?

3. If I rounded 1 546 833 to the nearest ten thousand, would I write 1 500 000 or 1 550 000?

Level 3

1. If a palindromic number reads the same forwards as backwards, what is the next palindromic number after 546 645?

2. Max entered the number 714 528 into his calculator, then he doubled the number in the thousands column. What is his new number?

3. The auctioneer said the highest bid for the antique vase was "32 hundred and ten". How would you write this in dollars on the receipt?

4. Violet used 10 beads to make the first three triangular numbers in her pattern. How many beads does she need for the next triangular number?

Investigation

Selina's restaurant has 48 seats. Name four different ways the seats can be arranged around the tables. No tables can have just one seat.

Table Groups

Table	2	3	4	6	8
1					
2					
3					
4					
5					
6					

Unit 2 — Add, Subtract, Multiply and Divide

Level 1

1. Four friends are sharing the rent on an apartment in the city. How much will each pay if the rent is $360 per week?

2. Adult tickets outsold children's tickets by the ratio of 4:1. How many adult tickets were sold if 1500 children's tickets were sold?

3. Mitchell uses 25 L of water daily. How much water will he use in a week?

Level 2

1. The ratio of boys to girls is 3:1. If there are 48 students on the school bus, estimate the number of female passengers.

2. In summer, there were 6526 surf rescues but only 239 in winter. How many more rescues were there in summer?

3. What would be the mass of a carton of 50 chocolate bars if each bar had a mass of 200 grams?

Level 3

1. Curtis and Ben have 60 marbles between them. How many do they each have if Curtis has 4 times as many as Ben?

2. Home crowds for the Bombers totalled 144 000. What was the average attendance if there were 9 home games?

3. Can 5 friends afford to rent a house for $440 per week if none of them can afford more than $90 per week?

4. How far apart would 9 wharves be if they were evenly spaced around an island with a circumference of 450 kilometres?

Investigation

Population of major capital cities

City	Tokyo	New York	Moscow	London	Paris	Sydney
Population	32 million	20 million	15 million	12 million	10 million	4 million

Where in the world am I?

My population is three times that of Sydney.	My population exceeds that of Moscow by 17 000 000.	My population is 10 000 000 less than New York.	My population is ⅛ that of Tokyo.	My population is equal to 75% of New York's.
a	b	c	d	e

Unit 3   Fractions

Level 1

1. Of the 160 children in Year 6, three-quarters were involved in the play. How many children were in the play?

2. A small plastic cup has a capacity 120 mL. How much was in the cup if it was a quarter full?

3. 100 of the 300 tissues in the box have been used. What fraction of the tissues remain?
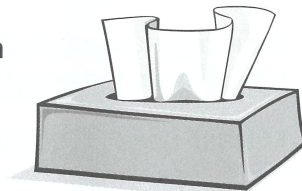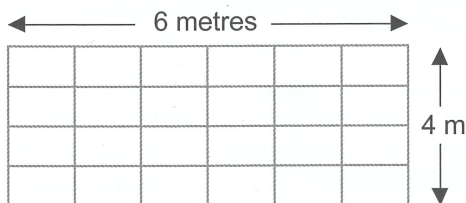
Level 2

1. Four thousand hectares of land is to be divided equally into eight blocks. What will be the area of each block?

2. 1500 mm of timber is being sawn into tenths. What will be the length of each piece?

3. Pretty Beach Caravan Park has 276 sites. If two thirds are occupied, how many sites are available for campers?

Level 3

1. Who was the more accurate goal shooter, Susan who shot 30 out of 40 attempts, or Kate who shot 35 out of 50?

2. If a netball game is one hour long, how many minutes did Kate play if she played 1¼ games?

3. Ticket sales for the disco totalled $1500. How much profit was made if ⅓ was used to pay expenses?

4. How much would you pay for 3¼ kg of beef at $20 per kilogram?

Investigation

6 metres	

4 m

What size are these areas?

1. The soccer and netball courts occupy two-thirds of the space.
2. The play equipment occupies one-quarter of the space.
3. One-twelfth is a barbecue area.

Level 1

1. How much needs to be sawn off the 1 metre length of timber if it has to be exactly 75.9 cm long?

2. The table is 3.75 metres long in its normal position and 5.25 m when extended. What increase does the extension provide?

3. Before the price increase of 3.5 cents, petrol was 135.4 cents/litre. How much is it now?

Level 2

1. Jackson's mass is 54.5 kg and Sam's is 38.9 kg. How much heavier is Jackson compared to Sam?

2. On an average summer's day, a piece of steel is 1.01 metres long. During winter it contracts 0.02 metres. What is its length on an average winter's day?

3. Daniel was 35.5 cm when born. He is now three times that height. What is his height now?

Level 3

1. Our car travels 10.5 km on a litre of petrol. How far should it travel on 50 litres?

2. Estimate the mass of a dozen eggs if the average mass of each egg was 49.9 grams.

3. How long is the baseline of my graph if it has six intervals of 3.5 cm?

4. The tree's shadow was 0.55 metres at 1pm. Later that afternoon it was 5 times longer. What was the new length of the shadow?

Investigation

Ally's piggy bank weighs each coin as it drops in.

1. Complete the table to show how heavy the contents of her piggy bank are.
2. How much money is in her piggy bank?

Coin	Mass	Tally	Subtotal
5c	2.83 g	III	
10c	5.66 g	IIII	
20c	11.31 g	IHL I	
50c	15.55 g	IIII	
$1	9 g	IHL	
$2	6.6 g	IHL IHL	
Total			

Unit 5 — Percentages

Level 1

1. How much charge is left on my phone if the battery indicates that I have used 40% of the power?

2. How tall is the poster if it is 50% of the height of the real player, who is 180 cm tall?

3. How many lights were not working if 25% of the 80 lights were faulty?

Level 2

1. Grant's jumper is red, white and blue. What percentage is red if 3 out of the 12 balls of wool used to make it were red?

2. Adelaide earns $400 per week. How much will she earn this week if she was given a 25% bonus?

3. What percentage of the book does Jasper have left to read if he has read $\frac{4}{5}$ of the book so far?

Level 3

1. How much did Scarlett pay for her car if it was priced at $20 000, but she was given a 25% discount?

2. Jemma placed a one litre container of water in the sun. If 10% evaporated, how much water was left in the container?

3. Prani invested $500 for one year and received 5% interest. How much interest did she earn and how much will she have at the end of the year?

Investigation

Australia's population – Fact Sheet	
Total population = 22 000 000	
30% live in NSW	25% born overseas
20% live in Sydney	5% born in the UK
20% are under 15 years of age	2½% born in New Zealand
65% live in capital cities	

How many Australians

1. live in Sydney?
2. live in NSW?
3. are 15 years or older?

4. were born overseas?
5. were born in the UK?
6. are under 15 years of age?

Unit 6 Patterns and Algebra

Level 1

1. The bus takes 8 minutes to travel 5 km, 16 minutes to travel 10 km and 24 minutes to travel 15 km. About how long would it take to travel 20 km?

2. Estimate the length of time for an Under 12 T-ball game if the U6's play for 20 minutes, U8's for 30 minutes and U10's for 40 minutes.

3. Ben buys one newspaper every day but he buys two on Sundays. How many papers would he buy in two full weeks?

Level 2

1. About how many tomatoes would there be in a 2 kg bag if a 500 g bag has 4, a 1 kg bag has 8 and a 1½ kg bag has 12?

2. When Mia earned $100 she paid $20 tax, $40 tax on $200 and $60 on $300. Estimate the amount of tax she would pay on $500.

3. 9 minutes out of every 30 minutes of television on Lee's favourite channel is advertising. Estimate the amount of time devoted to advertisements in 1½ hours.

Level 3

1. Paul has noticed that low tide is always about one hour later than the previous day. Predict the time of Monday's low tide, if low tide was at 4:50 am on Friday, 5:50 am on Saturday and 6:50 am on Sunday.

2. How many votes did Amy get if she got twice as many as Ruby and four times as many as Jack, who received 10% of the 400 votes?

3. Martin's stick houses are joined together. The first one used 5 matches and every extra house only used 4 matches. How many would be needed to make 4 adjoining houses?

Investigation

Cooper's socks are on the clothesline. He has black socks for work and white ones for sport.

Use the picture to work out the least number of socks he needs to gather, from a straight line, before he has 3 pairs.
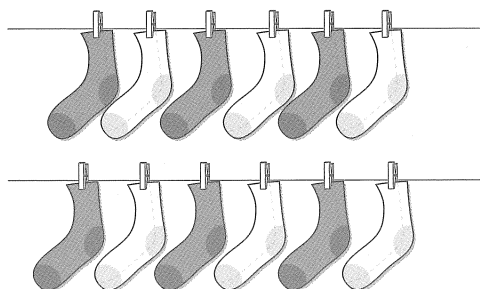
Level 1

1. Tran has grown 130 millimetres since this time last year. How tall is she now if she was 1.42 metres?

2. Wes cut a 1.8 m piece of wood into tenths. How many centimetres long was each piece?

3. Charlie's step is 0.65 m. How far will he travel if he takes 10 steps?

Level 2

1. It is 3.855 km from my home to school. A short cut takes 0.65 km off the trip. How long is the shorter trip?

2. Each skipping rope is 150 cm long. How much rope is needed to make six skipping ropes?

3. How long would it take to travel 640 km, travelling at an average speed of 80 km/h?

Level 3

1. How many kilometres does Winston swim each day if he always completes 40 laps of the 50 metre pool?

2. The distance by road between two cities is 890 km. By air it is 20% shorter. What is the distance by air?

3. What is the length in millimetres of a chain that is comprised of 16 links, each 1.5 cm long?

4. How many metres of fencing are needed, if I need fencing along the back of my property and down both sides? My yard is 18 m wide and 15 m deep.

Investigation

Length of coastline in kilometres

| NSW	Vic.	Qld	SA	WA	Tas.	NT	Total
1900	1800	7400	3700	12 500	3200	6200	36 700

True or false.

1. The combined NSW and Vic. coastline is equal to that of SA. _____
2. The coastline of SA is half that of Qld. _____
3. Tasmania represents 10% of the total coastline. _____
4. WA's coastline is more than double that of NT. _____

Level 1

1. An area of 240 m² is to be divided into four equal lots. What will be the area of each lot?

2. A showroom 18 metres long and 10 metres wide is to be carpeted. How many square metres of carpet need to be ordered?

3. Jessica ran around the block three times. How many kilometres did she run if the block is 700 m long and 300 m wide?

Level 2

1. Fencing costs $20 per metre. How much will it cost to enclose a field 50 metres long and 100 metres wide?

2. How much space is needed for two courts each 9 metres long and 5 metres wide?

3. One litre of paint will cover 30 m². How many litres are needed to cover an area of 240 m²?
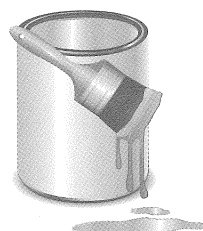
Level 3

1. Tom drew a square with a perimeter of 32 cm. Jack's rectangle also had a perimeter of 32 cm, but its area was 9 cm² less than Tom's square. What were the dimensions of Jack's rectangle?

2. A poster is 90 cm by 60 cm. If a photo takes up half the space, what area is left for printed information?

3. Sam and David made rectangles. Sam's dimensions were 5 cm by 4 cm and David's were double that. How many times larger is the area of David's rectangle?

Investigation

Tracey has drawn two netball courts to scale. Calculate and draw more courts on the gymnasium floor below.

STORE
ROOM

SHOWERS

Unit 9 — Volume and Capacity
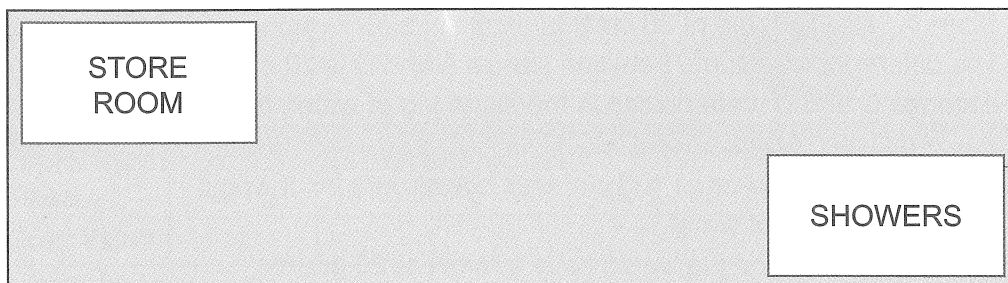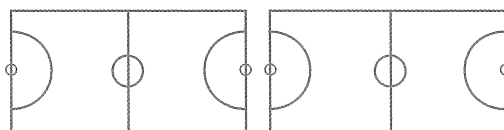
Level 1

1. What would be the capacity of a storage box 3 metres long, 2 metres high and 2 metres wide?

2. How many 250 mL bottles can be filled from a 4 litre container?

3. If 120 tins of soup fit in a one cubic metre container, how many similar containers are needed for 480 tins?

Level 2

1. How much water is left in the 750 mL bottle if ⅔ have been poured out?

2. Luke's prism has a volume of 162 cm³ and the area of its base is 54 cm². How tall is his prism?

3. Greta is to take 15 mL of medicine every 4 hours. If she had her first dose at 0730 hours, how much will she have had by 2000 hours?

Level 3

1. How many millilitres are left in the 2 L bottle if 40% has been used?

2. A shed's volume is 72 m³. If it was extended so that it was 4 m longer, 3 m wider and 3 m higher, what would be its new volume?

3. The tray used to catch dripping water has a volume of 6 m³. How high is it if the area of its base is 12 m²?

Investigation
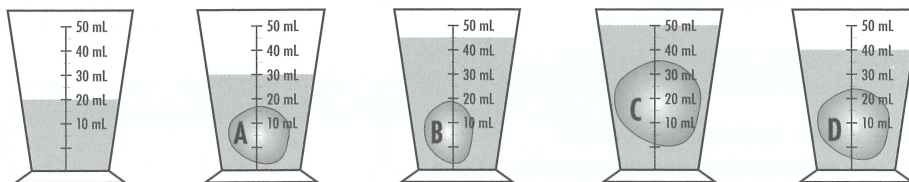
True or false.

1. Stone A has a volume of 30 cm³. _____
2. The difference in volume between stones A and C is 20 cm³. _____
3. If stones C and D were placed in the same jug of water, they would displace 50 mL of water. _____
4. If a rock with a volume of 100 cm³ was placed in a jar, it would displace one litre of water. _____
5. The water in the first jug would have a mass of 20 grams. _____

12

Level 1

1. A courier picked up 15 parcels each with a mass of 15 kg. What was the total mass of the parcels he collected?

2. If a dozen watermelons weigh 84 kg, what is the average mass of each watermelon?

3. A jar of jelly beans has a total mass of 1 kg. If the jar's mass is 250 g, what is the mass of the jelly beans?

Level 2

1. A football player weighed 83 kg. Under a diet, he has to gain 0.25 kg each week for 8 weeks. What will be his mass in eight week's time?

2. Each biscuit has a mass of 3 grams. What would be the mass of 2 dozen biscuits?

3. I use 25 g of 'Washo' in every load of washing. How many loads can I get from a 2.5 kg packet?
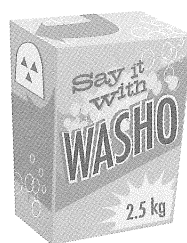
Level 3

1. When fully laden, the mass of the truck was 4 tonnes and 350 kg. After dropping its load the mass fell to 3 t and 200 kg. What was the mass of the load?

2. A jockey has a mass of 52 kg. If he loses 500 g each week for a period of 12 weeks, what will be his new mass?

3. How much did I pay for 2.5 kg of steak at $16.80 per kg and 3.5 kg of sausages at $12.40 per kg, and how much change would I receive from $100?

Investigation

'You're worth your weight in gold,' said the coach after the team won the grand final. Calculate how much each player is worth if gold is priced at $60 per gram.

Player	Daniel	Jeff	Dion	Zoe	Emma
Mass	42 kg	40 kg 500 g	45 kg 500 g	30 kg 250 g	35 kg 250 g
Gold Value					

Level 1

1. Monday's temperature was 18°C. If Tuesday's temperature was 23.5°C, by how many degrees did the temperature rise?

2. Jana's temperature fell 1.2°C from 36.9°C. What is her current temperature?

3. By how many degrees did Canberra's temperature increase if it rose from -2° to 12°C throughout the day?
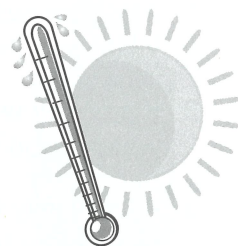
Level 2

1. The temperature rose 2.5°C every hour for 4 hours from 8:00 am. What was the temperature at noon if it was 16°C at 8:00 am?

2. At 7 am the air temperature was 14°C, but the sea temperature was 1½ times greater. What was the ocean temperature?

3. Safa recorded the temperature in 5 rooms of her house. The temperatures she recorded were: 28°C, 31°C, 25°C, 30°C and 26°C. What was the average temperature throughout the house?
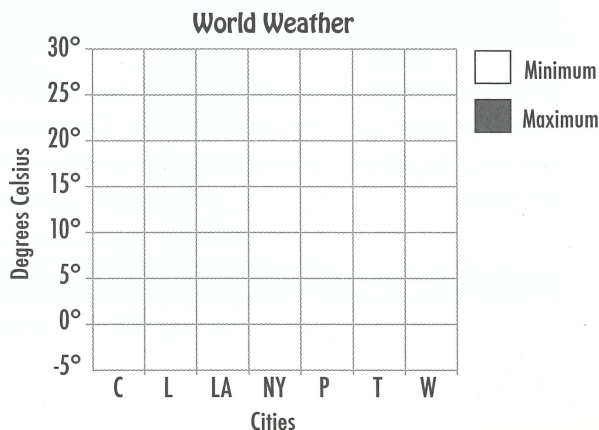
Level 3

1. The temperature inside an electric kettle is 89.7°C. By how many degrees does it have to rise to reach boiling point?

2. The sunny side of Venus has a temperature of about 527°C and the dark side is 211°C cooler. What is the temperature of the dark side?

3. At a certain level in the clouds on Jupiter, the temperature is 145°C. Towards the centre it is 5500°C. What is the difference in temperature between the two areas?

Investigation

Construct a graph to show the minimum and maximum temperature for each city for Friday 13 March.

	Min	Max
Canberra (C)	10°	25°
London (L)	5°	15°
Los Angeles (LA)	15°	17°
New York (NY)	0°	10°
Paris (P)	5°	20°
Tokyo (T)	9°	15°
Wellington (W)	10°	21°

World Weather

Degrees Celsius — 30° 25° 20° 15° 10° 5° 0° -5°

Cities: C L LA NY P T W

☐ Minimum
■ Maximum

Level 1

1. The Harris family left home at 4:50 pm and returned at 8:05 pm.
   How long were they away?

2. My train was due at 6:58 am but was 9 minutes late. When did it arrive?

3. Lieutenant Doyle was on duty for 5¼ hours. When did he start work if
   he finished at 2230 hours?

Level 2

1. The alarm was set at 8:15 pm to come on in 5½ hours.
   At what time will the alarm go off?

2. When will I reach the city if I left home at 8:30 am, took 13 minutes
   to walk to the station and then had a 28 minute train trip to the city?

3. Paul's plane trip from Sydney to Melbourne took 55 minutes.
   What was his departure time if he arrived in Melbourne at 1518 hours?

Level 3

1. How far did we drive in 1½ hours at an average speed of 90 km/h?

2. The school clock loses 2 minutes every hour. When the 1 pm lunch
   bell rang it showed 12:37. What time will it be showing at 3 pm?

3. When should I set the DVD player to turn off if the game runs for
   100 minutes, starts at 1330 hours and I always allow an extra 15 minutes
   in case the game goes into 'extra time'?

4. The express train covered the 780 km journey in 6 hours. What was
   the train's average speed per hour?

Investigation

Ruby and her sister are having a 500 metre race.
Ruby is giving her sister a 20 second head start.
Ruby's average speed per 100 metres is 20 seconds.
Sara's average speed per 100 metres is 30 seconds.

1. At what point will Ruby catch up to Sara?
2. How long will it take Sara to complete the race?
3. Who won?

200 m
300 m
100 m
400 m
500 m
START
FINISH
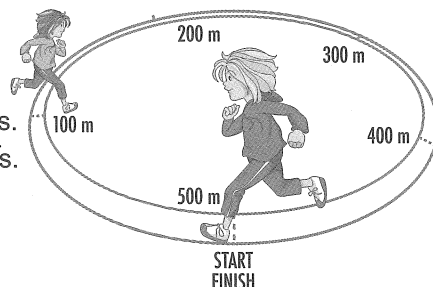
Level 1

1. Each hexagon Sally made used 6 matches. How many matches will she need to make 15 hexagons?

2. How many hexagons are in Cara's sequence if she used 150 matches?

3. What is the fourth angle on Kim's quadrilateral if the angles she has measured are 120°, 60° and 120°?
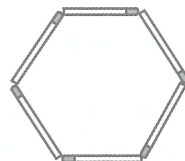
Level 2

1. What fraction of the pie graph represents 'chocolate' if the 'chocolate' sector is 120 degrees?

2. How many degrees are in each section of Kate's Chocolate Wheel if it is divided into 12 equal sectors?

3. When the oven door was open it formed an angle of 90°. What angle was formed when the door was opened half way?
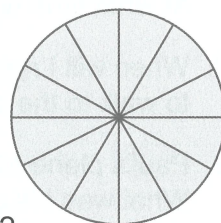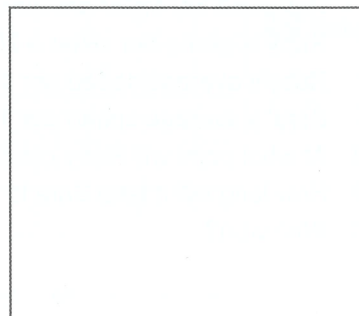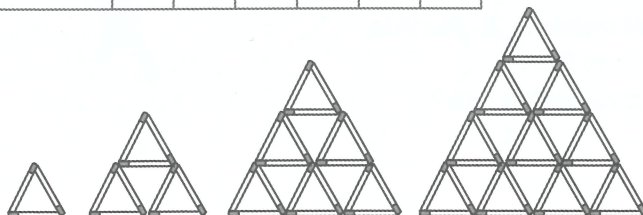
Level 3

1. The hands of a clock form a right angle at 3:00. What will be the time when the next right angle is formed?

2. If the hands of a clock form a right angle at 9:00, what type of angle will be formed at 9:05?

3. Alex drew an angle of 90° and then cut it into five equal parts. What size are the angles he created?
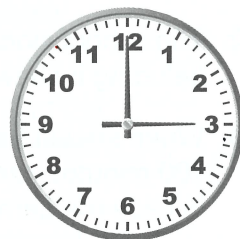
Investigation

1. Draw the next triangle in the pattern.

2. Complete the grid to describe the pattern.

Triangle	1	2	3	4	5	6
Matches						

Level 1

1. If 3 out of every 4 players in the soccer club is a boy, estimate the number of boys there would be in a squad of 20 players.

2. Jen's set of cards consists of black cards and red cards. There are 4 black cards for every red card. Estimate the number of red cards there would be if she dealt out 15 cards.
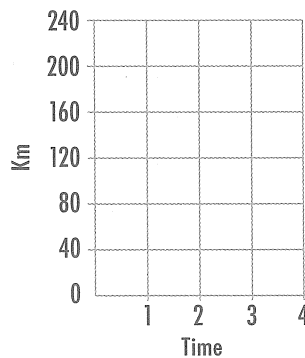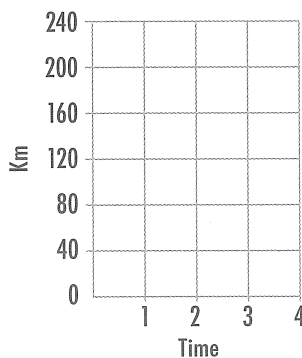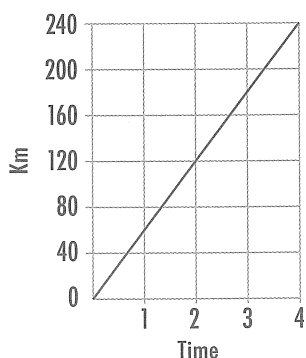
Level 2

1. 30% of the Chocolate Wheel is coloured red. If the wheel is divided into 50 sectors, how many would be red?

2. If there is a 30% chance of rain over the weekend, what is the likelihood of it not raining?

Level 3

1. What did Max get in his final test if his average score was 20 and his first three scores were 12, 16 and 28?

2. Davis had batted five times and had an average of 24 before today's game. What score did he get today if his average fell to 20?

3. If you bought 25 tickets out of 2500 tickets in a raffle, would you have a 10%, 25% or 1% chance of winning?

Investigation

Three cars drove at an average speed of 60 km/h for a period of 4 hours. A graph of one car's journey has been created. Construct two other graphs to show how the other two drivers may have travelled.

Unit 15   Rates and Ratios

Level 1

1. Green and gold balloons were used in the ratio of 4:3. How many green balloons would there be if there were 9 gold ones?

2. The ratio of girls to boys was 5:3. How many girls would there be if there were 24 children altogether?

3. Jasper's pay rate is $15 per hour. How much would he receive if he worked 9 hours?

Level 2

1. How many women's watches were sold if twenty-seven watches were sold in the ratio of 5 women's watches to every 4 men's watches?

2. How long did it take Samantha to complete the 11 km course if she ran at a rate of 4½ minutes per kilometre?

3. Water is dripping at a rate of 45 mL per 30 seconds. How much water will drip over a 5 minute period?

Level 3

1. The ratio of word cards to picture cards is 3:1. How many word cards would there be in a set of 52 cards?

2. If the sales offer said 'Buy 3 get 1 free', how many T-shirts would I actually pay for if I got enough for the 16 players in my team?

3. Each month, Daniel's wage increased 1½ times. What was his monthly wage after 4 months if he began on $400 per month?

4. If one in three Australians live in NSW, and one in five Australians live in Sydney, what fraction of the population live outside NSW?

Investigation

Jill has blue, pink and yellow flowers. The ratio of colours is :

Blue to pink is 3:1
Yellow to pink is 2:1
*Blue to yellow is 9:6*

Colour each square in the grid to match the ratio of the 54 flowers in her garden.

Level 1

1. What year was the movie made if the Roman numerals MMXII appeared at the end of the movie?

2. This is the pattern Tiffany created: 36, 49, ___, ___, 100, ___ and 144. What numbers are missing from her pattern?

3. How many times larger is the '6' in the thousands column than the '6' in the tens column in the number 546 362?

Level 2

1. If a palindromic number reads the same forwards as backwards, what is the next palindromic number after 675 576?

2. How many times larger is the '8' in the thousands column than the '8' in the hundreds column in the number 668 868?

3. If 845 456 was multiplied by 10, would the product be closer to 8 million or 9 million?
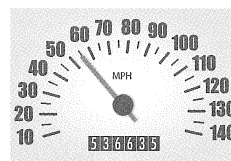
Level 3

1. How many levels did Brooke travel in the lift if she went from level 19 down to the car park, 3 levels below ground level?

2. The newspaper advertisement described the wage as $85k. How much more is this compared to Mike's current salary of $69 500?

3. What was the temperature range in Norway if the maximum was 21°C and the minimum was -4°C?

Investigation

1. Complete the table to show the first seven triangular numbers.

☺	☺☺	☺☺☺	☺☺☺☺	☺☺☺☺☺	☺☺☺☺☺☺	☺☺☺☺☺☺☺
1	1 + 2	1 + 2 + 3	1 + 2 + 3 + 4	1 + 2 + 3 + 4 + 5		
1	3	6	10			

2. True or false
   The sum of two consecutive triangular numbers is a square number. _____

Level 1

1. David is 164 cm tall, Mitchell is 173 cm and Noah is 185 cm. What is their combined height?

2. Tania completed three jobs for customers and was paid $165, $185 and $178. What was the average amount she charged?

3. From Sydney to Cairns by road is 2477 km, by air it is 1957 km. How much shorter is a flight compared to a car trip?
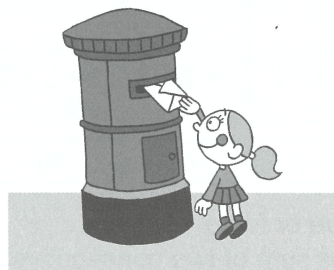
Level 2

1. What would be the total length of the timber if 15 pieces, each 5 metres long, were placed end to end?

2. 50 000 litres of grape juice was being held in storage. How much would be left if 22 500 litres was delivered to supermarkets?

3. How many points did Sam score in the rugby game if he scored three tries worth 5 points each, 3 field goals worth 3 points each and 2 penalty goals worth 3 points each?

Level 3

1. The average number of passengers on the boat was 250. Estimate the number of passengers it would carry in one year if it undertook a cruise every month.

2. How far did the pilot fly if the Brisbane to Sydney flight was 728 km and the Sydney to Melbourne flight was 15 km less?

3. Seventy customers bought a total amount of 3500 litres of petrol at the garage on Friday. What was the average amount of petrol bought?

4. How long will it take a typist to type a 4425 word document if she types at a rate of 59 words per minute?

Investigation

Mason can deliver 1200 leaflets in one hour.
Shay is faster and can deliver 1600/hr.
On Saturdays they work together to deliver 3500 leaflets. When will they complete their leaflet delivery run if they begin at 8:00 am?

Unit 18 Fractions

Level 1

1. ⅓ of the 9090 eggs were cracked. How many were suitable for sale?

2. Ryan's wage is $350 per week. If his salary is increased by three-tenths, what is his new weekly wage?

3. Ben's test score was ⅘. If there were 120 questions in the test, how many did he get wrong?

Level 2

1. The cost of our March water bill was $160.80. If the June bill showed an increase of ¼, what amount was shown on the June bill?

2. The water tank on a property has a capacity of 1200 litres. How many litres are in the container if it is at 7/10 of its capacity?

3. Tom's phone usually runs for 32 hours before it needs recharging. If the indicator shows ⅜, how many hours of charge are left?

Level 3

1. On a full tank of petrol a car can travel 560 km. Estimate the distance it could travel if it is only ⅝ full.

2. A 48 000 ha property is to be divided into eighths in order to be sold. However, the owner is going to keep ⅜. How much land is he keeping?

3. An agent takes 1/10 of a singer's fee. How much will the agent receive if the singer earned $1500 and $1650 over the weekend?

Investigation
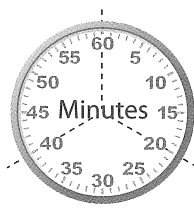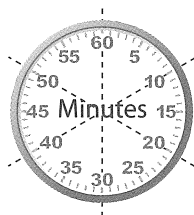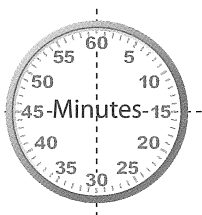
1. How many minutes in ½ an hour?
2. How many minutes in ¾ of an hour?
3. How many minutes in ⅓ of an hour?
4. How many minutes in ⅚ of an hour?

5. How many minutes in ⅗ of an hour?
6. How many minutes in 7/10 of an hour?
7. How many minutes in 11/12 of an hour?

Level 1

1. How much taller is Joe compared to Ned if Joe is 1.83 m tall and Ned is 159 cm tall?

2. How far did we travel if we ran for 4.85 km and walked another 3.3 km?

3. Phoebe ran 4.005 km every day last week. What was the total distance she ran?
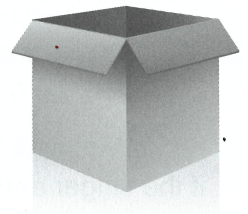
Level 2

1. What was the total mass of the package if it consisted of eleven boxes, each with a mass of 4.25 kg?

2. How much water leaked from the tap if it leaked at a rate of 0.05 L/hr for 8 hours?

3. How much heavier is the 4WD vehicle, which has a mass of 1.85 tonnes, compared to the sedan, which has a mass of 0.975 tonnes?

Level 3

1. If 10 packets of detergent have a total mass of 42.48 kg, what would be the mass of each packet?

2. How much tax would Max pay on his earnings of $500 if 0.25 of every dollar is paid as tax?

3. What is the volume of the container if its length is 6.4 m, its width is 4.6 m and it is 2 metres high?

4. Each water bottle contains exactly 2.45 litres. How much water does Amanda have if she has half a dozen bottles?

Investigation

Calculate the amount of tax each person pays and their take home pay.

Worker	Wage	Tax Rate	Tax	Take Home Pay
A. Armstrong	$400	0.25 per $		
B. Bradfield	$500	0.35 per $		
C. Chan	$550	0.4 per $		
D. Donato	$600	0.45 per $		
E. Evans	$626	0.5 per $		

Level 1

1. The gift Jake bought was originally priced at $50. How much did Jake actually pay if he was given a 10% discount?

2. Stuart won't eat anything that tastes like ginger. If 25% of a box of 48 chocolates contained ginger, how many wouldn't he like?

3. Adelaide's latest test score was 10% higher than her previous score. What score did she get this time if her previous score was 70?

Level 2

1. How many students didn't attend the snow camp if 75% of the 80 Year 6 students did attend?

2. How old is Nelson if he worked out that his age is equal to 30% of Mr Mitchell's age of 50?

3. How many points did Gabby get in the snowboard competition? The competition was worth 80 points and her score was 80%.

Level 3

1. The indicator showed that 25% of the time had elapsed. How much time was left if Greta had 2 hours to begin with?

2. How much interest did Isabelle earn if she invested $20 000 at 5% interest for one year?

3. Five people ate at a restaurant. They shared the cost of the bill which was $150 and also left a 10% tip. How much did each person pay?
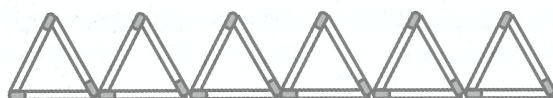
Investigation

Convert each score into a percentage. Draw arrows to connect the highest percentage to the gold medal, 2nd to the silver and 3rd to the bronze medal.

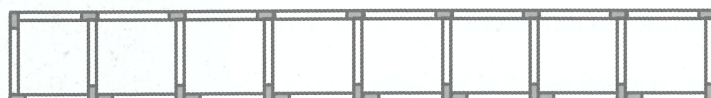| Subject	Spelling	Science	History	Reading	Maths
Score	48/60	24/40	48/50	56/80	42/56
Percentage					

Gold   Silver   Bronze

Level 1

$m = 3t$

1. How many matches would be needed to make 20 triangles?

2. How many matches would be needed to make 50 triangles?

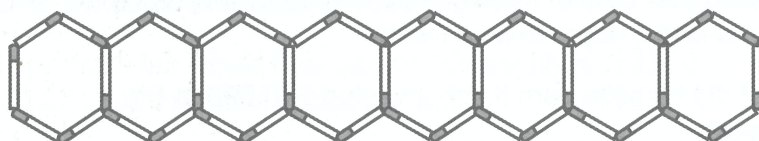3. How many matches would be needed to make 100 triangles?

Level 2

$m = 3s + 1$

1. How many adjoining squares can be made with 61 matches?

2. How many adjoining squares can be made with 106 matches?

3. How many adjoining squares can be made with 151 matches?

Level 3

$m = 5h + 1$

1. I have 25 matches, how many more do I need to make 11 hexagons?

2. I have 43 matches, how many more do I need to make 15 hexagons?

3. I have 138 matches, how many more do I need to make 50 hexagons?

Investigation
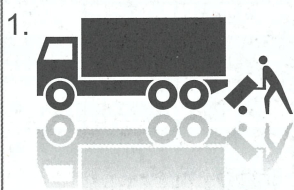
1. Cooper's Transport charge a $10 booking fee for all deliveries and $5 per parcel.

Select the formula the company would use to calculate the total cost of an order.

☐ 10p + 5

or

☐ 5p + 10

2. Use your formula to calculate the cost of the deliveries below.

a. 5 parcels   b. 11 parcels   c. 50 parcels   d. 100 parcels   e. 1000 parcels

Level 1

1. The old record for the long jump was 1.3 metres. What is the new record if Scott improved it by 250 millimetres?

2. A full-size field is 100 metres long. If the field used by the U6's is ⁷⁄₁₀ the normal size, how long is the field used by the U6's?

3. At present the length of the freeway is 1500 km. If its length is to be quadrupled, what will be the new length?

Level 2

1. Ava lives 7.5 km from school. If she cycles to and from school each day, how many kilometres will she travel in a fortnight?

2. Nine signs were placed along a stretch of road. How long was the road if the signs were 250 metres apart?

3. How much space is left along the 6 metre wall if two desks measuring 2.7 m and 2.35 m were placed along it?
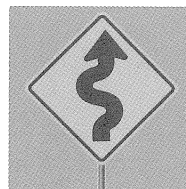
Level 3

1. How much higher is Mt Everest, which is 8850 metres, compared to Mt Cook in New Zealand, which is 3754 metres?

2. Jamie's step is 0.755 m. How far would he travel if he took 5000 steps?

3. How long is the coastline of Australia's eastern states if Queensland's coast is 7400 km, NSW's coast is 1900 km and Victoria's is 1800 km?

4. What was the average distance driven each day if we drove 940 km on day 1, 750 km on day 2 and 563 km on day 3?

Investigation

Isaac is going to America where distances are measured in miles rather than kilometres. He found out that 1 kilometre is approximately 0.6 miles. Convert each measurement from kilometres to miles.

	Trip	Kilometres	Miles
1.	Boston – New York	310	
2.	Detroit – Chicago	385	
3.	New Orleans – Atlanta	685	
4.	Phoenix – Los Angeles	575	
5.	Dallas – New York	2210	

Level 1

1. Rema made a handball court in the playground. What was its area if it was 7 m long and 4 m wide?

2. If 25% of the 60 hectare farm is used for growing crops, how many hectares are under crop?

3. What is the area of the double garage if it is 10 metres wide across the front and goes back 4.5 metres?
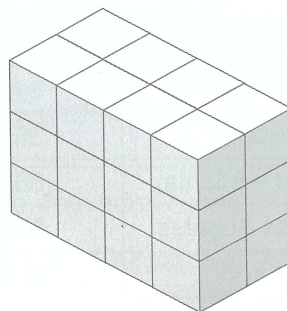
Level 2

1. Krista made a birthday card for her friend. If the total area of the card was 300 cm² and the picture took up 50% of the space, what area was left to write on?

2. Tiles are $25 per m². How much will it cost to cover an area 9 metres long and 5 metres wide?

3. The PE teacher divided the hall into 9 equal sections. What would be the area of each section if the hall was 18 metres long and 9 metres wide?

Level 3

1. What is the area of Kim's block of land if it is 22 metres long and 15 metres wide?

2. Each paving stone is a square 50 cm by 50 cm. What is the area of the courtyard if it took 20 pavers to cover it?

3. If one hectare is about the size of two soccer fields, what would be the area of a park containing 12 soccer fields?

4. A rectangle has a length of 15 cm and a perimeter of 50 cm. What would be its width and area?

Investigation

Calculate the total surface area of the rectangular prism, built using 2 cm building blocks.

Unit 24 — Volume and Capacity

Level 1

1. How many 250 millilitre glasses can be filled from a 2 L bottle?

2. The instructions on the plant food said '15 mL per 5 litres'. How many millilitres will I use if my watering-can holds 10 litres?

3. Is a 1.5 litre bottle enough to fill six 250 millilitre glasses? Would there be any left in the bottle?

Level 2

1. What would be the capacity of a shipping container 15 metres long, 10 metres wide and 10 metres high?

2. If 1 mL of water has a mass of 1 gram, what would be the mass of two 1 litre water bottles?

3. If 80 millilitres of paint is used to paint each face of a cube, how much paint would be needed to paint the entire cube?
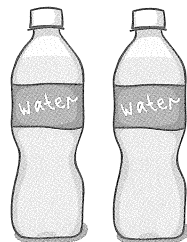
Level 3

1. How many storage boxes 50 cm long, 50 cm wide and 50 cm high would fit in a one cubic metre container?

2. If one litre of water was poured into a vase that weighed 500 grams, what would be the total mass of the vase and water?

3. How many cubic metres of space would be needed to stack five containers, each 5 m long, 4 metres wide and 3 metres high?

Investigation

How much water does this family use each day?

Where	Description	Litres
1. Toilet	6 litres per flush x 5	
2. Bath	120 litres per bath x 3	
3. Shower	205 litres per shower x 2	
4. Kitchen	20 litres per meal x 2½	
5. Laundry	265 litres per load x 1	
6. Other	Gardens/car wash x 1	120 L
7. Total		

Level 1

1. If a packet of biscuits has a mass of 250 grams, what would be the total mass of 12 similar packets?

2. After a hiking trip, Jim's weight fell from 45 kg 750 g to 42 kg 495 g. How much weight did he lose?

3. Talia and Mark are in a piggy-back race. What is their combined mass if Talia is 28 kg and Mark is double that?
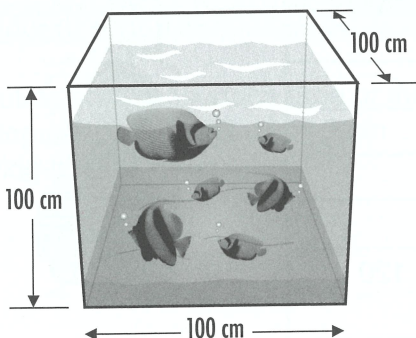
Level 2

1. The total mass of the 9 girls in the netball team is 468 kg. What is the average mass of each player?

2. A truck has a mass of 4.5 tonnes. What is the mass of the truck and its load if it is carrying four containers, each weighing 1.75 tonnes?

3. Find the cost of 1.5 kg of steak at $20/kg, 2 kg of sausages at $12/kg and 500 g of mince at $10/kg.

Level 3

1. Sam's carry bag holds a maximum weight of 5 kg. By how much is she under or over the limit if she has placed four items with masses of 150 g, 2.5 kg, 750 g and 1.5 kg in her bag?

2. Kris has to place washing powder into 80 g packets. How many can he fill using 12 kg?

3. Breakfast cereal is made using these amounts of ingredients: 500 g of mixed fruit, 260 g of apricots, 500 g of wheat and 240 g of bran. How many 250 gram packets can be filled using these quantities?

Investigation

100 cm

100 cm

100 cm

1. What is the capacity of the fish tank?

2. What would be the mass of the tank when full?

Unit 26 — Time

Level 1

1. Michael's train departed the station at 7:47 am. When did he arrive at his destination if the journey took 47 minutes?

2. When did Tina start work if she finished at 2045, having worked for 6 hours and 30 minutes?

3. How much sleep did Nathan get if he went to bed at 9:15 pm and set the alarm for 6:45 am the next morning?

Level 2

1. A courier averages 40 minutes per delivery. How many hours will it take him to complete 12 deliveries?

2. My watch gains 30 seconds every hour. At 0600 my watch was showing 0615. What time will my watch be showing at 12 noon?

3. How far will a plane fly in 75 minutes at a speed of 680 km/hr?

Level 3

1. 2 hours 11 minutes and 48 seconds was the record for the orienteering course. If a competitor took 75 seconds off the time, what is the new record?

2. If the 1620 km flight from Adelaide to Alice Springs took 2 hours and 15 minutes, what was the plane's average speed?

3. Will works 7.5 hours each day at a rate of $44 an hour. How much will he receive for 5 days work?

4. How long should the meat cook for if the recipe suggested 30 minutes per kilogram and the meat weighs 2.5 kg?

Investigation

Beach Volleyball Competition

	March					April			
Sun	1	8	15	22	29	5	12	19	26
Mon	2	9	16	23	30	6	13	20	27
Tue	3	10	17	24	31	7	14	21	28
Wed	4	11	18	25		1	8	15	22	29
Thu	5	12	19	26		2	9	16	23	30
Fri	6	13	20	27		3	10	17	24
Sat	7	14	21	28		4	11	18	25

- Comp starts Sunday March 8
- Four team competition
- Sunday is game day
- Teams play each other twice

1. Name all the dates games will be played in March.

2. What is the date of the last game?

Geometry

Level 1

1. The oven door was designed to open to a maximum of 90°. What angle was formed when it was opened one third of the way?

2. If one angle on the right angle triangle is 45°, what size are the other two angles?

3. Two angles on a parallelogram are 100° and another angle is 80°. What size is the fourth angle?

Level 2

1. What fraction of the pie graph represents 'strawberry' if the 'strawberry' sector is 270°?

2. How many degrees are in each section of Evelyn's Chocolate Wheel if it is divided into 18 sections?

3. If 'caramel' has a 1 in 9 chance of winning on the Chocolate Wheel, how many degrees would this represent?
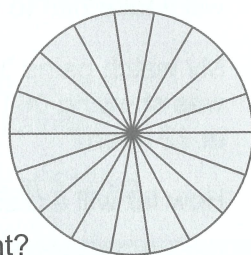
Level 3

1. At 4:45 on Tom's clock, the hands formed an angle of 140°. What other angle do the hands form?

2. How many degrees between 3 pm and 6 pm on an analog clock?

3. If I was facing due north and turned anticlockwise 45°, would I be facing west, north-west or north-east?
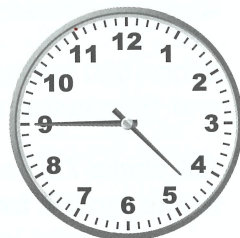
Investigation

1. Which formula could be used to describe this pattern of hexagons?

   ☐ hexagons x 6 + 1   ☐ hexagons x 5 + 1   ☐ hexagons x 6 – 1

2. Use your formula to predict the number of matches needed to make:

   a 15 hexagons   b 20 hexagons   c 50 hexagons

Level 1

+	1	2	3	4	5	6
1	2					
2		4				
3			6			
4				8		
5					10	
6						12

When complete, this addition chart will show all the possible scores that can occur when two dice are thrown.

1. How many possible combinations are shown on the grid?

2. How many times did '12' appear?

Level 2

1. If two dice are thrown, what score has the greatest chance of occurring?

2. If two dice are thrown, which two scores share the possibility of being the least likely to occur?

3. Which score has a greater likelihood of occurring, 4 or 5?

Level 3

1. Given a bag of 50 marbles of which 15 are red, is the probability of selecting a red marble first greater than 0.3, less than 0.3 or 0.3?

2. Given a box of 56 sweets of which 14 are chocolates, is the probability of selecting a chocolate first 14%, 20%, 25% or 56%?

3. If medals are given to the first three place getters in a race, what is the likelihood of a runner winning a medal if there are 30 runners?

Investigation

Three baseball caps are in a box.
One is red, one is green and one is blue.
Two caps are picked out of the box.
Use the tree diagram to show the possible outcomes of the selection process.
Record the number of possible outcomes.
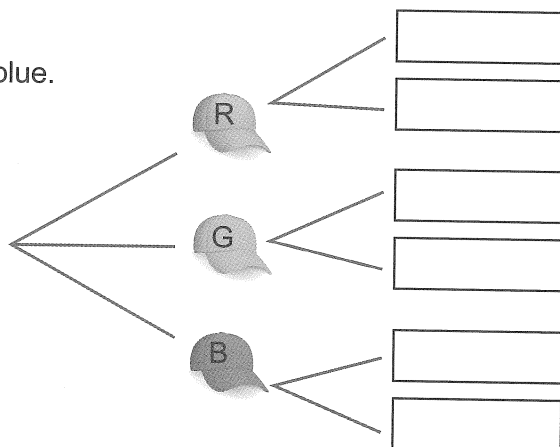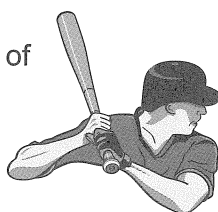
Level 1

1. Red apples outsell green apples in the ratio of 3:1. Estimate the number of red apples sold if 80 green apples were sold.

2. Chloe's pay rate is $14.50 per hour. How much would she receive if she worked for four hours on Saturday?

3. Train travellers outnumber bus passengers 7:3. Estimate the number of bus passengers if 42 people travelled by train.
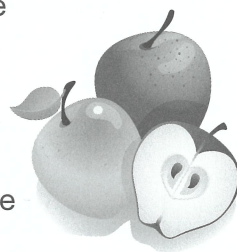
Level 2

1. Red jelly beans outnumbered black jelly beans 15:4. Estimate the number of black jelly beans in a jar containing 45 red ones.

2. The car park charges $5 for the first hour, $4.50 for the second hour and $4/hr after that. How much would it cost Kim to park for 5 hours?

3. The ratio of males to females in the ocean swim was 12:7. Estimate the number of female swimmers if there were 84 males.
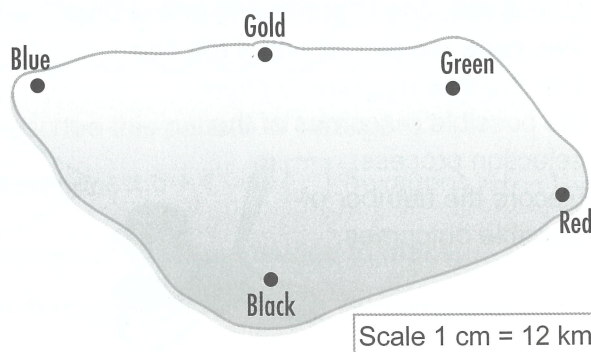
Level 3

1. For every $10 spent at the shop, the owner will donate 50c to the school. How much would the school receive if $2000 was spent at the shop?

2. Riley mixes cordial with water in the ratio of 5:100 when making drinks. How much cordial would he use if he used 2 litres of water?

3. Robyn is taxed at a rate of 25%. How much tax would she pay if her annual income is $56 000?

4. What is the distance between two points on a plan of a house, shown as 4 centimetres apart, if a scale of 1:500 was used?

Investigation

Apply the scale to calculate the distance between each point.

|	Journey	Kilometres
1	Gold to Black	
2	Black to Red	
3	Red to Green	
4	Green to Blue	
5	Blue to Black	

Scale 1 cm = 12 km

Level 1

1. In what year was the art gallery built if the foundation stone had the Roman numerals MCMLXXX printed on it?

2. Will said the factors of 24 are 1, 2, 4, 6, 12 and 24. Which other factors did he forget?

3. How much does Tina have in the bank if she owed the bank $350 but made a deposit of $500?

Level 2

1. If 949 601 was divided by 10, would the quotient be closer to 940 000 or 95 000?

2. Estimate Hong Kong's population if London, with 12 000 000 people, has a population roughly double that of Hong Kong.

3. How many times larger is the '9' in the millions column than the '9' in the hundreds column in the number 9 546 999?
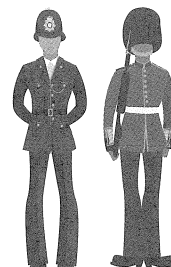
Level 3

1. The greatest temperature change in a 24 hour period occurred on Jan 15, 1972, in Loma, USA. Throughout the day the temperature rose 57°C, to reach a maximum temperature of 9°C. What was the minimum temperature that day?

2. If James bought a vintage car 15 years ago for $39K, how much profit did he make if he sold it this year for $61½ K?

3. When Mike bought his car it had travelled 3246 km. Six years later he noticed that every digit had increased its value ten times. How far had the car travelled?

Investigation

Complete the factor trees to find the prime factors of each number. They have been designed so that you begin with a prime number.

45

54

72
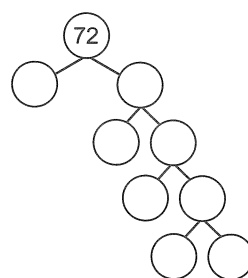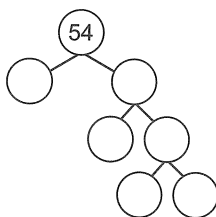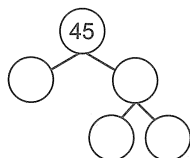
Level 1

1. Felix makes $10 profit on every 1000 brochures he prints. How many does he have to print to earn $1000?

2. Liam buys a newspaper every day. How much would he spend in June if the newspapers are $1.50 each?

3. Home crowds for the Dolphins totalled 14 084. What was the average attendance if they played 4 home games?

Level 2
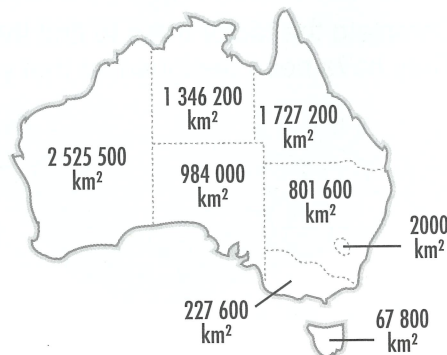
1. Six adult tickets cost $48. How much do children's tickets cost if 8 can be purchased for the same amount?

2. How much did it cost 10 people to see a movie if 3 people paid $15 each, 2 paid the seniors' price of $10 each and the children paid $4.50?

3. At Christmas, 300 000 letters are sent to Santa. Australia Post spends $900 000 replying to these letters. What is the average cost per letter?

Level 3

1. Year 6 laid $1 coins end to end for one metre. What was the total value raised if each dollar coin has a diameter of 25 millimetres?

2. How much do you save per litre by buying a 2 litre carton for $2.30, compared to buying four 500 mL cartons at $0.95 each?

3. What is the difference between the largest number that can be made with the digits 5, 4, 2, 4, 9, 3 and the smallest number?

4. At the cake stall, we received $98.70. How much profit did we make if we spent $21.50 on ingredients and $4.65 on signs?

Investigation

1. How much larger is WA than Qld?
2. How much larger is SA than NSW?
3. Is the combined area of NT and SA greater than WA?
4. Which state is more than 3 times larger than NSW?
5. What is Australia's total area?

1 346 200 km²

1 727 200 km²

2 525 500 km²

984 000 km²

801 600 km²

2000 km²

227 600 km²

67 800 km²

Level 1

1. Of the 560 children at our school, three-eighths travel to school by bus. How many travel by bus?

2. Henry earns $35 a week at his after school job. How much does he save if he puts $\frac{3}{5}$ in the bank?

3. If $\frac{3}{4}$ of the year has gone, how many weeks are left?

Level 2

1. Two-fifths of the $630 received at the fete was used to pay expenses. How much was profit?

2. A TV show ran for $1\frac{1}{2}$ hours. If $\frac{1}{6}$ of the time was ads, how many minutes of the actual show were shown?

3. Of the 48 000 spectators at the game, it was estimated that $\frac{1}{8}$ had free passes. How many paid an entry fee?
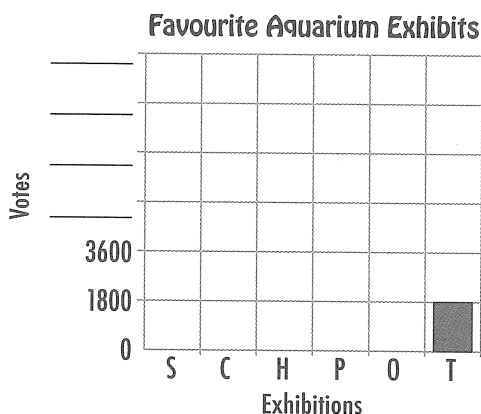
FREE PASS   432437   432437

Level 3

1. At this stage, the tree which is 21 metres tall is $\frac{3}{4}$ of its expected height. To what height is it expected to grow?

2. Tim is paid $30/hr for a 35 hour working week. Pay for hours above that is at $1\frac{1}{2}$ times the normal rate. How much will he get if he works 40 hours?

3. Because she worked over the long weekend, Kyra was paid $1\frac{3}{4}$ times her normal pay of $360. How much was she paid?

4. A water tank has a capacity of 1560 litres. If there are 520 litres in the tank, what fraction of the tank is empty?

Investigation

36 000 people at the aquarium voted for their favourite exhibit. Complete the data in the table and transfer it onto the graph.

Exhibit		Fraction	Number of votes
Sharks	(S)	$\frac{3}{10}$	
Crocodiles	(C)	$\frac{1}{4}$	
Hands on	(H)	$\frac{1}{5}$	
Poisonous Fish	(P)	$\frac{1}{10}$	
Ocean Fish	(O)	$\frac{1}{10}$	
Tropical	(T)	$\frac{1}{20}$	

Favourite Aquarium Exhibits

Votes

3600

1800

0   S   C   H   P   O   T

Exhibitions

Level 1

1. Brad lives 6.1 km from school, Adam lives a further 2.5 km and Josh another 3.4 km. How far from school does Josh live?

2. Jono has completed 0.3 of the 20 km road race. What distance does he still have to run?

3. How far did I travel if the odometer reading was 6548.9 km at the start of the trip and at the end it was 6874.5 km?

Level 2

1. The normal route is 17.45 km. However, a short cut reduces the distance by 3.8 km. How long is the shorter route?

2. Fifteen pieces of steel, each 10.5 m, are to be joined together. What will be the total length of the steel?

3. The mass of one parcel is 2.055 kg. What would be the total mass of eight identical parcels?

Level 3

1. Alana was sponsored at a rate of $3.50/km. How much will she receive if she runs 11.5 km?

2. How long is the library wall if it is taken up by five cupboards measuring 2.253 m, 3.052 m, 2.5 m, 0.956 m and 2.45 m?

3. What is the average length of the skateboards if the seven display models are 77.1 cm, 78.5 cm, 73.2 cm, 75.5 cm, 76.3 cm, 71.5 cm and 72.9 cm?

4. How much would I pay for 40 litres of petrol priced at 145.5 cents per litre?

Investigation

Complete Jennifer's receipt.

The Fresh Fruit Shop Shop 5 Blake Town Centre, Blake	Date: May 28 Receipt 615
Purchase items	Cost
1. 2.5 kg potatoes @ $2.50/kg	
2. 3.5 kg tomatoes @ $4.80/kg	
3. 2.1 kg pumpkin @ $3.00/kg	
4. 1.5 kg onions @ $0.80/kg	
5. 2.25 kg bananas @ $3.00/kg	
Thanks for shopping with us. **Total**	

Unit 34 — Percentages

Level 1

1. How much would Max pay for a suit priced at $360, if he was given a 25% discount?

2. How much interest did Edward earn if he invested $5000 for one year at an interest rate of 5% per annum?

3. Car sales this year are 10% greater than for the same time last year. What are the sales figures for this year if 1500 cars were sold last year?

Level 2

1. How much commission would a real estate agent earn on the sale of a $1 000 000 property, if she receives 5% commission?

2. Jacqui bought a house for $500 000 and made a profit of 25% when she sold it. How much did she sell it for?

3. Ten years ago the town's population was 15 500. Now it is 50% greater. What is the town's population now?

Level 3

1. 50 000 people voted in the election. Calculate the number of votes the Environmental Party got if they received what was left after the Worker's Party got 55% of the votes and the Youth Party got 25% of the votes.

2. After the service, Ben's car went 25% further on a tank of petrol. Before, he could travel 424 km on a full tank. What distance can he travel now?

3. How much would an agent's commission be on the sale of a $2½ million dollar property if she is paid a commission of 1%?

Investigation

Complete the table to show the discount and the selling price for each item.

Item	Marked price $	% Discount	Discount $	Selling Price
TV	$1500	10%	$	$
computer	$ 800	20%	$	$
bike	$ 780	25%	$	$
jacket	$ 420	30%	$	$
surfboard	$ 660	35%	$	$
car	$ 32 000	20%	$	$
ring	$ 36600	15%	$	$
tent	$ 1400	80%	$	$

Level 1

1. Jen's step is 65 cm. What distance will she cover if she takes 120 steps?

2. A roll of adhesive tape was 5.5 metres long. How much has been used if 265 cm are left?

3. A carpenter has to saw a board 3 m and 50 cm long into fifths. How long will each piece be?

Level 2

1. Tissue boxes are 225 mm long. What would be the length in metres of 8 boxes laid end to end on a shelf in a shop?

2. What is the average height of the three boys whose heights are 138 cm, 155 cm and 133 cm?

3. How many kilometres did Karlie swim if she did 120 laps of the 50 metre pool?
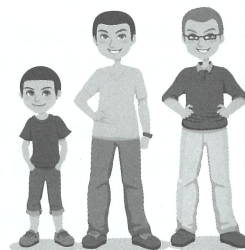
Level 3

1. This time last year Jackson was 106 cm tall. Since then he has grown at a rate of 2.75 cm every three months. How tall is he now?

2. Guttering for a house comes in 4.5 m lengths. How many lengths are required for a house whose eaves are 24 m, 26 m, 22 m and 18 m?

3. On the map, a distance of 50 km was represented by an interval of 1 cm. What distance would be represented by an interval of 12.5 cm?

4. A telephone pole is 24 metres long. If 0.625 of the pole is above ground what is the length of the section below the ground?

Investigation

Apply the formula **distance = speed × time** to calculate the distance each person travelled in the 'Bike and Run' fun day.

BIKE & RUN

Description	Speed × time	Distance
1. 2 hours @ 2.5 km/h		
2. 4½ hours @ 10 km/h		
3. 5 hours @ 25 km/h		
4. 3½ hours @ 30 km/h		

Unit 36　Area, Patterns and Algebra

Level 1

> A rectangle's perimeter can be found using the formula　**P = 2l + 2b**
> (P = perimeter, l = length, b = breadth)

Use the formula to solve these problems.

1. Perimeter of a rectangle with a length of 12 cm and breadth of 4 cm.

2. Perimeter of a rectangle with a length of 20 cm and breadth of 5 cm.

3. Perimeter of a rectangle with a length of 32 cm and breadth of 8 cm.

Level 2

> A rectangle's area can be found using the formula　**A = l × b**

Use the formula to solve these problems.

1. Area of a rectangle 15 cm long and 4 cm wide.

2. Length of a rectangle with an area of 24 cm² and 4 cm wide.

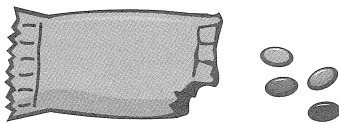3. Width of a rectangle with an area of 40 cm² and 8 cm long.

Level 3

> The electrician charges $50 per hour + a call-out fee of $20　**(Cost = ☐ hrs + 20)**

Use the formula **C = ☐ h + 20** to solve these problems.

1. Cost of a 5 hour job at 15 Davidson Rd.

2. Cost of a 10½ hour job at Dunbar High School.

3. Time spent at 10 Faye Ave, if the cost was $220.

Investigation

At Mia's party everyone was given at least one bag of 10 lollies plus 4 extra lollies. Lollies = b + 4	Use the expression ☐ b + 4 to calculate how many lollies each person received. 1. 2b + 4 = 2. 3b + 4 = 3. 4b + 4 = 4. 5b + 4 =

Level 1

1. How many millilitres are in the drink bottle which has a capacity of 800 mL, but is only 75% full?

2. What is the volume of the storage container if it is 12 metres long, 9 metres wide and 3 metres high?

3. My car uses 1 litre of fuel for every 10 kilometres travelled. How many litres would be used on a 520 km trip?

Level 2

1. What is the volume of a room 7 metres long, 6 metres wide and 3.5 metres high?

2. If 3 oranges produce 250 mL of juice, how many oranges would be needed to produce 1 litre of juice?

3. The reservoir is filled to ⅜ of its capacity of 480 000 kilolitres. How much water is being stored at present?

Level 3

1. How many litres of juice are needed if it was estimated that each of the 140 children would have two, 250 mL cups of juice at the dance?

2. An engine produces 0.75 litres of steam per hour. How many litres would be produced during a 36-hour period?

3. What would be the volume of a tank 2 metres long, 1.5 metres wide and 0.5 metres deep?

4. Concrete costs $85/m³. Find the cost of concreting the foundations of a building 10 metres long, 4 metres wide and 0.1 m deep.

Investigation

Jasper is packing shoe boxes into 1 m³ cartons.

1. How many shoe boxes 33.3 cm long, 20 cm wide and 10 cm high would fit in one carton?

2. How many shoe boxes 50 cm long, 25 cm wide and 12.5 cm high would fit in one carton?

Unit 38 Mass, Temperature and Time

Level 1

1. An athlete wants to reduce his weight by 2.5 kg. What is his target mass if currently he weighs 82.3 kg?

2. What's the difference between Darwin's minimum temperature of 19.7°C and its forecast maximum of 32.3°C?

3. A car travelled 25 km in 15 minutes. How far would it travel in 2 hours?

Level 2

1. How many 25 kg bags of potatoes can be made up from a shipment of 2.5 tonnes?

2. The temperature inside an electric jug is rising on average 1.4°C every minute. How many degrees will it rise in 6 minutes?

3. When did I reach my destination if I drove at an average speed of 60 km/h throughout the 360 km trip, having left home at 0800?
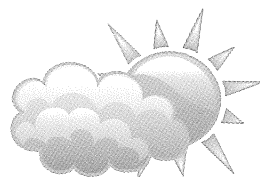
Level 3

1. What is the aggregate mass of the Aussie Rules team of 18 players if the average mass of the players is 110 kg?

2. A flight to London took 24 hours flying at 640 km/h. What was the distance of the flight?

3. Mack weighed 96 kg prior to commencing a 10 week training program. His mass is now 91 kg 500 g. What was the average mass lost per week?

Investigation

	Annual rainfall in millimetres	Daily hours of sunshine	January maximum temperature
Adelaide	530 mm	7.5	26°C
Brisbane	1200 mm	8.0	30°C
Canberra	630 mm	7.5	28°C
Darwin	1660 mm	8.5	32°C
Hobart	630 mm	6.0	20°C
Melbourne	660 mm	5.5	25°C
Perth	800 mm	8.0	30°C
Sydney	1226 mm	6.6	25°C

Calculate these averages:

1. Maximum temperature
2. Hours of sunshine
3. Annual rainfall

Level 1

1. What would be the cost of 96 stamps if they are 12 for $5.50?

2. Johnson was given a 10% discount on a mountain bike priced at $3550. How much did he pay?

3. Margaret's pay rate is $35/hr. How much would she receive if she worked 40 hours last week?

Level 2

1. To hire a bus for an excursion is $76.70. How much will each of the 59 children have to pay?

2. How much interest will be earned if $10 000 is invested for one year at an interest rate of 4%?

3. How much water will be used during a 5½ minute shower if 8 litres are used per minute?

Level 3

1. An agent charges 5% commission. How much would he receive on the sale of 3000 sheep at $10 a head?

2. Tickets were selling at a rate of 100/hr, with females outnumbering males 2:1. Estimate the number of tickets sold to women in 3 hours.

3. Max invested $10 000 at a rate of 5% per annum.
   a) How much interest will he earn in one year?
   b) How much will he have in his account at the end of the year?

4. Our intended trip was 1600 km. We planned to drive part of the way. How far did we drive if we drove 45% of the distance?

Investigation

Use the clues below to work out how many men, women, boys and girls attended the concert.

Clues

- 250 tickets have been sold.
- 100 were sold to adults.
- 150 were sold to children.

Ratios
3 women : 1 man
2 girls : 1 boy
4 girls : 3 women
2 boys : 1 man

Level 1

1. How much would a manufacturer pay for 9.5 kg of wool at $90 per kilogram?

2. 50 apples are packed into each bag. How many bags are needed if there are 3500 apples?

3. How much would a fisherman receive for 35 kg of prawns at $14.50/kg?

Level 2

1. How much daylight is there if the sun rose at 0715 and set at 1816?

2. Carpet is $100/m². How much would it cost to carpet a room 5.25 m by 4 m?

3. If 75% of the 5200 residents claimed the three free trees they were offered, how many trees were given out?

Level 3

1. How many 20 m² plots could be created on a hectare of land?

2. The wheel's circumference is 2.15 m. What distance would it travel in 80 revolutions?

3. Calculate the average speed if a plane covered 3400 km in 5 hours..

Investigation

Across	
1	123 x 6 =
3	1 + 99 ÷ 3 =
6	10% of 7770 =
8	7250 ÷ 10 =
11	4^2
12	8 x (12 − 4) =
13	½ of 430 =
15	271 + 138 =
17	69 − 99 ÷ 3 =
18	9^2 + 3 =
21	19 x 4 =
24	10% of 4990 =
25	1020 − 753 =
27	(6 + 3) x 7 =
29	6^2
30	430 − 5 x 6 =
31	125 x 5 =
32	1361 − 858 =

Down	
1	104 x 7 =
2	587 + 230 =
4	39 + 64 ÷ 8 =
5	23 x 9 =
7	1039 − 323 =
9	189 ÷ 9 =
10	1692 ÷ 3 =
14	12 x 9 =
16	554 + 121 x 3 =
19	144 x 3 =
20	5^2 − 7 x 3 =
22	1000 − 354 =
23	25% of 424 =
26	436 + 278 =
28	1515 ÷ 3 =
29	1053 − 250 x 3 =