SYDNEY TECHNICAL HIGH SCHOOL

(Established 1911)

YEAR 8
TERM 2 COMMON TEST
2012

Mathematics

Section 2

General Instructions

- Working time - 60 minutes
- Write using black or blue pen
- Calculators may be used
- All necessary working should be shown in every question
- Diagrams are not drawn to scale

Total marks - 62

- Attempt Questions 1 – 5
- Questions are not of equal value

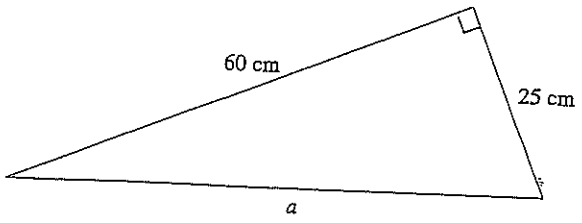
Name :_____

Teacher :_____

Non - Calculator	Question 1	Question 2	Question 3	Question 4	Question 5	Total

Question 1. (12 marks – 2 marks each)

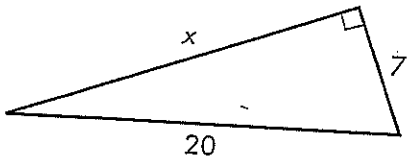
a) Find the value of a.



$a^2 = 60^2 + 25^2$

$\therefore a = 65\text{ cm}$

b) Find the value of x (correct to 1 decimal place).

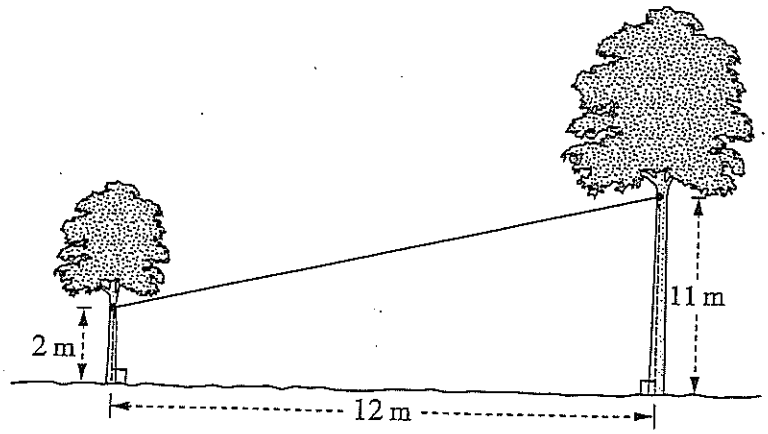


$x^2 + 7^2 = 20^2$

$\therefore x = 18.7$

c) Two trees on level ground, 12metres apart, are joined by a cable. It is attached 2 metres above the ground to one tree and 11 metres above the ground on the other.

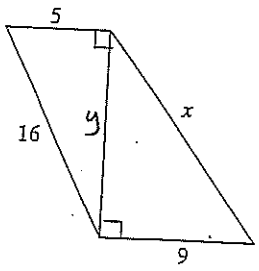
What is the length of the cable between the two trees ?



$d^2 = 12^2 + 9^2$

$d = 15\text{m}$

d) Find the exact value of x.



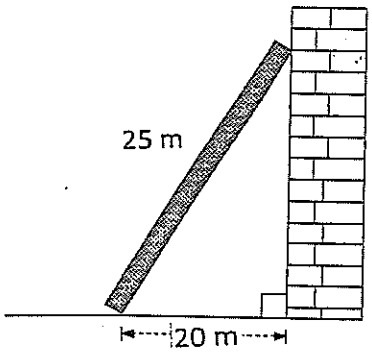
$y^2 + 5^2 = 16^2$

$\therefore y^2 = 231$

$231 + 9^2 = x^2$

$x = \sqrt{312}$

e) A 25 metre ladder is propped against a vertical wall with its feet 20 metres from the wall. If the feet of the ladder slip a further 4 metres away from the wall, how far does the top of the ladder slip down the wall ?



$d_1^2 = 25^2 - 20^2$

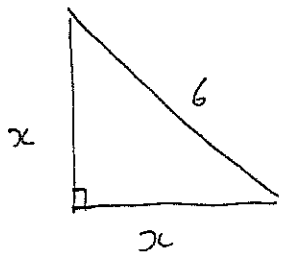
$d_1 = 15$

$d_2^2 = 25^2 - 24^2$

$d_2 = 7$

$\therefore$ distance is 8 m

f) Find the area of a right angled isosceles triangle with hypotenuse 6 centimetres long.



$x^2 + x^2 = 6^2$

$2x^2 = 36$

$x^2 = 18$

$A = \frac{1}{2} \times x \times x$

$= \frac{1}{2} \times 18$

$= 9 \text{ cm}^2$

Question 2. (14 marks – 1 mark each)

	Answers
a) Simplify $4x - 6y + 3x + 2y$	$7x - 4y$
b) Expand $4a(2a - 3)$	$8a^2 - 12a$
c) Evaluate $2x^2 - 4x - 2$ when $x = 5$	28
d) Sticks were used to create the following pattern.  Figure 1 Figure 2 Figure 3 How many sticks would be required for figure 100 ?	302
e) Simplify $\frac{12a \times 4a}{8a}$	$6a$
f) Simplify $x^2 + 5x + x^2 - x$	$2x^2 + 4x$
g) Factorise $6a - 15$	$3(2a - 5)$
h) You are given that $A = 4x + 3$. If the value of x is increased by 2, by how much is the value of A increased ?	8

i) Expand and simplify $5(b-3)+2(b+4)$	$7b-7$
j) Simplify $10m^8 \div 5m^2$	$2m^6$
k) Simplify $(2x^2)^4 \times 3x^6$	$48x^{14}$
l) Given $g(x)=\frac{11-x}{2x-1}$ evaluate $g(-3)$	-2
m) Factorise $15x^2-12x$	$3x(5x-4)$
n) Expand and simplify $4(2x+1)-3(x-1)$	$5x+7$

Question 3. (12 marks – 1 mark each)

a) Express 128 out of 620 as a percentage correct to 1 decimal place.

20.6%

b) Write $12\frac{1}{2}\%$ as a decimal.

0.125

c) Find 73% of $880.

$642.40

d) Increase 280 by 35%.

378

e) Find the simple interest earned on $1850 invested at 6% p.a. for 9 years.

$999

f) Jonathon bought a case of 64 apples for $15.99.
He wants to make a profit of 40%.
For how much, to the nearest cent, should he sell each apple ?

35 cents

g) The number 9 is 15% of x. Find the value of x.

60

h) Leo played 450 games of "Angry Birds" with a win rate of 40%.
If he plays another 100 games, what is the highest percentage win rate he could achieve ? (answer correct to 1 decimal place)

50.9%

i) An item decreased in value from \$20 to \$5. What is the percentage decrease ?

75%

j) A plane is loaded with 480 tonnes of fuel.
This is 20% more than required for a flight under normal conditions.
If conditions are normal, how much fuel will be used for this flight ?

400 tonnes

k) After receiving a discount of 20% off the marked price, Sue paid \$420 for an ipod.
What was the marked price of the ipod ?

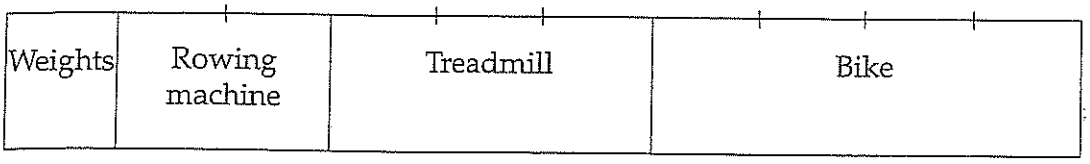
\$525

l) A large watermelon weighs 20 kg, with 98% of its weight being water. It is left to stand in the sun, and some of the water evaporates so that now only 95% of its weight is water. How much does the watermelon now weigh ?

8 kg

Question 4. (11 marks – 1 mark each)

a) On Wednesday, Xena went to the gym and worked out on four machines. The fraction of time she spent on each machine is represented by the divided bar graph below.

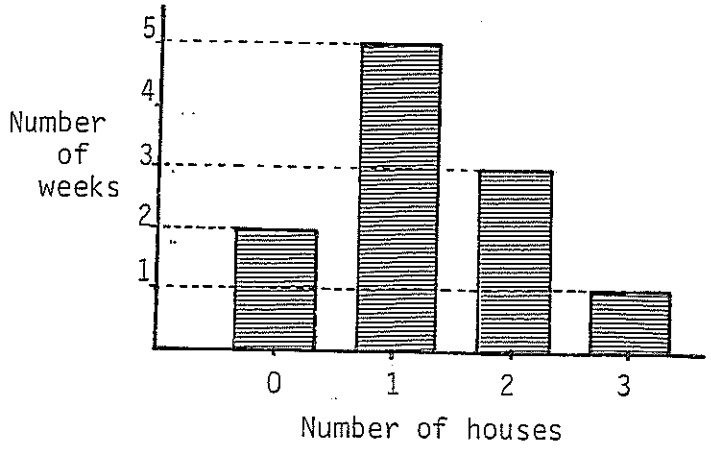


i) For what fraction of the time was Xena on the bike ? $\frac{2}{5}$

ii) If Xena spent 24 minutes on the treadmill, how long did she spend working out at the gym ?

80 minutes

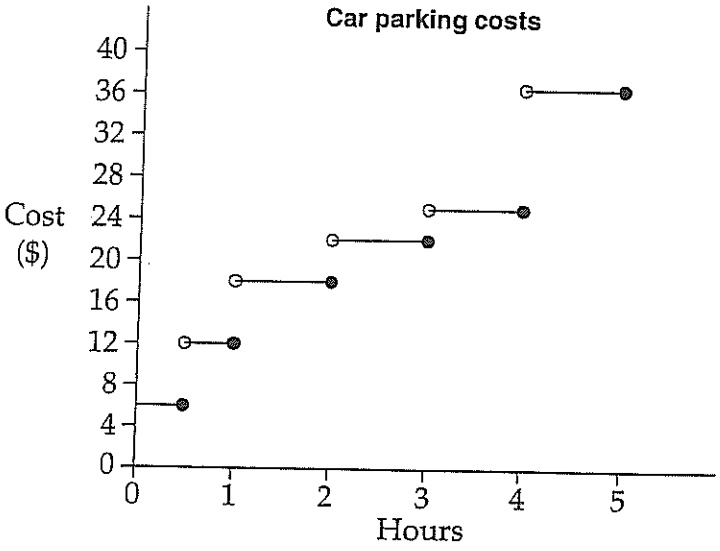
b) The graph shows the number of weeks a salesperson sold 0, 1, 2 or 3 houses.



For how many weeks are sales shown ?

11

c) The step graph shows car parking costs.



i) Mary enters the car park at 10:10 am and exits at 1:35 pm. How much will she pay ?

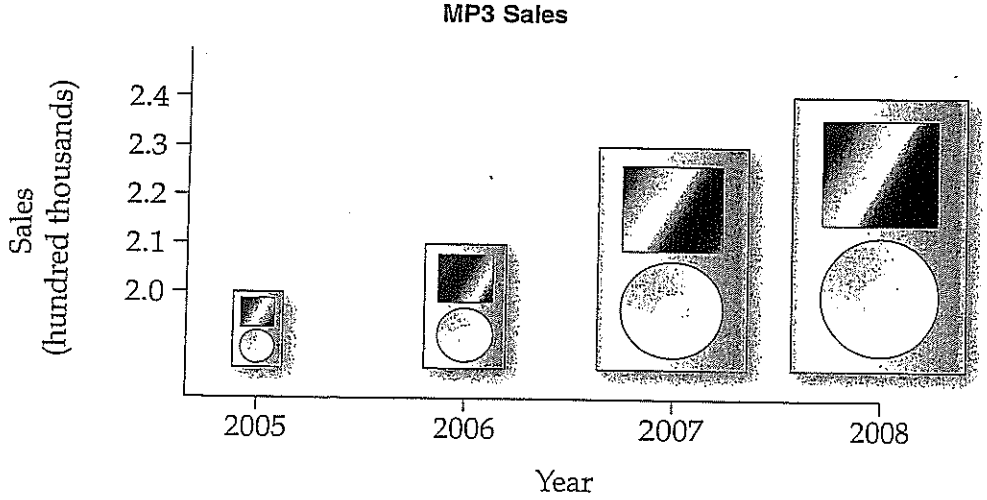
$25

ii) On leaving the car park at 1:15 pm, Kasey was charged $22.

What was the earliest time that Kasey could have entered the car park ?

10·15 am

d) The graph shows sales of MP3 players over a period of years.

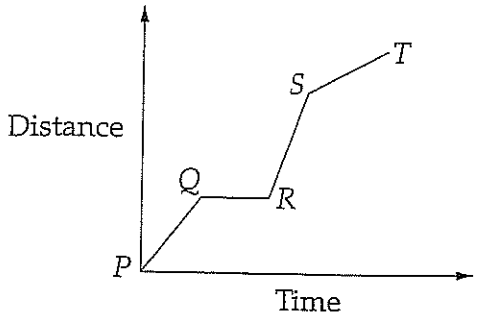


Give ONE reason why this graph could be misleading.

columns different widths making areas much bigger when only height is important.

(Could also mention vertical scale not starting at zero)

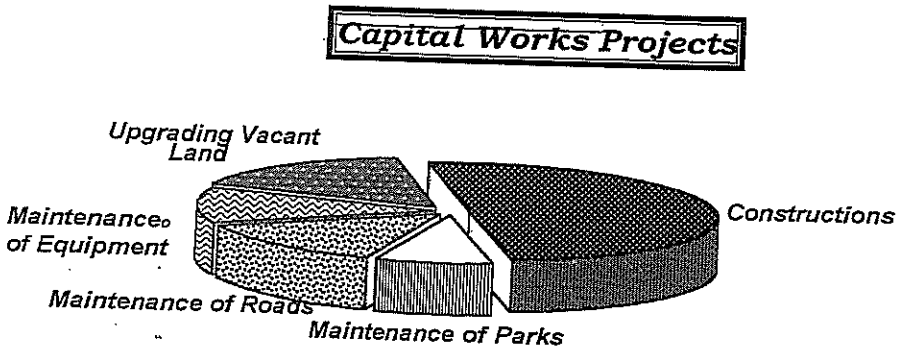
e) Kim participated in a charity bike ride. The graph shows Kim's distance from the starting point during the ride.



Between which two points was Kim travelling fastest ?

R and S

f) A total of 9 million dollars is used for capital works projects during 2012 by a local council. The sector graph shows the distribution of this money by the council.

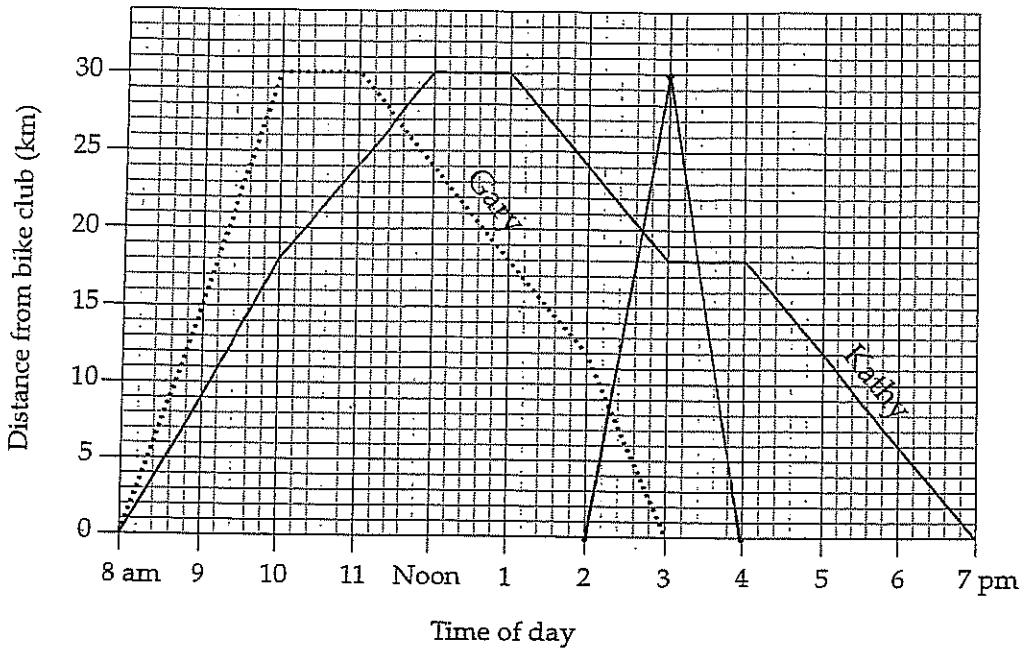


$700 000 is used for maintenance of parks.

What angle would be used for this sector in the above diagram ?

28°

g)



The travel graph represents cycling trips of Kathy and Gary. They rode from their bike club to a waterfall and back.

i) How long does it take Kathy to reach the waterfall ?

4 hours

ii) How far from the waterfall do Gary and Kathy meet ?

3km

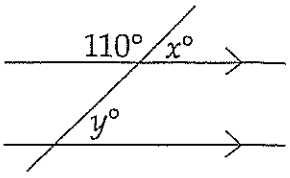
iii) Shane is a champion cyclist. He leaves the bike club at 2 pm on a training run to the waterfall and back. He completes the journey in 2 hours, without stopping.

Show the graph of Shane's trip on the above diagram.

Question 5. (13 marks – 1 mark each except where indicated)

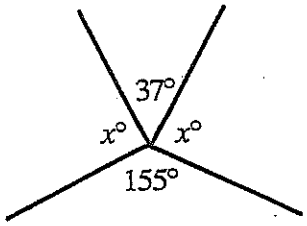
a) Brad finds the value of x in the diagram to be 70.

What reason could he then give, that y is also equal to 70.



corresponding angles, parallel lines

b) (2 marks)

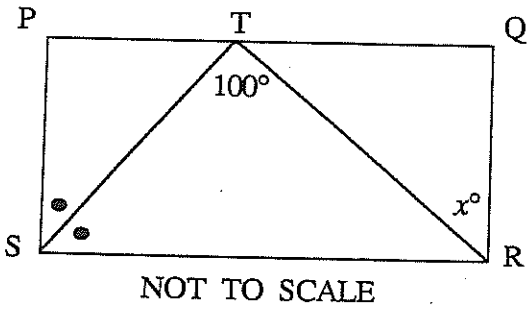


Find the value of x, giving a reason

$x = 84$

angles at a point

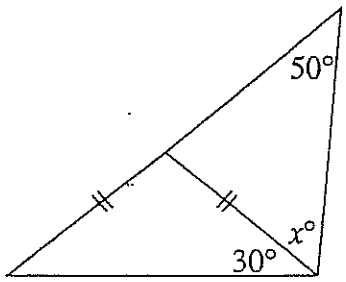
c) The figure PQRS is a rectangle. ST bisects angle PSR.



What is the value of x ?

55

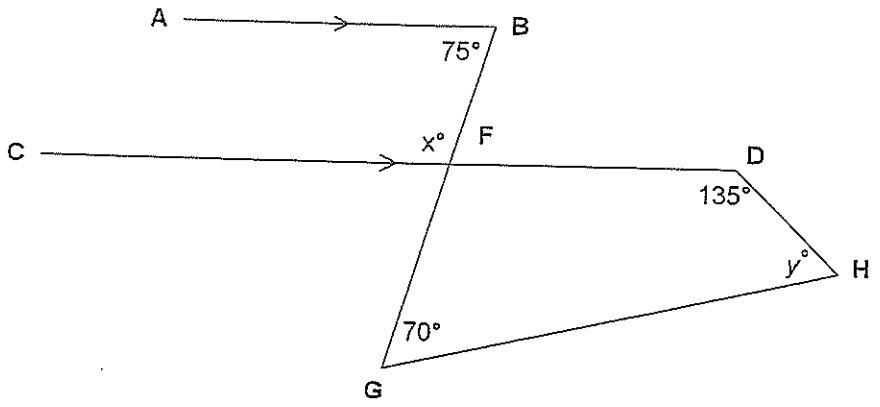
d)



What is the value of x ?

70

e) In the following diagram, AB is parallel to CD, angle ABG = 75° , angle BGH = 70° and angle FDH = 135°.



i) Find, giving reasons, the value of x.

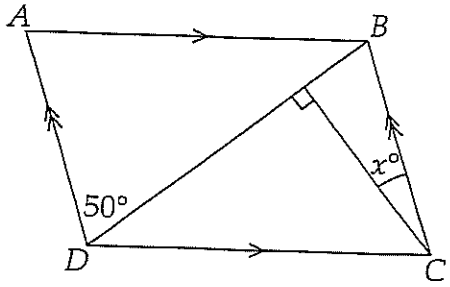
$x = 105$ (cointerior angles, AB // CD)

ii) Find, giving reasons, the value of y. (2 marks)

$\angle GFD = 105°$ (Vertically opposite angles)

$\therefore y = 50$ (angle sum of a quadrilateral)

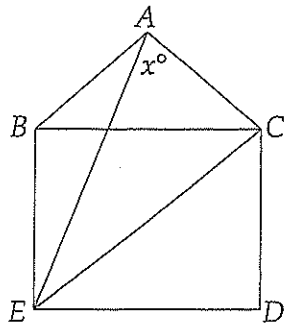
f) ABCD is a parallelogram.



What is the value of x ?

40

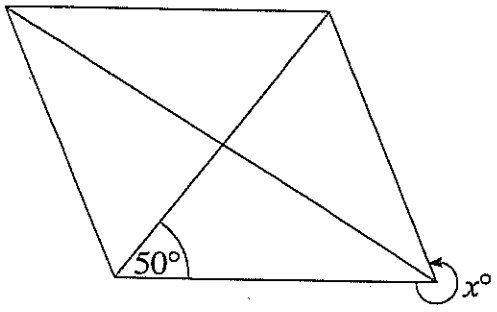
g) ABC is an equilateral triangle. BCDE is a square.



What is the value of x ?

45

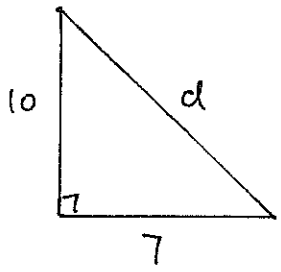
h) The figure below is a rhombus.



What is the value of x ?

280

i) Two sides of a triangle are 10 centimetres and 7 centimetres long. What is the greatest possible length of the 3rd side if it is to be a whole number of centimetres and the triangle is to be acute angled ?



$d^2 = 10^2 + 7^2$

$d = 12.2$

∴ greatest length = 12 cm

Year 8 May Common Test

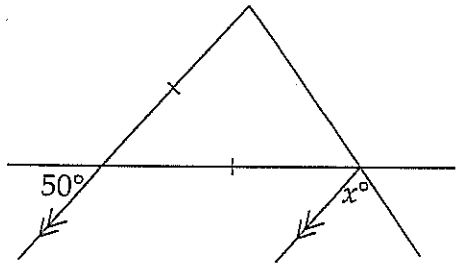
2012

Non Calculator section

NAME :_____

Time Allowed : 12 minutes

ANSWERS (1 mark each)

1. Express $\frac{2}{5}$ as a percentage	40%
2. Find the value of x 	65
3. Evaluate $3ab - 2b$ when $a = 4$ *and* $b = -5$	−50
4. Peter enters a lift in a tall building. He went up 3 floors, down 5 floors, up 7 floors, and down 10 floors. He then finds himself on the 23rd floor. On what floor did he enter the lift ?	28th
5. Three of the operations $+, -, \times$ *or* $\div$ have been left out of the following number sentence. 10 □ 6 □ 2 □ 3 = 1 Insert an operation in each square to make the sentence true.	Write answers in the squares.

6. Find $2\frac{1}{2}\%$ of 600	15
7. The height of a triangle is increased by 50% and the base decreased by 50%. By what percentage does the area of the triangle change ?	25%
8. If the following were arranged in order of magnitude, which would be the middle number ? (A) $2\,(2)^{15}$ (B) $2\,(2)^{14}-2$ (C) $2+(2)^{14}$ (D) 2^{15} (E) $\frac{2^{15}}{2}$	B
9. Express $12\frac{1}{4}\%$ as a fraction.	$\frac{49}{400}$
10. When $10^{60}-97$ is expressed as a single number, what is the sum of the digits ?	525