Name: FILE COPY

Teacher: _____

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 8

MATHEMATICS

COMMON TEST

JUNE 2011

A	Non-Calculator	/ 12
B	Pythagoras	/ 16
C	Percentages	/ 12
D	Algebra	/ 18
E	Geometry	/ 19
	Total:	/ 77

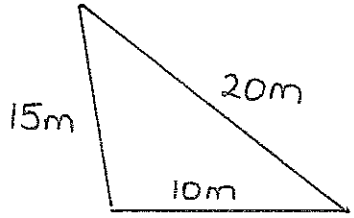
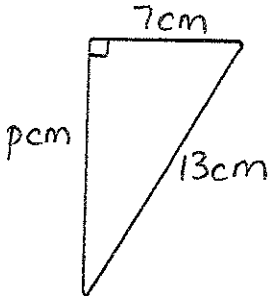
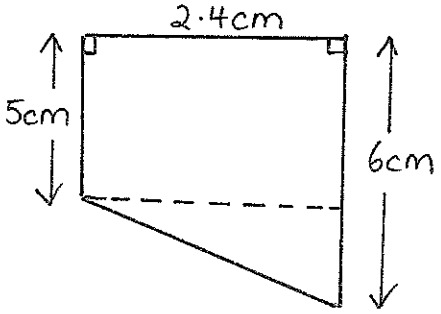
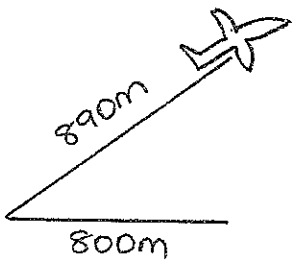
Time Allowed: 70 minutes

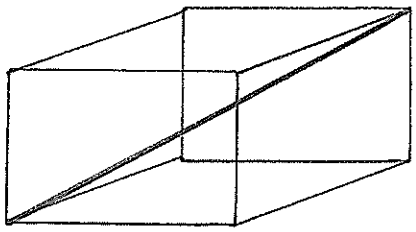
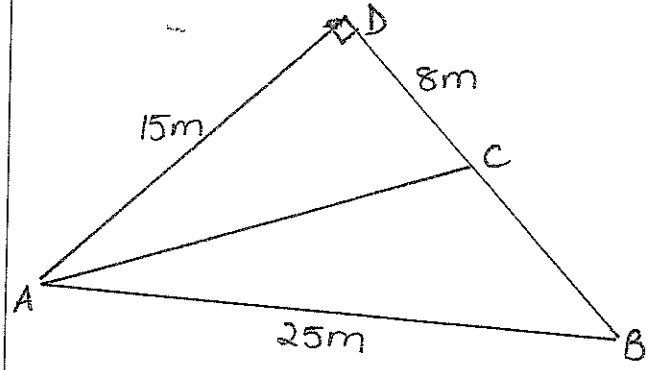
Place all answers in the spaces provided.

Show all necessary working.

B. Pythagoras Theorem **Name:**_____

Show all working. **Marks**

1. Circle the correct answer The value of $\sqrt{1.7^2 - 1.5^2}$ is closest to: A.0.64 B.0.8 C. 0.20 D. 0.45	1
2. State whether this triangle is right angled or not. 	1
3. Find p. Leave your answer in exact form. 	2
4. Find the perimeter of this shape, correct to the nearest cm. Show all working. 	3
5. After taking off, a plane flies 890m but covers a ground distance of 800m. How high is the plane off the ground? Show all working. 	2

6. A rectangle prism box measures 6 cm wide, 20 cm long and 5 cm high. Find the length of the longest pencil that can fit into the box in exact form. 	3
7. For the diagram, find the length of BC 	2
8. A ramp is 9 metres long and rises to a height of 250cm. What is the horizontal distance in metres, between the bottom and the top of the ramp correct to 2 decimal places?	2

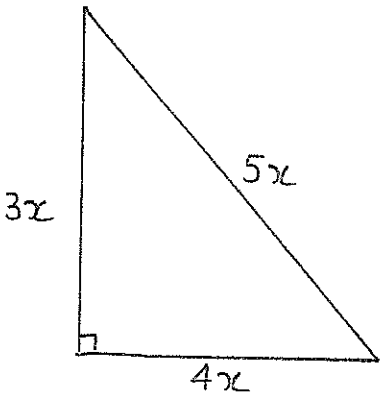
C. Percentages

Show all working **Marks**

1. Express $66\frac{2}{3}\%$ as a fraction in its simplest form.	1
2. Find 78% of 200	1
3. What percentage of 360° is 117°?	1
4. All items in a shop are on sale at 15% discount off the marked price. Find the sale price of a shirt marked $48.	1
5. An amount of $760 is decreased by 30% and the resulting amount is then increased by 20%. What is the final amount?	2
6. Albert received a pay rise at work of $21.60 per week. If this pay rise represented an 8% increase, how much is his weekly wage now.	2
7. The sale price of a cricket bat including 10% GST is $253. Find the cost of the bat before GST.	2
8. Zac works at an electronics shop. He is paid a weekly wage of $110.50. At the end of a certain week his income is a total of $548 and he has sold $12500 worth of goods. What percentage commission is he paid on the sale of the goods?	2

D. Algebraic Expressions **Marks**

1. Simplify (a) $4a + 3b - 3a + 5b$_____ (b) $3x^2 \div -27y$_____	1 1
2. Expand and simplify (a) $8(2e-5) + 24 - 28e$ (b) $3d-(4 - 2d) - 15$	2 2
3. Simplify: $(5q^3)^4$	1
4. $15a^8 \div 5a^2 =$ A. $3a^4$ B.$3a^6$ C.$10a^4$ D. $10a^6$	1
5. Factorise (a) $36d-54d^2$ (b) $-4m - 12$	2
6. Simplify $\frac{-3m^3 \times (3m^2)^2}{(3m^2)^3}$	2
7. If $f(x)= 2x^2 - 3$, find: (a) f(0) (b) f(2) (c) $f(-1)$ (d) $f(2)+ f(-1)$	1 1 1 1

8. Find a simplified expression for the :  (i) area (ii) perimeter of this figure	**1** **1**

E. Geometry

Marks

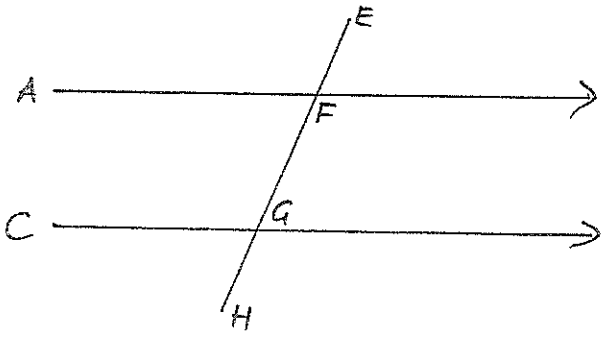
1. In the diagram below, complete the following sentences — **4**

(a) Angles EFB and EGD are called _____ angles

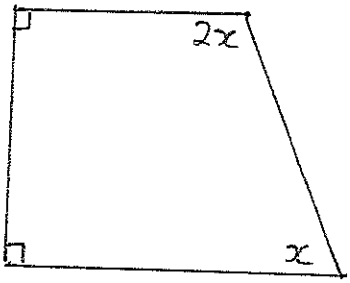
(b) Angles BFG and CGE are called _____ angles

(c) Angles AFG and CGF are called _____ angles

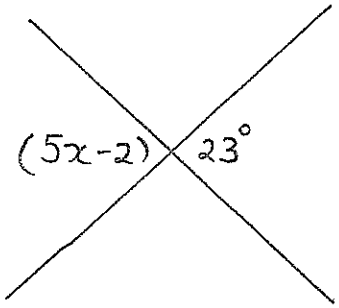
(d) Angles EFA and _____ are corresponding angles



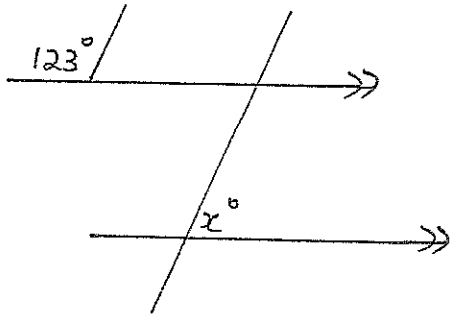
2. Find x, giving reasons — **2**

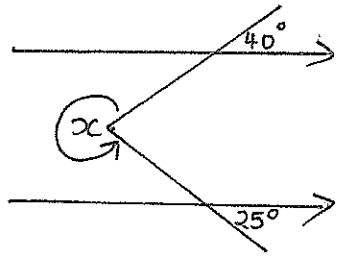
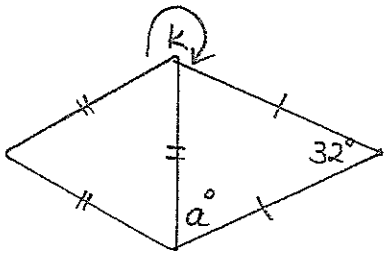
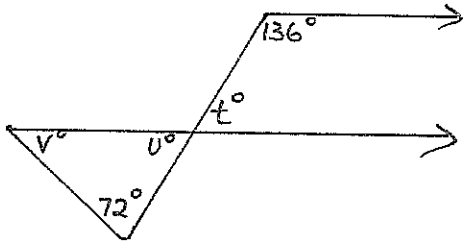


3. Find the value of x, giving reasons for your answer — **2**



4. Find x (no reasons required) — **1**



5. Find x (reason not required)  	**1**
6 Find the angle measure of a and k  a= _____ reason _____ k = _____ (reason not required)	**3**
7.  t = _____ reason _____ u = _____ reason _____ v = _____ reason _____	**6**

A. **Non-Calculator (Time allowed 15min) (1 mark each) Name:**_____

1. Express 81.298 correct to 2 decimal places.	1.
2. Find $2\frac{1}{2} \times 3\frac{2}{5}$	2.
3. Convert $12\frac{1}{2}\%$ to a decimal	3.
4. Find $\sqrt{6\frac{1}{4}}$	4.
5. Find two numbers such that their product is 216 and their sum is 30.	5.
6. Find the number that is halfway between 27.15 and 27.98	6.
7. Change $\frac{5}{8}$ to a decimal	7.
8. Find $9\times 3 - 16 \div 4 + 15$	8.
9. If $a = -6,\ b = 3$ and $c = -2,$ find (a) $ab \div c$ (b) $a - b - c$ (c) $\sqrt{a \times b \times c}$	9. (a)_____ (b)_____ (c)_____
10. The average of six numbers is 19. A seventh number is added and the new average is 20. What is the seventh number?	10.

Name: ANSWERS

Teacher: _____

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Time Allowed: 70 minutes

Place all answers in the spaces provided.

Show all necessary working.

B. Pythagoras Theorem **Name:**_____

Show all working. **Marks**

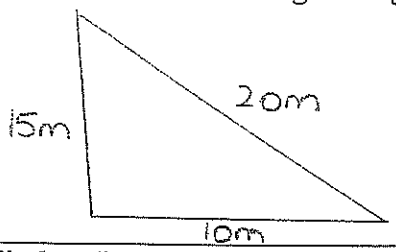
1. Circle the correct answer — **1**

The value of $\sqrt{1.7^2 - 1.5^2}$ is closest to:

A.0.64 B.0.8 C. 0.20 D. 0.45

B

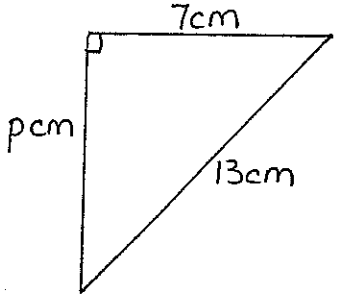
2. State whether this triangle is right angled or not. — **1**



$15^2 + 10^2 \neq 20^2$

NO

3. Find p. Leave your answer in exact form. — **2**



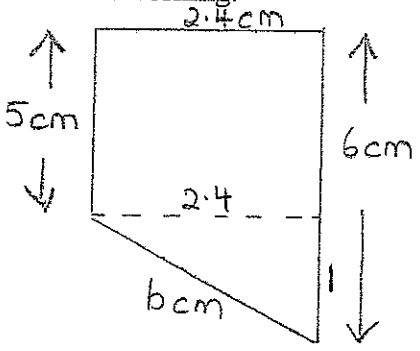
$p^2 = 13^2 - 7^2$

$p^2 = 120$

$p = \sqrt{120}$

4. Find the perimeter of this shape, correct to the nearest cm. — **3**

Show all working.



$b^2 = 2.4^2 + 1^2$

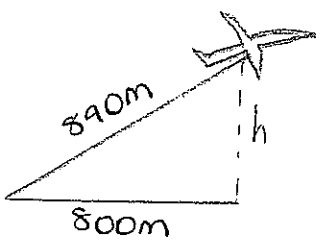
$b = \sqrt{6.76} = 2.6$

$P = 2.4 + 6 + 2.6 + 5.$

$P = 16cm.$

5. After taking off, a plane flies 890m but covers a ground distance of 800m. How high is the plane off the ground to the nearest metre? — **2**

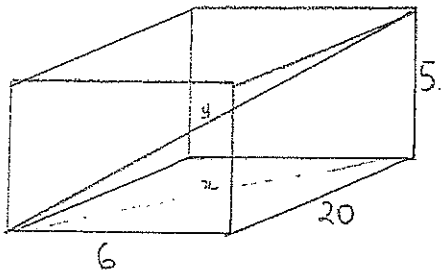
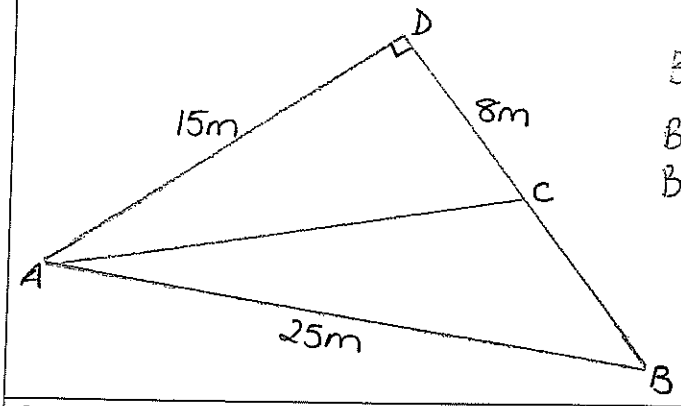
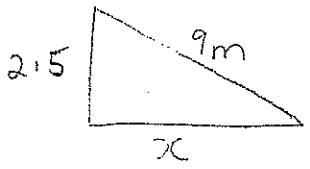
Show all working.



$h^2 = 890^2 - 800^2$

$h = \sqrt{152100}$

$h = 390m.$

6. A rectangle prism box measures 6 cm wide, 20 cm long and 5 cm high. Find the length of the longest pencil that can fit into the box.  $x^2 = 6^2 + 20^2$ $x = \sqrt{436}$ $y^2 = 5^2 + \sqrt{436}^2$ $y = \sqrt{461} = 21.47\text{cm}$	**3**
7. For the diagram, find the length of BC  $BD^2 = 25^2 - 15^2$ $BD^2 = 400$ $BD = 20$ $\therefore BC = 12\text{m}$	**2**
8. A ramp is 9 metres long and rises to a height of 250cm. What is the horizontal distance in metres, between the bottom and the top of the ramp?  $x^2 = 9^2 - 2.5^2$ $x^2 = 74.75$ $x = \sqrt{74.75} = 8.65\text{m}$	**2**

C. Percentages

Show all working **Marks**

1. Express $66\frac{2}{3}\%$ as a fraction in its simplest form. $\frac{2}{3}$	1
2. Find 78% of 200 $0.78 \times 200 = 156$.	1
3. What percentage of 360° is 117°? $\frac{117}{360} \times 100 = 32.5\%$.	1
4. All items in a shop are on sale at 15% discount off the marked price. Find the sale of a shirt marked \$48. $\frac{85}{100} \times 48 = \$40.80$.	1
5. An amount of \$760 is decreased by 30% and the resulting amount is then increased by 20%. What is the final amount? $= 0.7 \times 760$ $= 1.2 \times 532$ $= \$532$ $= \$638.40$.	2
6. Albert received a pay rise at work of \$21.60 per week. If this pay rise represented an 8% increase, how much is his weekly wage now. $\frac{8}{100} \times x = 21.60$. Weekly Wage $= 270 + 21.60$ $x = 270$ $= \$291.60$	2
7. The sale price of a cricket bat including 10% GST is \$253. Find the cost of the bat excluding GST. $\frac{110}{100} \times x = 253$ $x \$230$	2
8. Zac works at an electronics shop. He is paid a weekly wage of \$110.50. At the end of a certain week his income is a total of \$548 and he has sold \$12500 worth of goods. What percentage commission is he paid? $548 - 110.50$ $\frac{x}{100} \times 12500 = 437.50$ $= \$437.50$ $\frac{x}{100} = 0.035$ $x = 3.5\%$.	2

D. Algebraic Expressions **Marks**

1. Simplify

(a) $4a + 3b - 3a + 5b$ $a + 8b.$ — 1

(b) $3x^2 \div -27y$ $\frac{3x^2}{-27y} = \frac{-x^2}{9y}$ — 1

2. Expand and simplify

(a) $8(2e-5) + 24 - 28e$
$= 16e - 40 + 24 - 28e$
$= -12e - 16$ — 2

(b) $3d-(4-2d) - 15$
$= 3d - 4 + 2d - 15$
$= 5d - 19$ — 2

3. Simplify: $(5q^3)^4$ $625q^{12}$ — 1

4. $15a^8 \div 5a^2 =$ — 1

A. $3a^4$ (B) $3a^6$ C. $10a^4$ D. $10a^6$

5. Factorise (a) $36d-54d^2$ $18d(2-3d)$ — 1

(b) $-4m - 12$ $-4(m+3)$ — 1

6. Simplify $\frac{-3m^3 \times (3m^2)^2}{(3m^2)^3}$ $\frac{-3m^3 \times 9m^4}{27m^6} = \frac{-27m^7}{27m^6} = -m.$ — 2

7. If $f(x) = 2x^2 - 3$, find

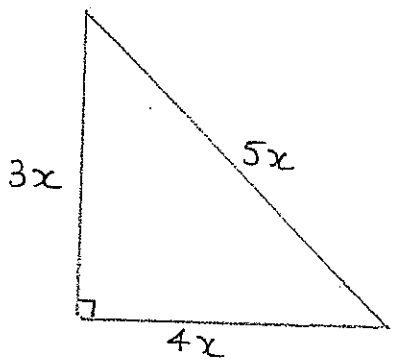
(a) $f(0) = 0 - 3 = -3$ — 1

(b) $f(2) = 2 \times 4 - 3 = 5.$ — 1

(c) $f(-1) = 2 \times -1^2 - 3 = -1$ — 1

(d) $f(2) + f(-1) = 5 + -1 = 4$ — 1

8. Find an expression for the



(i) area $A = \frac{1}{2} \times 4x \times 3x$
$A = 6x^2$ — 1

(ii) perimeter of this figure — 1

$P = 3x + 5x + 4x$
$P = 12x$

E. Geometry

Marks

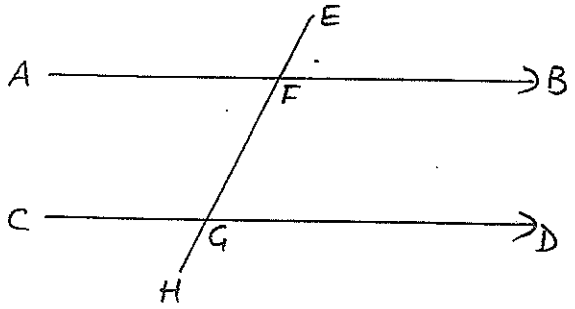
1. In the diagram below, complete the following sentences — **4**

(a) Angles EFB and EGD are corresponding angles

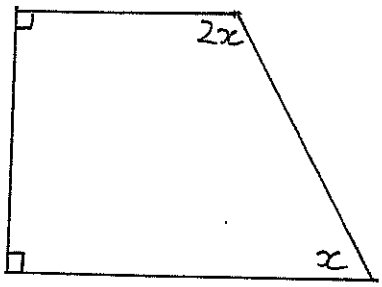
(b) Angles BFG and CGE are alternate angles

(c) Angles AFG and GGF are co-interior angles

(d) Angles EFA and ∠FGC are corresponding angles



2. Find x, giving reasons — **2**



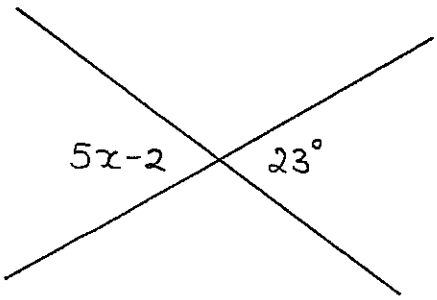
$180 + 3x = 360$

$3x = 180$

$x = 60$.

angle sum of quadrilateral.

3. Find the value of x, giving reasons for your answer — **2**



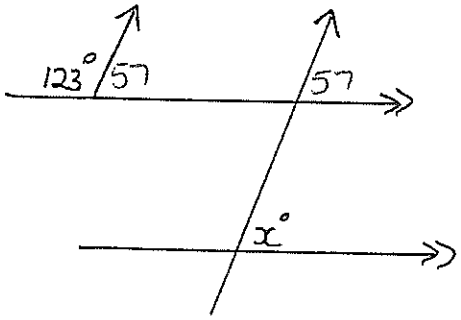
$5x - 2 = 23$

$5x = 25$

$x = 5$

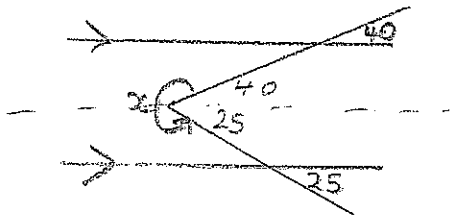
Vertically opposite angles are equal

4. Find x (no reasons required) — **1**



$x = 57$

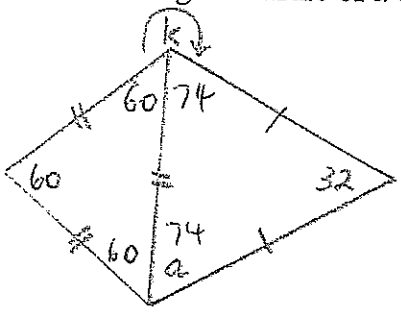
5. Find x (reason not required)



$x = 295$

1

6 Find the angle measure of a and k



$a =$ 74.

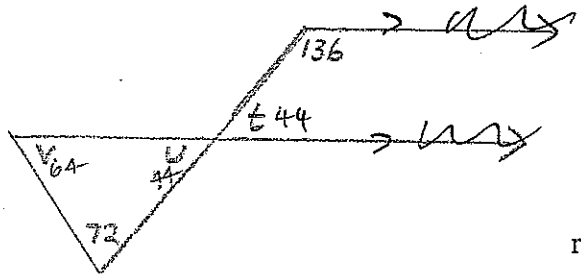
reason base angles of isosceles triangle

$k =$ 226

(reason not required)

3

7.



$t =$ 44

reason = co-interior ∠'s suppl in ll lines

$u =$ 44

reason = vertically opp ∠'s =

$v =$ 64

reason = angle sum of triangle

6

A. **Non-Calculator (Time allowed 15min) (1 mark each) Name:**_____

1.Express 81.298 correct to 2 decimal places.	1. 81.30
2. Find $2\frac{1}{2} \times 3\frac{2}{5}$	2. $\frac{17}{2} = 8\frac{1}{2}$
3. Convert $12\frac{1}{2}\%$ to a decimal	3. 0.125
4. Find $\sqrt{6\frac{1}{4}}$	4. $\frac{5}{2}$
5. Find two numbers such that their product is 216 and their sum is 30.	5. 18 & 12
6. Find the number that is halfway between 27.15 and 27.98	6. 27.565.
7. Change $\frac{5}{8}$ to a decimal	7. 0.625
8. Find $9\times 3-16\div 4+15$	8. 38
9. If $a=-6,\ b=3$ and $c=-2$, find (a) $ab \div c$ $-18 \div -2$ (b) $a-b-c$ $-6-3--2$ (c) $\sqrt{a\times b\times c}$ $\sqrt{36}$	9. (a) 9 (b) -7 (c) 6
10. The average of six numbers is 19. A seventh number is added and the new average is 20. What is the seventh number? $\frac{x}{6}=19$ $\frac{114+y}{7}=20$ $x=114$ $114+y=140$ $y=26$	10. 26