Paper 2

Section 1 - Non Calculator

1 We left at 8:12 pm and arrived the next day at 5:35 am. The number of hours and minutes of the journey was:

	:		

2 Nine more than three times the sum of 4 and 8 is:

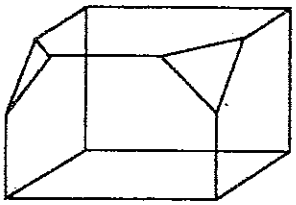
O 45 O 29 O 47 O 43

3 A girl has enough money to buy two large bears at \$9.60 each or, with the same money, she could buy 15 small bears. The cost of a small bear must be:

O $\frac{9.60 \times 15}{2}$ O $2 \times (9.60 \times 15)$

O $\frac{9.60 \times 2}{15}$ O $\$\frac{1}{2}(9.60 + 15)$

4 Two corners have been cut off a rectangular prism as shown in the diagram. If we let V stand for the number of vertices, F for the number of faces and E for the number of edges possessed by the solid, then the value of V + F + E is:



O 2 O 38

O 24 O 32

5 What fraction of a fortnight is $3\frac{1}{2}$ days ?

O $\frac{1}{2}$ O $\frac{1}{3}$ O $\frac{1}{4}$ O $\frac{2}{5}$

6 A rectangular field has a length of 600m and an area of 15ha. Its perimeter in metres would be:

7 A racing car is travelling at 40m per second. Its speed in kilometres per hour is:

8 The surface area of a cube is $216cm^2$. The sum of the lengths of its edges will be:

9 The average of 4 marks was 66. The average of 3 of the marks was 59. The fourth mark must have been:

O $66 \times 3 - 59 \times 4$ O $66 \times (4 - 3) \times 59$

O $66 \times 4 - 3 \times 59$ O $66 \times 59 - 4 \times 3$

10 I bought my car by instalments. I had to pay 40 monthly instalments of $405 each. How much did I still have to pay after a year?

O $11340 O $4860
O $12240 O $10450

Each of questions 11, 12, 13, 14 may have MORE THAN ONE correct answer. Fill in EVERY correct answer for each of these questions.

11 I made a mistake. Instead of dividing by 5, I divided by 2. To get the correct answer I should now:

O multiply my answer by $2\frac{1}{2}$
O divide my answer by 5 and multiply it by 2
O multiply my answer by 10 and divide by 5
O divide my answer by 10 and multiply by 2

12 After my brother gave me 24 of his sweets, we had the same number. How many more did he have originally?

O 12 O 24 O 48 O 6

13 Which of the following equals 35?

O $3 + 4 \times 5$ O $7(3 \times 2)$ O $7 \times 6 - 7$ O $2 \times 17 + 3$

14 Fill in the box with a whole number to give a fraction whose value lies between 5 and 6.

$$\frac{58}{\square}$$

End of questions in Section 1 that may require you to fill in more than one correct answer.

15 Three students were talking about how to multiply and divide.
Student A: To multiply by 10 just add a zero
Student B: To divide by 100, move the decimal point 2 places to the left
Student C: To divide by 10 just cross off a zero.
How many of the students' statements would work in all occasions?

O 0 O 1 O 2 O 3

16 Which of the following numbers is closest to 7?

O 6.9 O 7.01 O 6.93 O 7.1

17 The two 4's in the number 420.41 have different values. What is the difference in their values?

			.		

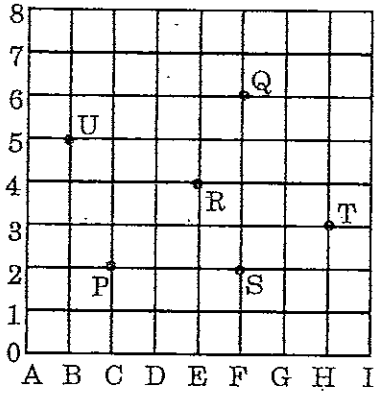
18 $62\frac{1}{2}$% means 5 parts out of:

O 9 O 7 O 8 O 12

19 A triangle with 3 unequal sides is called:

O isosceles O scalene O equilateral O right angled

Questions 20-23



20 The point P is at the grid point C2. What will be the coordinates of Q?

21 Name the coordinates of 4 grid points which are 2 units away from R

22 How many units is S away from P?

23 If a circle was drawn with centre at S and passing through T, what other point(s) would it pass through?

O R O R and P O R, T and P O T only

24 Only one of the following statements is true. Which is it?

O $\frac{3}{5}$ is greater than $66\frac{2}{3}\%$

O $\frac{3}{5}$ is the reciprocal of $2\frac{2}{3}$

O $\frac{3}{5}$ is less that $\frac{11}{20}$

O $\frac{3}{5}$ is the same as 0.6

25 Consider the following solution to the equation $2x - 3 = 12$

$2x - 3 = 12$ Line 1

$2x = 9$ Line 2

$x = \frac{9}{2}$ Line 3

$x = 4\frac{1}{2}$ Line 4

If you were marking this solution, what would you say?

O no mistakes

O mistake from line 1 to line 2

O mistake from line 2 to line 3

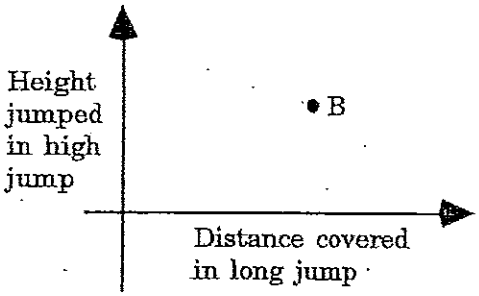
O mistake from line 3 to line 4

Section 2 - Part A

26 Evaluate $\dfrac{\sqrt{1.44}+98.8}{\sqrt{10.24}}$

27 What fraction added to $\frac{7}{12}$ gives $1\frac{2}{3}$?

28



When Alaz and Bita competed in the athletics carnival, they recorded their results in the high jump and long jump on a graph. Alaz was better at the high jump but not as good at the long jump as Bita (B). On the graph, mark a point, A, which could represent Alaz's results.

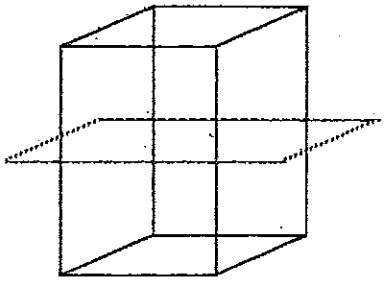
29 A regular pentagon is inscribed inside a circle. Each vertex of the pentagon is joined to the centre of the circle. What would be the size of three of these angles taken together.

30 For Latin, I have to translate 38 pages. I set myself a goal of translating 3 pages per night. How many nights will it take before I finish the translation?

31 Which two of the numbers 3, 5, 6, 9 should be placed in the boxes to give a fraction closest in value to $\frac{4}{5}$? $\dfrac{\square}{\square}$

32 A rectangular prism is cut into two parts by a plane parallel to its base. The two sections would be

(A) rectangular prisms
(B) cubes.
(C) hexagons
(D) regular prisms

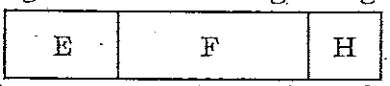


33 A map shows that 0.25cm on the map corresponds to 5500m in the real world. The scale being used would make 1cm on the map correspond to how many metres in the real world?

1cm = | | | | | | | | | metres

34 We averaged 60kmh^{-1} for the journey of 480km. We left home at 2:10p.m. At what time did we arrive at our destination?

35 In preparing for an exam, a student's time is allocated to English, French and History according to the following bar graph.



The percentage of time spent on French and History combined would be

(A) 25% (B) 50% (C) 60% (D) 70%

36 The line below represents the distance that a bicycle moves forward when its wheels make one revolution.

Which of the lines below would best represents the diameter of the wheel?

(A) ——————

(B) ——————

(C) ——————

(D) ——————

37 What is the mode of the letters of the word MATHEMATICS ?

(A) M (B) A (C) T (D) M, A and T

38 The area of a square is $324m^2$. What must its perimeter be?

39 Two cars start from the same spot at the same time. The first is driven at $45kmh^{-1}$ and the second at $60kmh^{-1}$. After 7 hours, how much further will the second car have travelled than the first?

40 A student has 5 equal square tiles, 2 equal triangular tiles and 4 equal rectangular tiles. Which of the following may be possible for the student to build using some or all of the tiles?

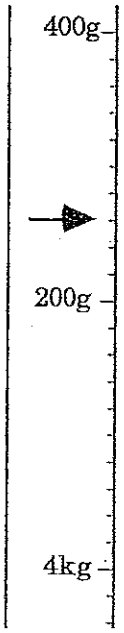
(A) cube
(B) rectangular prism
(C) triangular prism
(D) triangular pyramid

41 What number could be placed in the box in order to complete the pattern below?

9 12 19 ☐ 45 64

42 Part of a spring balance is shown in the diagram. The measurement beings pointed to by the arrow is

(A) 260g
(B) 230g
(C) 4230g
(D) 4260g



43 We divided our class up into teams: Red, Blue, Green and Purple. The teams were not equal in number and our teacher formed a team by herself. We drew up a sector graph showing the 5 teams. The sector showing the teacher had an angle of 15° at the centre. How many students were there in the class?

44 When I was in Year 7, I received $5 per week pocket money. Now I receive $20 per week. What percentage increase is this?

45 The range of the marks in our last test was 48. The highest mark was 87. The lowest mark would have been

46 The ages of four girls, A, B, C and D are noted. It is found that B is younger than C and A is older than D. From oldest on the left to youngest on the right, the order of the girls could be

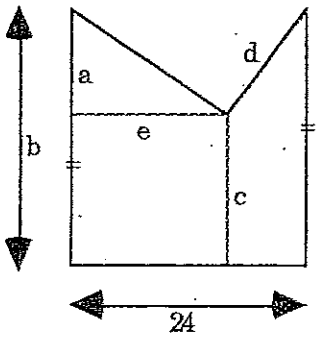
O CBDA O CDAB O ACBD O ABCD

47 One of the angles of a triangle is 91°. This triangle could be

O equilateral O right angled
O scalene O isosceles

48 The base of the figure shown in the diagram is 24cm long. What other lengths do you need to know in order to find the area of the figure?

O a, b and c O c, d and e
O a, c and d O a, b and e



49 A coded signal is received at a base. When decoded, the message is a sequence of 4 letters A P Q D repeated over and over. What would the 511th letter of the code be?

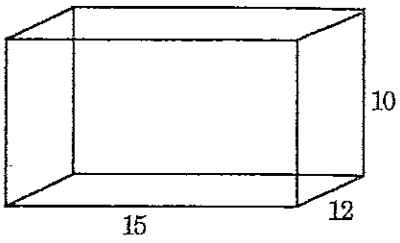
O A O P O Q O D

50 My Monday timetable is shown below:

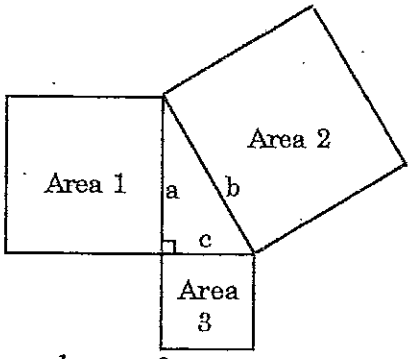
English
English
French
Recess (15 minutes)
Maths
PE
PE
Lunch (45 minutes)
Science
Art

Each period lasts for 45 minutes. What percentage of the school day is spent doing PE and Science combined? Answer to the nearest percent.

51 A block of butter is in the shape of a rectangular prism measuring 15cm by 12cm by 10cm. The block is cut into two smaller blocks by a vertical cut which is parallel to the (10 x 12)cm side. What is the total surface area of the two blocks?



52 Squares are constructed on the sides of a right angled triangle as shown in the diagram. In order to find Area 1 it would be sufficient to know



(A) Area 2 and area 3
(C) b and c
(B) Area 3 and the area of the triangle
(D) The perimeter of the triangle

53 A parking station advertises:

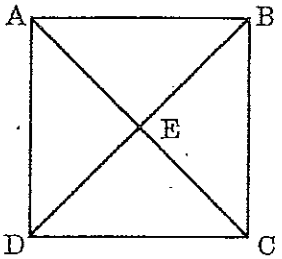
Total number of hours	Cost per hour or part hour
2 hours or less	$6.50
More than 2 hours but less than or equal to 6 hours	$12.50
More than 6 hours	$18

How long could you stay in the station for $189 ?

54 A man pays 30% of his salary in tax. If his salary is $56 000 how much will be paid in tax?

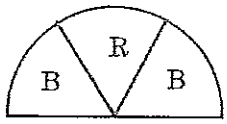
55 The triangles ABE, BCE, CDE and DAE are congruent. Triangle ABC must be
(A) isosceles
(B) equilateral
(C) right angled
(D) scalene

[More than one may be correct]

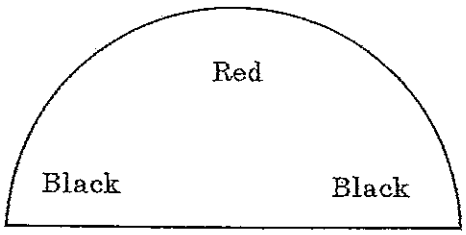


56 Four more than twice the sum of three and six is decreased by 9. What is the result?

57 A company logo is in the form of a semicircle with a red sector and two black sectors:

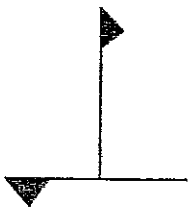


The two black sectors are equal, and the angle at the centre of one black sector is 4 times as large as the angle at the centre of the red sector. Use your protractor and ruler to draw the two dividing lines between the Red and the Black sectors.

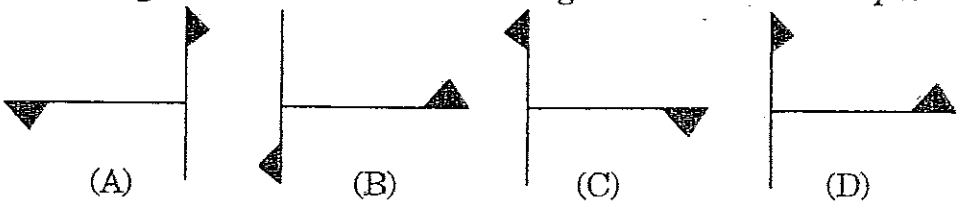


58 In my class there are 12 girls and 18 boys. If this proportion applied to the entire school of 450 students, how many boys would attend the school?

59



The above shape is transformed three times. First it is reflected, then rotated, then reflected again. Which of the following shows the new shape?



60 The heights of two buildings are in the ratio 3:5. If the sum of the two heights is 136m, then what will be the height of the smaller building?

61 The difference of two numbers is 2918 and the larger is 4735. What must the smaller number be?

62 Only one of the following equals 405. Which is it?

(A) $2 + 3 \times 5 + 5^2$ (C) $(2 + 3) \times 4 + 5^2$

(B) $(2 + 3) \times (4 + 5)^2$ (D) $2 + (3 \times 4 + 5)^2$

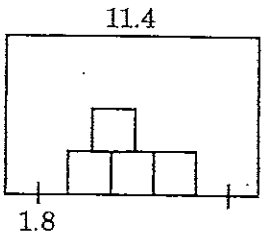
63 A box of matches is meant to contain 40 matches. A student checks the contents of 8 boxes and finds the number of matches in excess of 40. The results were: 3, 6, -2, 1, -4, 0, -1, 5
On the average, how many matches would this data suggest that a box contains?

64 A student is substituting whole numbers into the expression $n^2 + 1$. What is the smallest number she can substitute which will give an answer greater than 400?

65 I have two dice. One of them is red and the other is blue. If I toss the dice, in how many ways can they come down showing a sum of i) 2
ii) 3
iii) 4

66 A pattern is formed by subtracting 3 from the previous number. The first number is 1327. What would the 60th number be?

67 Four identical squares are drawn inside the rectangle as shown in the diagram Find the sum of the areas of these squares.



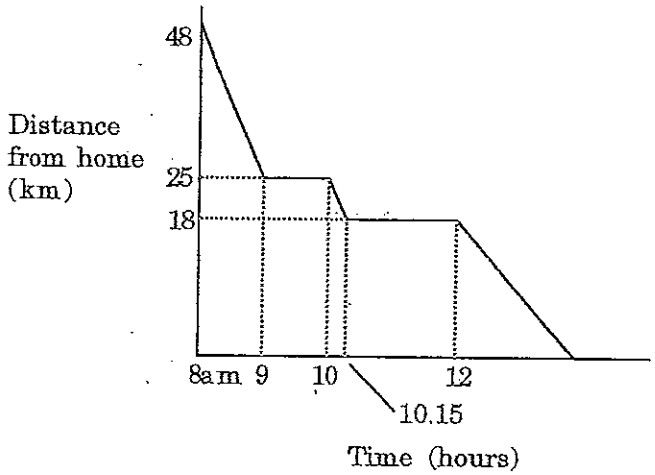
68 The toll in crossing a bridge depends on the type of vehicle - see diagram. During a morning, 12 cars, 6 bikes and 4 motor bikes crossed the bridge. How many trucks also crossed the bridge, if $92 altogether was paid?

Toll
Cars $2
Trucks $7
Bikes $1
Motor bikes $1.50

69 A man buys N tennis balls at $3 each. The store gives a 15% discount. Which of the following formulae would give the total cost C?
(A) C = N x 3 - 15% x N
(B) C = 0.85 x 3 x N
(C) C = N x (3 - 15% x N)
(D) C = 0.15 x N x 3

70 Four ties and 12 handkerchiefs cost $74. Eight ties and 16 handkerchiefs cost $118. Find what the combined cost of 1 tie and 1 handkerchief would be.

Questions 71-72 Use the information on the diagram to answer questions 71 and 72

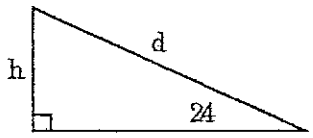


In travelling home Yupie stopped for a cup of coffee. Soon after that she had a flat tyre which she fixed and then completed her journey.

71 What was her average speed during the time between finishing the cup of coffee and before she had the flat tyre?

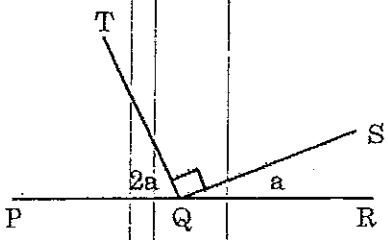
72 The average speed for the entire journey was 8km/h. At what time did she arrive home ?

73 A ramp is built an angle of 24° to the horizontal as shown in the scale drawing.

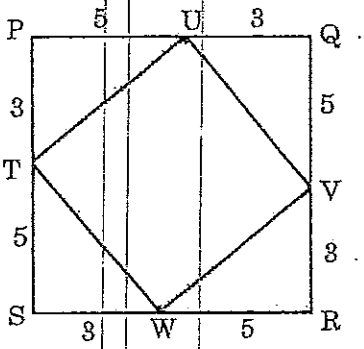


The length of the ramp, d, represents 35m. Find the height, h, of the ramp to the nearest metre.

74 In the diagram, PQR is a straight line, angle SQT = 90° and angle PQT = 2 x angle RQS. Find the value of a.



75 PQRS is a square. The points T, U, V and W are marked on the sides of the square as shown in the diagram. These points are then joined. It is found that quadrilateral TUVW is also a square. Use the information on the diagram to find the area of TUVW.



Section 2 - Part B

76 A rectangular prism has a square base whose side is 72cm.

a) How many steel cubes with side 1cm would be needed to completely cover the base?

b) The height of the rectangular prism is 18cm. How many cubes would be needed to fill the prism?

c) One of the steel cubes is heated so that its side increases by 20%. Find the change in the volume of this cube.

d) If all of the cubes have their sides increased by 20%, how many fewer cubes would be needed to equal the volume of the prism?

e) If each cube costs $\frac{1}{2}$ cent, what saving would you make by using the larger cubes to fill the prism?

77

Bus Time Table
Parramatta to Sydney

Departs	Mon	Tue	Wed	Thu	Fri	Sat	Sun
6:00 am	•	•	•	•	•		
7:00 am	•	•	•	•	•		
8:00 am	•	•	•	•	•	•	•
9:00 am	•	•				•	•
Noon	•	•	•	•	•		
1:00 pm	•	•			•		
3:00 pm	•	•	•	•	•	•	
4:00 pm	•	•	•	•	•	•	
5:00 pm	•	•	•	•	•	•	•
7:00 pm	•	•				•	
8:00 pm						•	•

a) What is the earliest time I can take a bus to the city on a Saturday?

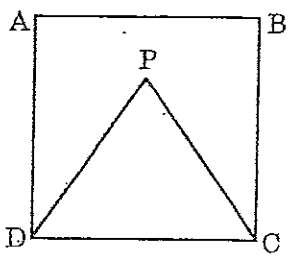
b) During a week, how many buses go to the city before noon?

c) If the trip takes 45 minutes, what is the latest time I can leave on a Saturday in order to reach the city before 3 pm?

d) What day/days have the most buses ?

e) I have an appointment in the city at 12:30 pm on a Wednesday. What is the latest bus I can catch?

78 An equilateral triangle of side 4cm has been constructed inside a square.



a) Find the area of the square.

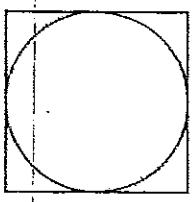
b) The perpendicular height of the triangle is 3.46cm. Find the area of the triangle.

c) If the figure was built out of wire, how much wire would be needed?

d) Join the points B and D with a straight line. Write down the size of angle BDC

e) Calculate the size of angle BDP

79 The circumference of a ball is 245mm.



a) Express this length in centimetres.
b) Use a formula from the list of formulae to show that the radius of the ball is 3.90cm. to 2 decimal places.
c) The ball <u>just</u> fits through a square hole. Find the length of one side of the square, correct to 2 decimal places.
d) Find the area of the square correct to 1 decimal place.
e) As the ball passes through the hole, what area of the hole will <u>not</u> be covered by the ball? Answer to 1 decimal place.

80 A person selling office supplies can have her weekly salary paid in one of two ways:

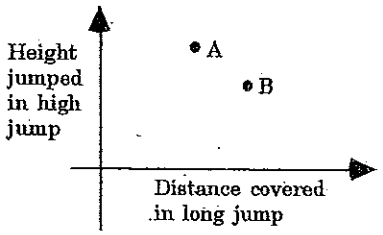
Plan A	Plan B
\$200 per week plus 3% commission on all sales	5% commission on all sales

a) During a week, she sold supplies for \$12 000. How much would she receive if she had chosen Plan A?
b) How much would she receive under Plan B?
c) During a different week, she sold supplies worth \$7000. How much would she receive under Plan A?
d) How much would she receive under Plan B?
e) How much should she sell if the amount she earned under Plan A equalled the amount under Plan B?

Paper 2 - Solutions

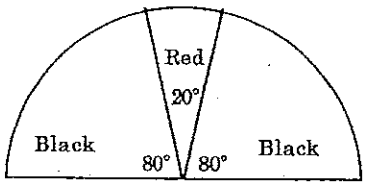
1	9:23	2	45	3	$\frac{9.60 \times 2}{15}$	4	38	5	$\frac{1}{4}$	
6	250	7	144	8	26	9	$66 \times 4 - 3 \times 59$			
10	$11340	11	divide my answer by 5 and multiply it by 2				12	48		
13	$7 \times 6 - 7$	14	10, 11	15	0	16	7.01			
17	399.6	18	8	19	scalene	20	F6			
21	E2, E6, G4, C4	22	3	23	R	24	$\frac{3}{5}$ is the same as 0.6			
25	mistake from line 1 to line 2			26	31.25	27	$1\frac{1}{12}$			

28



29	216°	30	13	31	$\frac{5}{6}$	32	A
33	1:22 000	34	10:10pm	35	D	36	C
37	D	38	72m	39	105km	40	B, C
41	30	The differences between the terms are 3, 7, 11, 15, 19					
42	A	43	23	44	300%	45	39
46	ACBD	47	Scalene or isosceles			48	c, d, e or a, b, e
49	Q	50	32%				
51	$1140cm^2 = 2 \times (15 \times 12 + 12 \times 10 + 10 \times 15) + 2 \times (10 \times 12)$					52	A, B, C
53	13 hours	54	$16 800	55	A, C	56	$13 = 4 + 2 \times (3 + 6) - 9$

57



58	270	59	C	60	51	61	1817	62	B	
63	41	64	20	65	i) 1	ii)	2	iii)	3	
66	1150	67	27.04	68	8	69	B			
70	$11	71	28km/h	72	2pm	73	14	74	30	
75	34									

76 a) $72 \times 72 = 5184$

b) $72 \times 72 \times 18 = 93312$

c) New volume $= 1.2^3 = 1.728$

Old volume $= 1^3 = 1$

Change in volume $= 1.2^3 - 1 = 0.728cm^3$

d) For larger cube we would need $\frac{72 \times 72 \times 18}{1.2^3} = 54000$

Therefore we would need 93312 - 54000 = 39312 fewer cubes

e) $39312 \times \frac{1}{2} = 19656cents = \$196.56$

77 a) 8:00am b) 21

c) 9:00am d) Monday and Tuesday

e) 8:00am - don't forget that the trip takes 45 minutes

78 a) $16cm^2$ b) $A = \frac{1}{2} \times 4 \times 3.46 = 6.92cm^2$ c) $6 \times 4 = 24cm$

d) Angle BDC = 45° since ABCD is a square

e) Angle PDC = 60° since the triangle is equilateral ∴ angle BDC = 15°

79 a) 245mm = 24.5cm

b) $C = 2 \times \pi \times r \Rightarrow 24.5 = 2 \times \pi \times r \Rightarrow r = 3.90cm$

c) The side will be twice the radius = 2 x 3.90 = 7.80

d) Area $= 7.80^2 = 60.8cm^2$

e) Area <u>not</u> covered = area square - cross-sectional area of ball

$= 60.8 - \pi \times (3.90)^2 = 13.0cm^2$

80 a) 200 + 3% of 12 000 = $560 b) 5% of 12 000 = $600

c) 200 + 3% of 7000 = $410 d) 5% of 7000 = $350

e) Let the amount be $A

We want $200 + 3\% \text{ of } A = 5\% \text{ of } A$

$\Rightarrow 200 = 2\% \text{ of } A$

$\Rightarrow 200 = \frac{2A}{100}$

$\Rightarrow 20000 = 2A$

$\Rightarrow A = \$10\,000$