Carlingford High School

Mathematics

Year 9 (5.1) Term 4 Exam

2017

Name: _____

Time allowed: 55 minutes

- Answer all questions in the spaces provided. All questions are worth 1 mark unless otherwise stated
- Complete the examination in blue or black pen. Draw diagrams using pencil and a ruler

Marking Scale

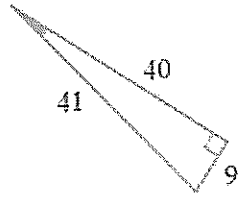
Topic	Outcome	Question(s)	Mark
Trigonometry	Sides of a right-angled triangle	1,2	/5
	The trigonometric ratios	3-5	/9
	Finding unknown sides and angles	6-8	/9
Investigating Data	Mean, mode, median and range	1-3	/6
	Graphs and tables	4-6	/11
Indices	Simplifying expressions	1-4	/15
	Significant figures and scientific notation	5-9	/11
Ratios and Rates	Ratios	1-6	/13
	Rates	7-10	/9
		Total	**/88**
		Percentage	**%**

Trigonometry

Question 1

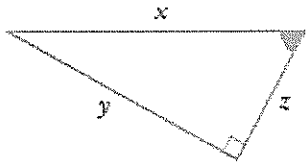
Name the hypotenuse in each triangle.

(a)



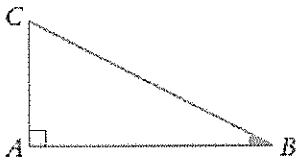
_____

(b)



_____

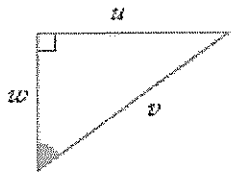
(c)



_____

Question 2

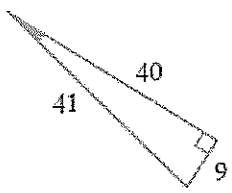
(a)



Name the side **opposite** the shaded angle.

_____

(b)

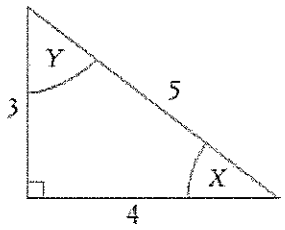


Name the side **adjacent** to the shaded angle.

_____

Question 3

Use ***SohCahToa*** to complete the following.



(a) $sinX = \frac{3}{\quad}$ (b) $cosX = \frac{\quad}{5}$ (c) $tanY = \frac{\quad}{\quad}$

Question 4

Round each of the following to the nearest degree.

(a) $24°34'$ _____

(b) $97.36°$ _____

Question 5

Evaluate each of the following correct to 2 decimal places.

(a) $tan84°$ _____

(b) $cos60.1°$ _____

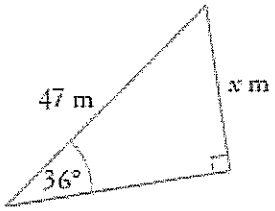
(c) $14tan9°15'$ _____

(d) $\frac{2{\cdot}4}{sin12°}$ _____

Question 6

Find the value of the pronumeral in each triangle, correct to 1 decimal place.

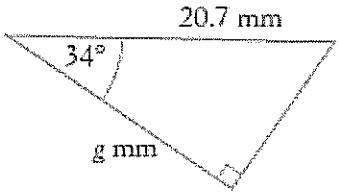
(a)



$sin36° = \frac{x}{47}$

$x =$ _____

(b)

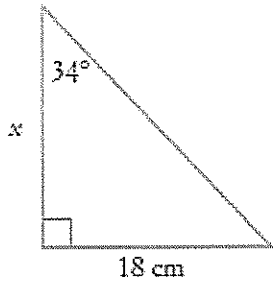


(2 marks)

_____$34^{\circ} =$ —

$g =$ _____

(c)



$tan34° = \frac{18}{x}$

$x =$ _____

Question 7

Find the size of angle *A*, correct to the nearest degree.

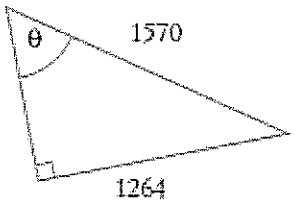
(a) $tanA = 0 \cdot 23$ _____

(b) $cosA = \frac{7}{15}$ _____

Question 8

Find the size of angle θ, correct to the nearest degree.

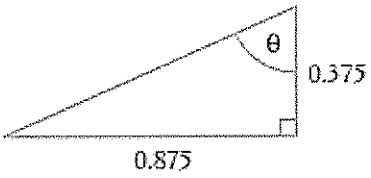
(a)



$sin\theta = \frac{1264}{1570}$

$\theta =$ _____

(b)



(2 marks)

_____$\theta =$ —

$\theta =$ _____

Investigating Data

Question 1

4, 5, 5, 5, 5, 6, 6, 6, 8, 9, 16

For this set of data, find the

(a) Mode _____

(b) Median _____

(c) Mean, correct to 1 decimal place.

_____

(d) Range _____

Question 2

12, 8, 9, 11, 6, 10, 9, 10

Find the median for this set of data. _____

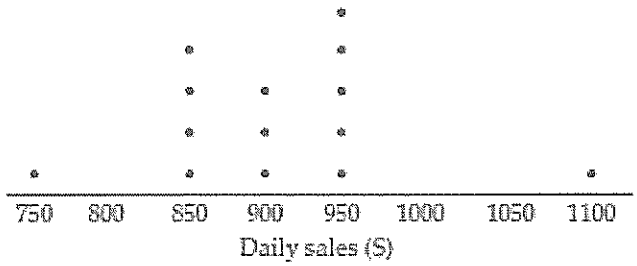
Question 3

The mean of 8, 9, 10, 11, 14 and x is 12.

Find the mean.

_____

Question 4



(a) What is this type of graph called?

_____ _____

(b) What is the range of the daily sales?

_____

(c) Find the median. _____

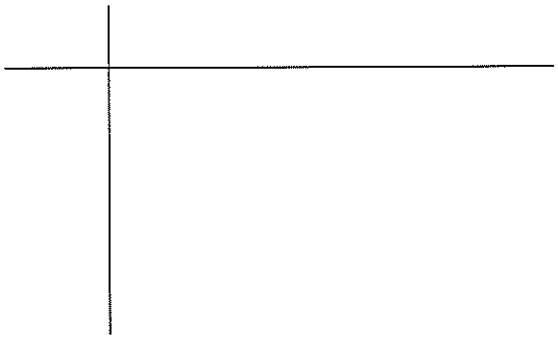
(d) Complete the calculation to find the mean.
(Write your answer correct to 1 decimal place)

_____ $\div 14 =$ _____

Question 5

22 24 25 25 26 27 28 33 37 37 42 43
45 47 48 50 51 56 58 60 61 62 68 69

(a) Organise this set of scores into a stem-and leaf plot. (2 marks)



(b) Find the median. _____

Question 6

Number of bedrooms	Frequency
1	4
2	7
3	8
4	5
5	1

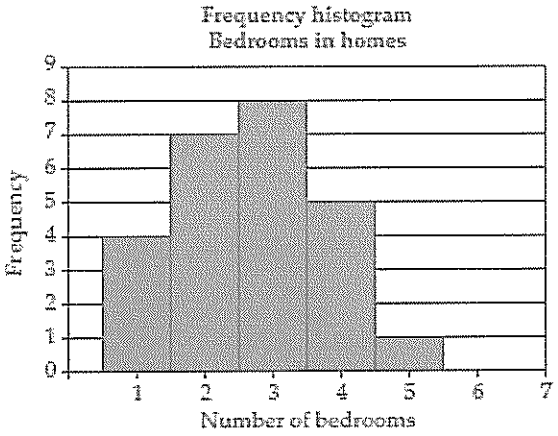
For this set of data,

(a) Find the mode _____

(b) Find the median _____

(c) Find the range _____

(d) Add a polygon to this histogram.



Indices

Question 1

Simplify each expression, using index notation.

(a) $2^5 \times 2^3$ _____

(b) $3a^2 \times a$ _____

(c) $x^4 \times x^{-2}$ _____

(d) $(-5y^3) \times 6y^8$ _____

Question 2

Simplify each expression, using index notation.

(a) $k^6 \div k^3$ _____

(b) $\frac{m^{10}}{m^2}$ _____

(c) $120g^{-2} \div 40g^5$ _____

Question 3

Simplify each expression, using index notation.

(a) $(x^3)^2$ _____

(b) $(2x^3)^4$ _____

(c) $(-3x^4)^2$ _____

(d) $(\frac{m}{3})^2$ _____

Question 4

Simplify each expression, using index notation.

(a) 4^0 _____

(b) f^0 _____

(c) $(4f)^0$ _____

(d) $4f^0$ _____

Question 5

Round each number to 2 significant figures.

(a) 28 624 _____

(b) $0 \cdot 005\ 24$ _____

Question 6

Write each number in scientific notation.

(a) 724 600 _____ $\times 10$

(b) $0 \cdot 000\ 721$ _____ $\times 10$

Question 7

Write each number as a basic numeral.

(a) 5×10^4 _____

(b) $6 \cdot 035 \times 10^2$ _____

(c) $1 \cdot 25 \times 10^{-3}$ _____

Question 8

Write these numbers in ascending order.

5×10^4 $6 \cdot 035 \times 10^2$ $1 \cdot 25 \times 10^{-3}$

_____, _____, _____

Question 9

Evaluate each expression correct to 2 significant figures.

(a) $(2 \cdot 4 \times 10^5) \times (7 \cdot 08 \times 10^{10})$

_____

(b) $(5 \cdot 385 \times 10^3) \div (1 \cdot 75 \times 10^{-5})$

_____

(c) $(6.1 \times 10^7)^3$ _____

Ratios and Rates

Question 1

Complete each equivalent ratio.

(a) $2:5 = 4:$_____

(b) $9:3 =$ _____$:1$

Question 2

Simplify each ratio.

(a) $10:20 =$ _____:_____

(b) $24:16 =$ _____:_____

(c) $\frac{1}{2}:\frac{3}{2} =$ _____:_____

(d) 10 mins to 1 hour = _____:_____

Question 3

A class of 28 students includes 12 boys. Find the ratio of

(a) Girls to boys. _____:_____

(b) Boys to girls. _____:_____

Question 4

The ratio of adults to children at a cinema was 3:4. If there are 78 adults, how many children were there? (2 marks)

Adults	3	
Children	4	

Number of children = _____

Question 5

A tennis court is drawn to a scale of 1:500.

(a) If the length of the court is 32m, how many centimetres is this on the scale diagram?

_____ cm

(b) If the width of the court on the scale diagram is 1.8cm, how long is the actual width?

_____ m

Question 6

Divide $25 in the ratio 2:3.

$_____ : $_____

Question 7

Simplify these rates.

(a) $200 for 8 hours work. $_____ /hour

(b) 50L of petrol to travel 450km.

_____ km/L

Question 8

Ali types 480 words in 5 minutes.

(a) 480 words/5 minutes = _____ words/minute

(b) How long will it take him to type 4032 words?

Words		
Minutes		

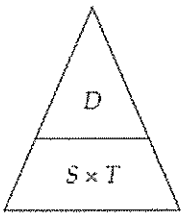
_____ minutes

(c) How many words can he type in half an hour?

Words		
Minutes		

_____ words

Question 9



(a) Distance = 450km, Time = 5 hours

Speed = _____ km/h

(b) Speed = 20m/s, Time = 80s

Distance = _____ km

(c) Distance = 472.5km, Speed = 105km/h

Time = _____ h

Question 10

A car is travelling at 60km/h. How many metres does it travel in 1 second?
(Round off to 1 decimal place)

_____m

END OF TEST

Carlingford High School

Mathematics

Year 9 (5.1) Term 2 Exam

2017

Name: SOLUTIONS

Time allowed: 55 minutes

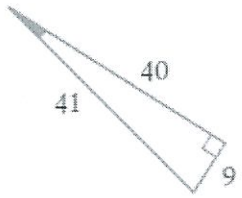
- Answer all questions in the spaces provided. All questions are worth 1 mark unless otherwise stated
- Complete the examination in blue or black pen. Draw diagrams using pencil and a ruler

Trigonometry

Question 1

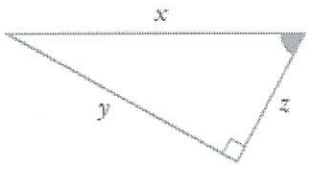
Name the hypotenuse in each triangle.

(a)



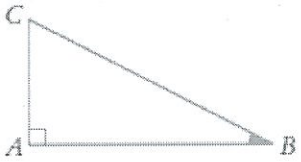
41

(b)



x

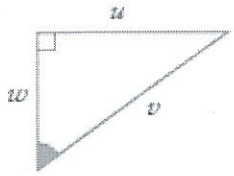
(c)



BC
(or CB or a)

Question 2

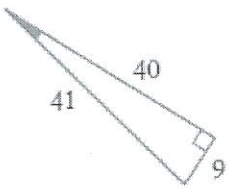
(a)



Name the side **opposite** the shaded angle.

u

(b)

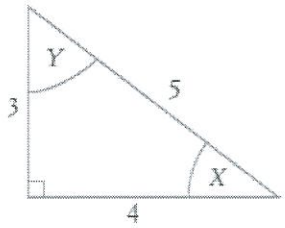


Name the side **adjacent** to the shaded angle.

40

Question 3

Use ***SohCahToa*** to complete the following.



(a) $sinX = \frac{3}{5}$ (b) $cosX = \frac{4}{5}$ (c) $tanY = \frac{4}{3}$

Question 4

Round each of the following to the nearest degree.

(a) 24°34′ 25°

(b) 97.36° 97°

Question 5

Evaluate each of the following correct to 2 decimal places.

(a) $tan84°$ 9.51

(b) $cos60.1°$ 0.50

(c) $14tan9°15'$ 2.28

(d) $\frac{2{\cdot}4}{sin12°}$ 11.54

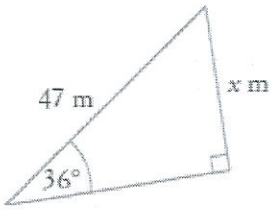
/9

/5

Question 6

Find the value of the pronumeral in each triangle, correct to 1 decimal place.

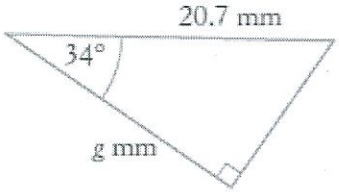
(a)



$sin36° = \frac{x}{47}$

$x =$ 27.6

(b)

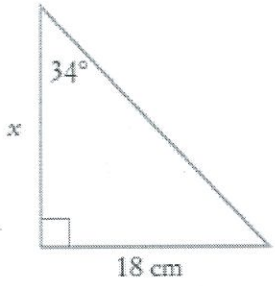


(2 marks)

cos $34° = \frac{g}{20.7}$ ✓

$g =$ 17.2 ✓

(c)



$tan34° = \frac{18}{x}$

$x =$ 26.7

Question 7

Find the size of angle A, correct to the nearest degree.

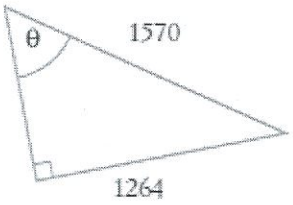
(a) $tanA = 0 \cdot 23$ 13°

(b) $cosA = \frac{7}{15}$ 62°

Question 8

Find the size of angle θ, correct to the nearest degree.

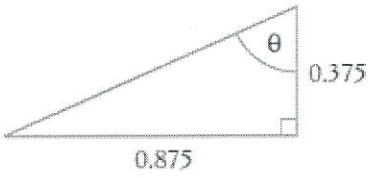
(a)



$sin\theta = \frac{1264}{1570}$

$\theta =$ 54°

(b)



(2 marks)

tan $\theta = \frac{0.875}{0.375}$.

$\theta =$ 67°

/9

Investigating Data

Question 1

4, 5, 5, 5, 5, 6, 6, 6, 8, 9, 16

For this set of data, find the

(a) Mode 5

(b) Median 6

(c) Mean, correct to 1 decimal place.

$75 \div 11 = 6.8$

(d) Range $16 - 4 = 12$

Question 2

12, 8, 9, 11, 6, 10, 9, 10

6, 8, 9, 9, 10, 10, 11, 12

Find the median for this set of data. 9.5

Question 3

The mean of 8, 9, 10, 11, 14 and x is 12.

Find the mean.

$x = 20$

$\frac{x+52}{6} = 12$

$x + 52 = 72$

$x = 20$

/6

Question 4

(a) What is this type of graph called?

Dot plot

(b) What is the range of the daily sales?

$1100 - 750 = 350$

(c) Find the median. 900

(d) Complete the calculation to find the mean.
(Write your answer correct to 1 decimal place)

12700 $\div 14 =$ 907.1

Question 5

22 24 25 25 26 27 28 33 37 37 42 43
45 47 48 50 51 56 58 60 61 62 68 69

(a) Organise this set of scores into a stem-and leaf plot. (2 marks)

2	2 4 5 5 6 7 8
3	3 7 7
4	2 3 5 7 8
5	0 1 6 8
6	0 1 2 8 9

✓✓

(b) Find the median. 44

$\frac{43+45}{2} = 44$

Question 6

Number of bedrooms	Frequency
1	4
2	7
3	8
4	5
5	1

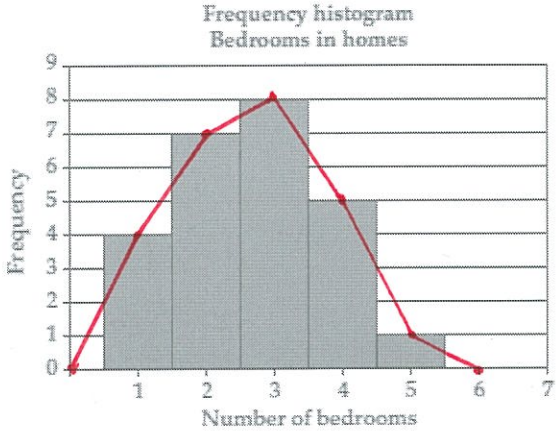
For this set of data,

(a) Find the mode 3

(b) Find the median 3

(c) Find the range 5-1 = 4

(d) Add a polygon to this histogram.



/11

Indices

Question 1

Simplify each expression, using index notation.

(a) $2^5 \times 2^3$ 2^8

(b) $3a^2 \times a$ $3a^3$

(c) $x^4 \times x^{-2}$ x^2

(d) $(-5y^3) \times 6y^8$ $-30y^{11}$

Question 2

Simplify each expression, using index notation.

(a) $k^6 \div k^3$ k^3

(b) $\frac{m^{10}}{m^2}$ m^8

(c) $120g^{-2} \div 40g^5$ $3g^{-7}$

Question 3

Simplify each expression, using index notation.

(a) $(x^3)^2$ x^6

(b) $(2x^3)^4$ $16x^{12}$

(c) $(-3x^4)^2$ $9x^8$

(d) $(\frac{m}{3})^2$ $\frac{m^2}{9}$

Question 4

Simplify each expression, using index notation.

(a) 4^0 1

(b) f^0 1

(c) $(4f)^0$ 1

(d) $4f^0$ 4

/15

Question 5

Round each number to 2 significant figures.

(a) 28 624 29000

(b) 0 · 005 24 0.0052

Question 6

Write each number in scientific notation.

(a) 724 600 7.246×10^{5}

(b) 0 · 000 721 7.21×10^{-4}

Question 7

Write each number as a basic numeral.

(a) 5×10^{4} 50000

(b) $6 \cdot 035 \times 10^{2}$ 603.5

(c) $1 \cdot 25 \times 10^{-3}$ 0.00125

Question 8

Write these numbers in ascending order.

5×10^{4} (3) $6 \cdot 035 \times 10^{2}$ (2) $1 \cdot 25 \times 10^{-3}$ (1)

1.25×10^{-3}, 6.035×10^{2}, 5×10^{4}

Question 9

Evaluate each expression correct to 2 significant figures.

(a) $(2 \cdot 4 \times 10^{5}) \times (7 \cdot 08 \times 10^{10})$

1.7×10^{16}

(b) $(5 \cdot 385 \times 10^{3}) \div (1 \cdot 75 \times 10^{-5})$

3.1×10^{8}

(c) $(6.1 \times 10^{7})^{3}$ 2.3×10^{23}

/11

Ratios and Rates

Question 1

Complete each equivalent ratio.

(a) 2:5 = 4:10

(b) 9:3 = 3:1

Question 2

Simplify each ratio.

(a) 10:20 = 1:2

(b) 24:16 = 3:2

(c) $\frac{1}{2} : \frac{3}{2}$ = 1:3

(d) 10 mins to 1 hour = 1:6

Question 3

A class of 28 students includes 12 boys. Find the ratio of

(a) Girls to boys. 16:12 (or 4:3)

(b) Boys to girls. 12:16 (or 3:4)

Question 4

The ratio of adults to children at a cinema was 3:4. If there are 78 adults, how many children were there? (2 marks)

Adults	3	78
Children	4	

✓✓

Number of children = $4 \times 78 \div 3 = 104$

A tennis court is drawn to a scale of 1:500.

(a) If the length of the court is 32m, how many centimetres is this on the scale diagram?

3200cm ÷ 500 = 6.4 cm

(b) If the width of the court on the scale diagram is 1.8cm, how long is the actual width?

1.8cm × 500 ÷ 100 = 9 m

Question 6

Divide $25 in the ratio 2:3.

$\frac{2}{5} \times \$25 = \$10$

$10 : $15

/13

Question 7

Simplify these rates.

(a) $200 for 8 hours work. $25 /hour

(b) 50L of petrol to travel 450km.

450 ÷ 50 = 9 km/L

Question 8

Ali types 480 words in 5 minutes.

(a) 480 words/5 minutes = 96 words/minute

(b) How long will it take him to type 4032 words?

Words	96	4032
Minutes	1	

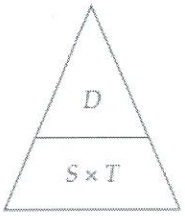
4032 ÷ 96 = 42 minutes

(c) How many words can he type in half an hour?

Words	96	
Minutes	1	30

96 × 30 = 2880 words

Question 9



(a) Distance = 450km, Time = 5 hours

Speed = $\frac{450}{5} = 90$ km/h

(b) Speed = 20m/s, Time = 80s

Distance = 20 × 80 = 1600m = 1.6 km

(c) Distance = 472.5km, Speed = 105km/h

Time = $\frac{472.5}{105} = 4.5$ h

Question 10

A car is travelling at 60km/h. How many metres does it travel in 1 second?
(Round off to 1 decimal place)

$\frac{60000m}{3600s} =$ 16.7 m

/9

END OF TEST