

Name: _____

Class: _____

St George Girls High School

Year 8

Common Test 1

May 2007



Mathematics

Time Allowed: 75 minutes

Instructions

- Attempt ALL questions.
- Show all working in Part B
- Marks will be deducted for careless or badly arranged work.
- Calculators may be used.
- Diagrams are not to scale.

Part A	/20
Part B	
Question 1	/13
Question 2	/13
Question 3	/13
Question 4	/13
Total	72

Part A (20 Marks)

Write all answers in the answer only column. Each question is one mark each.

Questions	Answer Only
1. Write $8 \times 8 \times 8 \times 8$ in index notation	
2. Simplify $3r - 10s + r + 12s$	
3. Change $\frac{7}{15}$ to a percentage	
4. Simplify $3^5 \times 3^2$ leaving your answer in index form	
5. Factorise $-4b - 6ab$	
6. Write 45¢ as a percentage of \$2	
7. True or False? $5^n (5^n - 1) = 5^{2n} - 5^n$	
8. Naomi is now t years old. In 5 years time Naomi's brother will be twice her age. Write an algebraic expression, in terms of t , for her brother's age in 5 years time	

Questions	Answer Only
<p>9. A computer shop purchases video games for \$80 and sells them for \$120. Find the profit as a percentage of the cost price.</p>	
<p>10. The travel graph below shows the journeys of two motorists, Peter and Dan. Peter is traveling from Abbatown to Elvison and Dan is traveling from Elvison to Abbatown.</p>	
<p>The graph shows the distance traveled by Peter and Dan over time. The vertical axis represents distance in kilometers (km), ranging from 0 to 400 in increments of 40. The horizontal axis represents time, ranging from 8 am to 1 pm in hourly increments. Dan's journey is a straight line from (8 am, 400 km) to (1 pm, 0 km). Peter's journey starts at (8 am, 0 km), goes to (10 am, 140 km), stops at (11 am, 140 km), goes to (11 am, 240 km), stops at (12 noon, 240 km), and finally goes to (1 pm, 400 km). The two lines intersect at (10:30 am, 200 km).</p>	
<p>a) At what time did Peter and Dan meet? b) How far apart were the two motorists at 11am? c) How many times did Peter stop? d) What was Dan's average speed? e) At what time was Peter 220km from Elvison?</p>	<p>a) b) c) d) e)</p>

Questions	Answer Only
11. Find the value of $\sqrt[3]{200}$ correct to two decimal places	
12. Simplify $\frac{5at}{10ab} =$	
13. Change 210.5% to a decimal	
14. A certain medicine has to be taken at equal intervals, 5 times a day. Calculate the time between doses, in hours and minutes.	
15. The expressions $x-2$ and $6x-5x+2-4$ are equivalent. Write another expression that is equivalent to them.	
16. A store marks up the price on a dress, originally marked at \$80, by 65%. How much is the dress sold for?	

Part B

Show all working in the space provided.

Question 1 (13 marks)

Mark

a) Simplify (leaving your answer in index form):

4

(i) $2^4 \div 2$

(ii) $(4^2)^5$

(iii) $\frac{5^2 \times 5^7}{(5^3)^2}$

b) Evaluate: $5^0 + (5^6)^0$

1

c) Simplify $\frac{3^5 \times 3^3}{9^2}$ leaving your answer in index form.

2

d) Evaluate $\sqrt[3]{\frac{2.3 + 1.9^2}{4.2 \times 0.16}}$ correct to one decimal place.

2

e) A farmer harvested 2688 apples. For every 56 apples harvested, 5 of those were unfit for sale. If she was able to sell all of the remaining apples for 45 cents each, how much did she earn?

2

f) In a target shooting competition, a competitor earns 2 points for each shot that hits the target and loses 1 point for each shot that misses. A competitor earned a total of 44 points from 31 shots. How many times did he hit the target?

2

Question 2 (13 marks)

Mark

a) Simplify:

(i) $7pq \times -3p \times 2p$

(ii) $\frac{4m-12}{12}$

2

b) If $a = 4$ and $b = -3$ find the value of $5ab - \frac{12}{b}$

1

c) Expand and simplify:

$4(2x - 1) - 3(5x - 2)$

d) Factorise:

$2x(x+1) + 3(x+1)$

3

e) Simplify:

(i) $\frac{2x}{5} + \frac{x}{4}$

(ii) $\frac{3a}{4b} \times \frac{6c}{5} \div \frac{3c}{8b}$

(iii) $\frac{x-3}{3} - \frac{x-1}{4}$

7

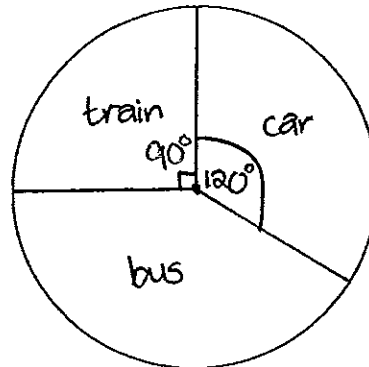
Question 3 (13 marks)

Marks

- a) The graph below shows how 360 students travel to school.

2

Travel to School



- (i) What size angle represents students who travel by bus?
- (ii) How many people traveled by car?

Question 3 (cont'd)

Marks

b) A fair die was rolled 40 times and the following results were recorded:

4

(1) 6 5 (1) 2 4 3 (1)
 (3) 6 2 (5) 4 2 5 4
 (3) 5 5 (4) 2 1 3 2
 4 3 2 (2) 1 6 2 1
 (5) 5 6 3 4 5 4 5

(i) Organise the data into the frequency distribution table below:

Score	Tally	Frequency
1		
2		
3		
4		
5		
6		
Total:		

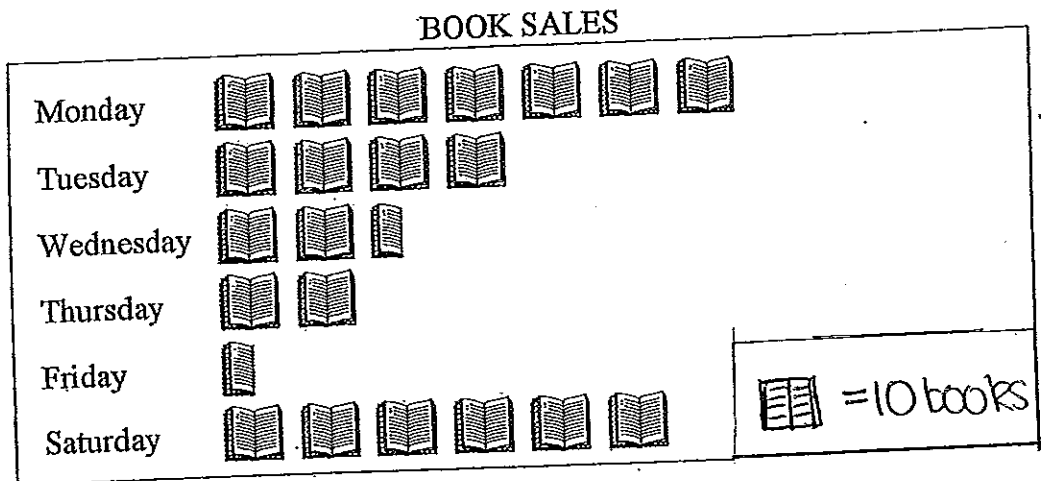
(ii) Which number was rolled most often?

(iii) What fraction of scores were less than 3?

Question 3 (cont'd)

Marks

- c) The picture graph below shows the number of books sold at the Bookworm Bookshop last week. 2



- (i) If 220 books were sold last week, what key has been used to create this graph?

- (ii) On which day were 25 books sold?

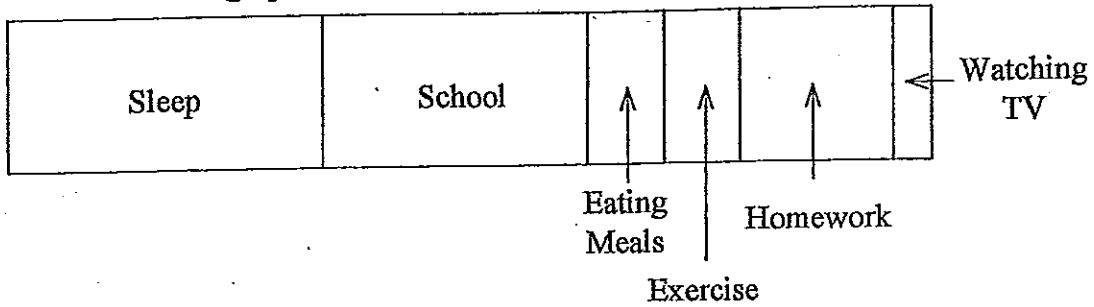
Question 3 (cont'd)

Mark

d) The divided bar graph shows how Jessica spent the 24 hours of last Monday.

5

The divided bar graph shows how Jessica spent the 24 hours of last Monday.



- (i) How many hours did Jessica spend exercising?
- (ii) What fraction of the day did Jessica spend doing homework?
- (iii) Which activity did Jessica spend 7 hours on?
- (iv) Use the data from the divided bar graph to draw a column graph showing how Jessica spent last Monday.

Question 4 (13 marks)

Marks

- a) (i) Change 0.065 to a percentage (ii) Change $6\frac{1}{4}\%$ to a fraction in simplest form 2
- b) Of the 250 students selected at random to complete a survey, 16% were in Year 8. How many Year 8 students completed the survey? 1
- c) The retail price of a pearl necklace was discounted by 10% and sold for \$304. Find the original price of the necklace. 2
- d) Dale invested \$2000 in shares. After one month his investment was worth \$2200. What would Dale's percentage profit be if he sold his shares after one month? 1
- e) Jake works for a company selling beauty products. He earns \$280 per week plus 2% commission on his total sales for the week. If Jake sells \$8450 worth of beauty products in one week, how much will he earn altogether? 2
- f) (i) Find the simple interest earned on \$600 at 8% p.a. for 18 months (ii) Find the simple interest rate if \$685 is invested for 2 years and earns \$68.50 interest 3
- g) What single rate of discount is equivalent to successive discounts of 20% and then 10%? 2

SOLUTIONS

Part A (20 Marks)

Write all answers in the answer only column. Each question is one mark each.

Questions	Answer Only
1. Write $8 \times 8 \times 8 \times 8$ in index notation	8^4 ✓
2. Simplify $3r - 10s + r + 12s$ $3r + r - 10s + 12s$ $= 4r - 2s$	$4r - 2s$ $4r + 2s$ $4r - 22s$
3. Change $\frac{7}{15}$ to a percentage	46.6% or $46\frac{2}{3}\%$ 47% X (rounded to the nearest whole percentage)
4. Simplify $3^5 \times 3^2$ leaving your answer in index form	3^7 ✓
5. Factorise $-4b - 6ab$ $-2b(2+3a) = -4b - 6ab$	$-2b(2+3a)$ ✓
6. Write 45c as a percentage of \$2 $\frac{45}{200}$	$22\frac{1}{2}\%$ ✓
7. True or False? $5^n (5^n - 1) = 5^{2n} - 5^n$	True ✓
8. Naomi is now t years old. In 5 years time Naomi's brother will be twice her age. Write an algebraic expression, in terms of t , for her brother's age in 5 years time	$2(t+5)$ $2(t+5)$ ✓

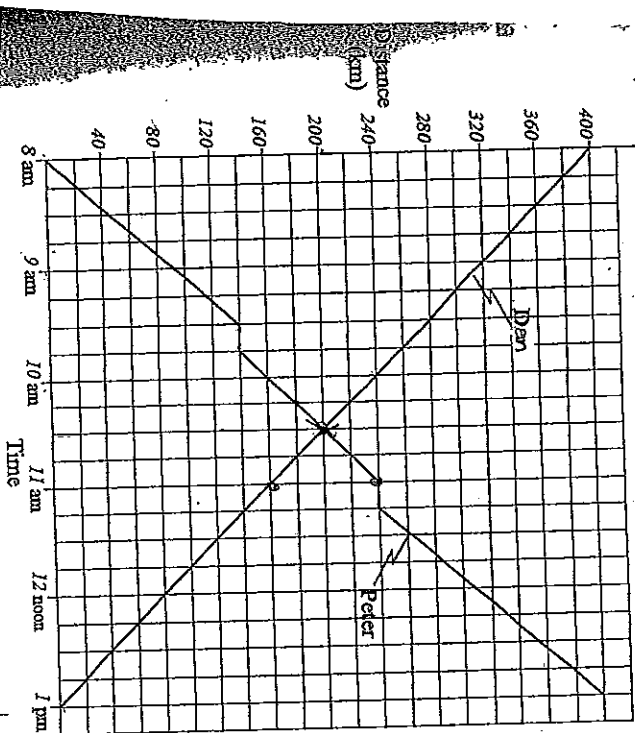
Questions

Answer Only

9. A computer shop purchases video games for \$80 and sells them for \$120. Find the profit as a percentage of the cost price.

50% ✓

10. The travel graph below shows the journeys of two motorists, Peter and Dan. Peter is traveling from Abbatown to Elvison and Dan is traveling from Elvison to Abbatown.



- At what time did Peter and Dan meet?
- How far apart were the two motorists at 11 am?
- How many times did Peter stop?
- What was Dan's average speed?
- At what time was Peter 220 km from Elvison?

- 10:30 am ✓
- 80 km apart ✓
- 2 times ✓
- 80 km/hr ✓
- ~~10:15 am~~
10:15 am ✓

Questions	Answer Only
11. Find the value of $\sqrt[3]{200}$ correct to two decimal places	5.85 ✓ (correct to 2 dec. places)
12. Simplify $\frac{ka}{2ab} = \frac{a}{2b}$	$\frac{a}{2b}$ ✓
13. Change 210.5% to a decimal	2.105 ✓
14. A certain medicine has to be taken at equal intervals, 5 times a day. Calculate the time between doses, in hours and minutes.	4 hr 48 mins ✓
15. The expressions $x-2$ and $6x-5x+2-4$ are equivalent. Write another expression that is equivalent to them.	$4x-3x+3-5$ ✓
16. A store marks up the price on a dress, originally marked at \$80, by 65%. How much is the dress sold for?	\$132 ✓

$\frac{17}{2}$

17

Part B

Show all working in the space provided.

Question 1 (13 marks)

a) Simplify (leaving your answer in index form):

(i) $2^4 \div 2 = 2^3 = 8$

(ii) $(4^2)^5 = 4^{2 \times 5} = 4^{10}$

(iii) $\frac{5^2 \times 5^7}{(5^3)^2} = \frac{5^2 \times 5^7}{5^6} = 5^2 \times 5^1 = 5^3 = 125$

b) Evaluate: $5^0 + (5^6)^0 = 1 + 1 = 2$

$\frac{3^5 \times 3^3}{9^2} = \frac{3^8}{3^4} = 3^4 = 81$

c) Simplify $\frac{3^5 \times 3^3}{9^2}$ leaving your answer in index form.

$\frac{3^8}{3^4} = 3^4 = 81$

d) Evaluate $\sqrt[3]{\frac{2.3+1.9^2}{4.2 \times 0.16}}$ correct to one decimal place.

$\sqrt[3]{\frac{5.91}{0.672}} = \sqrt[3]{8.8} \approx 2.1$

2.1 (correct to 1 dec. point)

e) A farmer harvested 2688 apples. For every 56 apples harvested, 5 of those were unfit for sale. If she was able to sell all of the remaining apples for 45 cents each, how much did she earn?

$2688 \div 56 = 48$ apples
 $48 \times 5 = 240$ unfit for sale
 $2688 - 240 = 2448$ apples
 $2448 \times 0.45 = \$1101.60$

f) In a target shooting competition, a competitor earns 2 points for each shot that hits the target and loses 1 point for each shot that misses. A competitor earned a total of 44 points from 31 shots. How many times did he hit the target?

36

$8 \times 31 \times 2 = 618$
 $6 \times 44 = 264$
 $18 \times 2 = 36$
 $44 - 36 = 8$ misses

$25 \times 2 = 50$ mins
 $50 - 6 \text{ mins} = 44$

Marks

4

1

2

2

2

2

Question 2 (13 marks)

Marks

a) Simplify:

(i) $7pq \times -3p \times 2p$

$7pq \times -6p^2$

$= -42p^3q$

(ii) $\frac{4m-12}{12}$

$\frac{4(m-3)}{12} = \frac{(m-3)}{3}$

b) If $a = 4$ and $b = -3$ find the value of $5ab - \frac{12}{b}$

$(5 \times 4 \times -3) - (\frac{12}{-3})$

$= -60 - (-4)$

$= -60 + 4$

$= -56$

c) Expand and simplify:

$4(2x-1) - 3(5x-2)$

$8x - 4 - 15x + 6$

$= 8x - 15x - 4 + 6$

e) Simplify:

(i) $\frac{2x+x}{5} + \frac{x}{4} = \frac{3x+5x}{20}$

$= \frac{8x}{20}$

(ii) $\frac{3a}{4b} \times \frac{6c}{5} \div \frac{3c}{8b}$

$\frac{3a}{4b} \times \frac{6c}{5} = \frac{18ac}{20b}$

$\frac{6}{5} \times \frac{18ac}{20b} \times \frac{8b}{3c} = \frac{12a}{5}$

$= \frac{12a}{5}$

(iii) $\frac{x-3}{5} - \frac{x-1}{4}$

$= \frac{4(x-3) - 5(x-1)}{20}$

$= \frac{4x - 12 - 5x + 5}{20}$

$= \frac{-x - 7}{20}$

d) Factorise:

$2x(x+1) + 3(x+1)$

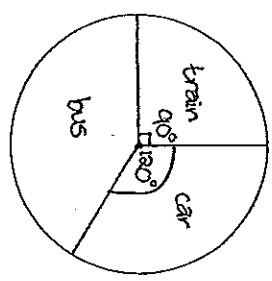
$(x+1)(2x+3)$

Question 3 (13 marks)

Marks

a) The graph below shows how 360 students travel to school.

Travel to School



(i) What size angle represents students who travel by bus?

$150^\circ = 360 - (90 + 120)$

(ii) How many people traveled by car?

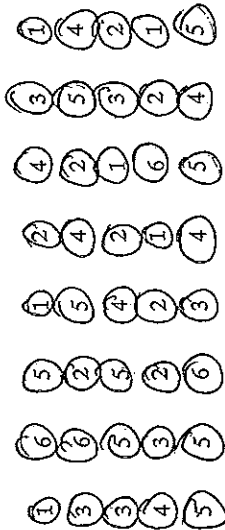
$\frac{120}{360} \times 360 = 120$

120 people traveled by car

Question 3 (cont'd)

Mark

b) A fair die was rolled 40 times and the following results were recorded:



4

(i) Organise the data into the frequency distribution table below:

Score	Tally	Frequency
1		6
2		8
3		6
4		7
5		9
6		4
Total:		40

(ii) Which number was rolled most often?

5 was rolled most often.

(iii) What fraction of scores were less than 3?

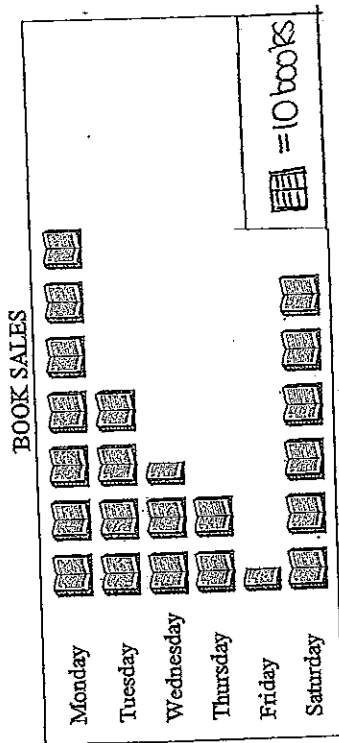
7/20

4

Question 3 (cont'd)

Marks

c) The picture graph below shows the number of books sold at the Bookworm Bookshop last week.



(i) If 220 books were sold last week, what key has been used to create this graph?

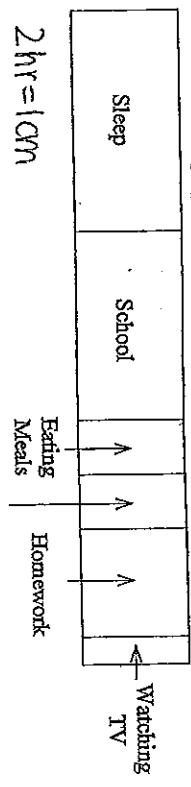
220 ÷ 22 = 10 books per icon

(ii) On which day were 25 books sold?

Wednesday

Question 3 (cont'd)

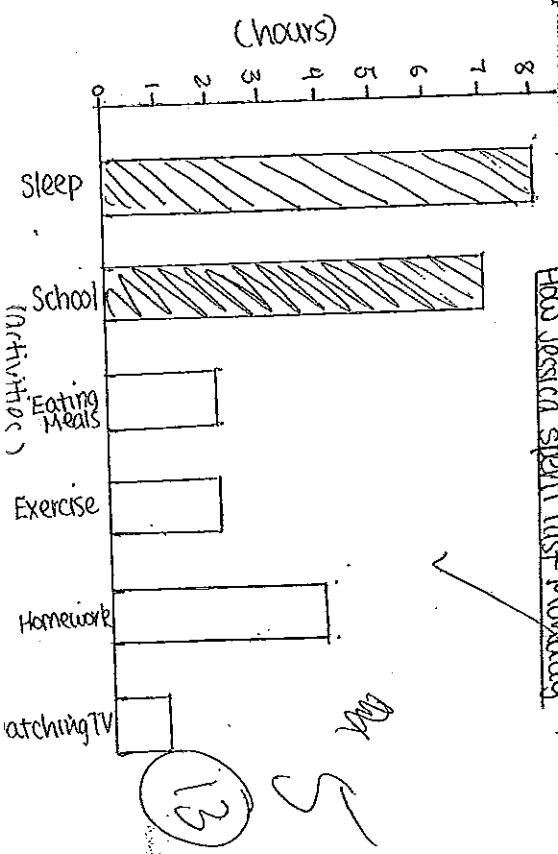
d) The divided bar graph shows how Jessica spent the 24 hours of last Monday.



The divided bar graph shows how Jessica spent the 24 hours of last Monday.

- (i) How many hours did Jessica spend exercising?
2 hrs, spent on exercising ✓
- (ii) What fraction of the day did Jessica spend doing homework?
 $\frac{4}{24} = \frac{1}{6}$ of the day, Jessica spent doing H.W. ✓
- (iii) Which activity did Jessica spend 7 hours on?
School ✓

(iv) Use the data from the divided bar graph to draw a column graph showing how Jessica spent last Monday.



Mark

5

Question 4 (13 marks)

a) (i) Change 0.065 to a percentage (ii) Change $\frac{6}{16}$ to a fraction in simplest form

6.2% ✓ $\frac{3}{8}$ ✓

b) Of the 250 students selected at random to complete a survey, 16% were in Year 8. How many Year 8 students completed the survey?

$16\% \times 250 = 40$ year 8 students completed the survey

c) The retail price of a pearl necklace was discounted by 10% and sold for \$304. Find the original price of the necklace.

$304 \div 0.9$ $337.78 \times 0.9 = 304.00$
Original price = 337.78 ✓ (convert to 2 decimal point)

d) Dale invested \$2000 in shares. After one month his investment was worth \$2200. What would Dale's percentage profit be if he sold his shares after one month?

$2200 - 2000 = 200$ $200 \times \frac{100}{2000} = 10\%$ percentage profit. ✓

e) Jake works for a company selling beauty products. He earns \$280 per week plus 2% commission on his total sales for the week. If Jake sells \$8450 worth of beauty products in one week, how much will he earn altogether?

$280 + 8450 \times 0.02 = 169$
 $169 + 280 = 449$ earned altogether. ✓

f) Find the simple interest earned on \$600 at 8% p.a. for 18 months

$600 \times 0.08 \times \frac{1}{2} = 72$ ✓
 $68.50 = 68.50 \times R \times 2$ years
 $68.50 = 1370 \times R$ (back page)
 $R = 20\%$ interest ✓

g) What single rate of discount is equivalent to successive discounts of 20% and then 10%?

$Eq = 200 \times 0.8 = 160$
 $= 160 \times 0.9 = 144$
 $= 200 \times 0.72 = 144$ ✓
28% ✓

Mark

2