**ST. ROSE OF LIMA'S COLLEGE**
**HALF-YEARLY EXAMINATION 2018–2019**
**MATHEMATICS**

**FORM 2**

**ANSWER SHEET**

**Time Allowed: 1 hour 30 minutes**
**Total Marks: 100**

Name: _____ Class: _____ Class No: _____

**INSTRUCTIONS**

1. Answer **ALL** questions in Sections A, B and C.
2. Write your answers in the space provided.
3. **Unless otherwise specified**, numerical answers should be either **exact or correct to 3 significant figures**.

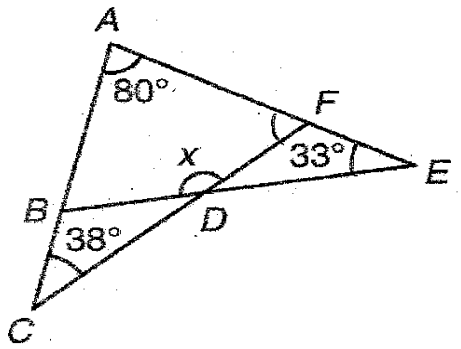
**SECTION B (50 marks)**

**1.** (a) Factorize $16x^2 - 25y^2$. (1 mark)

(b) Factorize $9x^2 + 24x + 16$. (2 marks)

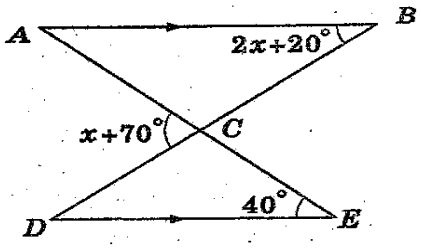
**2.** Simplify $\frac{m-n}{2+m} \div \frac{n-m}{2m+1}$. (3 marks)

**3.** In the figure, *ABC*, *BDE*, *CDF* and *EFA* are straight lines. Find $x$. (4 marks)




**4.** In the figure, *AE* and *DB* intersect at *C*.

(a) Find $x$. (3 marks)




(b) Is $\triangle ABC$ an isosceles triangle? Explain your answer. (2 marks)

**5.** Determine whether $2x(5x-3)+5=(10x+14)(x-2)+33$ is an identity. (4 marks)

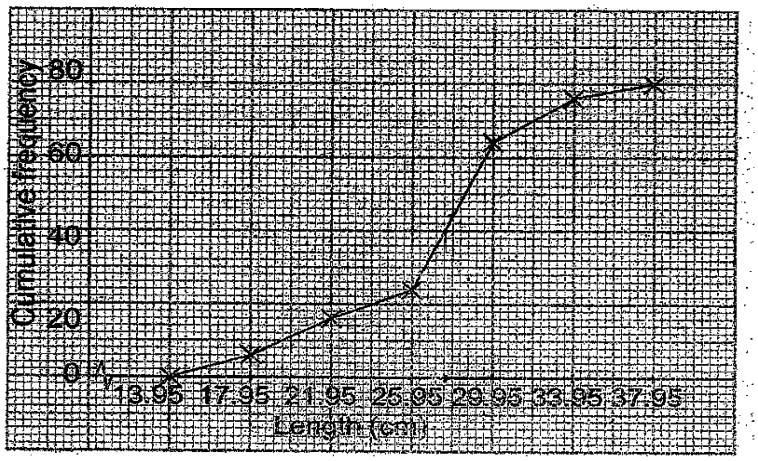
**6.** Consider the formula $\frac{m+2}{m}=\frac{5-n}{n}$.

(a) Make $n$ the subject of the formula. (3 marks)

(b) If $m=-6$, find the value of $n$. (2 marks)

7. The cumulative frequency polygon shows the lengths (in cm) of some books.

**Lengths of some books**




(a) How many books are there? (1 mark)

(b) What is the least possible length of the books? (1 mark)

(c) Find the median of the lengths of the books. (2 marks)

(d) If the longest 16 books are to be taken out from the bookshelf, find the minimum length of the book. (2 marks)

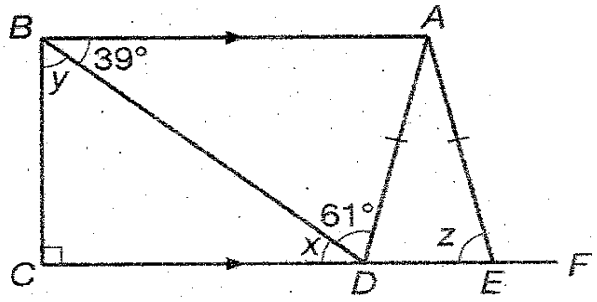
**9.** The weight of a newborn baby is measured to be 3.34 kg, and the percentage error of the measurement is 5%.

(a) Find the maximum absolute error. (2 marks)

(b) Find the range of the actual weight of the newborn baby. (2 marks)

(c) Is it possible that the actual weight of the baby is 3.5 kg? Explain your answer. (2 marks)

**10.** In the figure, $CDEF$ is a straight line. It is given that $BA \parallel CF$, $AD = AE$, $\angle BCD = 90°$, $\angle ABD = 39°$ and $\angle ADB = 61°$. Find $x$, $y$ and $z$. (8 marks)



**11.** Suppose that the actual length and width of a rectangular picture are 23.4 cm and 40.8 cm respectively.

(a) Round off the length and width of the picture to the nearest cm and then estimate its area. (3 marks)

(b) Find the absolute error of the estimated area of the box. (3 marks)

**-END OF SECTION B-**

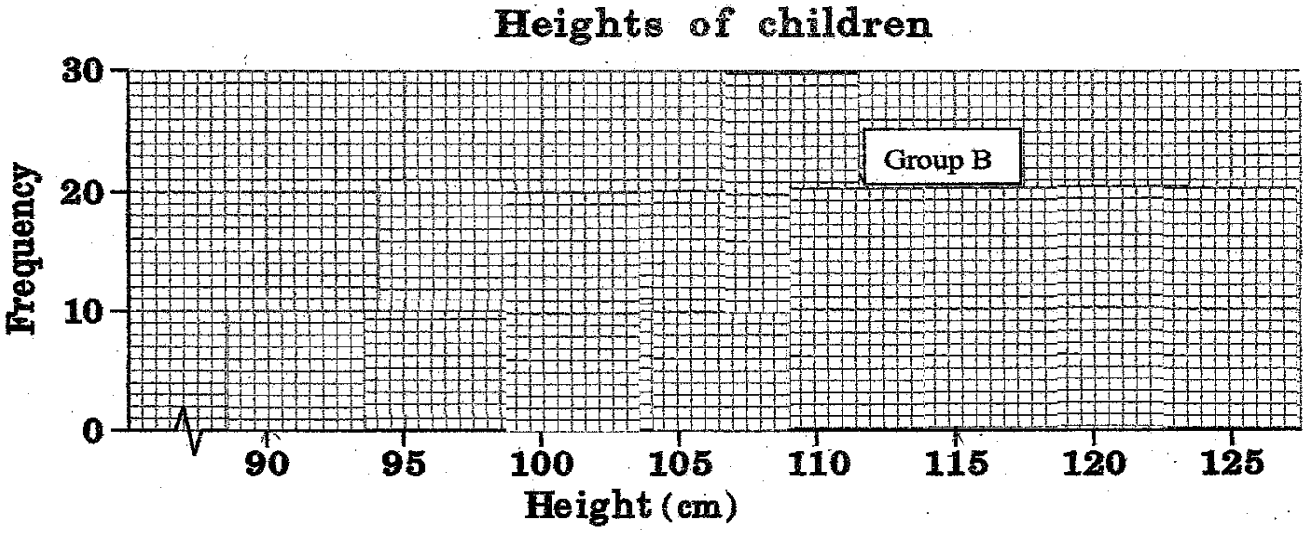
**SECTION C (20 marks)**

**12.** Some children are divided into two groups *A* and *B*. The frequency polygon below shows the distribution of the heights of group *B* children.

(a) The frequency distribution table below shows the heights of group *A* children. Complete the frequency distribution table. (4 marks)

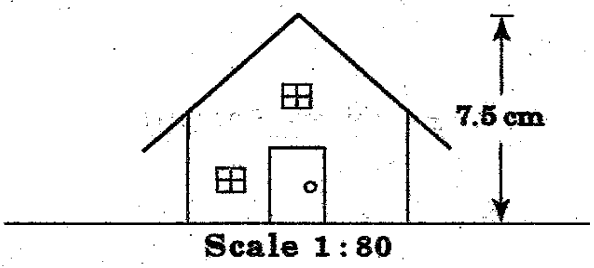
| Height (cm) | Class mark (cm) | Frequency |
|---|---|---|
| 93–97 | | 4 |
| 98–102 | | 10 |
| 103–107 | | 11 |
| 108–112 | | 5 |

(b) Construct a frequency polygon to present the data of group *A* children on the same diagram given below. (3 marks)




(c) Hence, determine whether group *A* or group *B* children are shorter on the whole. (2 marks)

**13.**




The figure shows a scale drawing of a house with a scale of 1 : 80. The height of the house in the drawing is 7.5 cm.

(a) Find the actual height of the house in m. (3 marks)

(b) A lamp post of height 8 m is built next to the house. If the lamp post is drawn on the scale drawing according to the given scale, find the height of the lamp post in the scale drawing in cm. (3 marks)

(c) The width of the door of the house is 1.8 cm shorter than its length in the scale drawing. If the ratio of the width to the length of the door is 13 : 25, find the length of the door in the scale drawing in cm. (3 marks)

Let the width of the door be $z$ cm, the length of the door is _____

(d) Hence, find the actual length of the door. (2 marks)

**-END OF SECTION C-**

**-END OF PAPER-**

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1819

1a) $16x^2 - 25y^2$
$= (4x)^2 - (5y)^2$
$= (4x+5y)(4x-5y)$

b) $9x^2 + 24x + 16$
$= (3x)^2 + 2(3x)(4) + 4^2$
$= (3x+4)^2$

2) $\frac{m-n}{2+m} \div \frac{n-m}{2m+1}$
$= \frac{m-n}{2+m} \times \frac{2m+1}{-(m-n)}$
$= \frac{2m+1}{-2-m}$

3) $\angle EFD = 38° + 80°$ (ext. $\angle$ of $\triangle$)
$= 118°$
$x = 33° + 118°$
$= 151°$

4a) $\angle CDE = \angle ABC$ (alt. $\angle$s, AB // DE)
$= 2x + 20°$
$\angle ACD = \angle CED + \angle CDE$ (ext. $\angle$ of $\triangle$)
$x + 70° = 2x + 20° + 40°$
$x = 10°$

b) $\angle ABC = 2(10°) + 20°$
$= 40°$
$\angle BAC = 40°$ (alt. $\angle$s, AB // DE)
$\because \angle ABC = \angle BAC = 40°$
$\therefore AC = BC$ (sides opp. equal $\angle$s)

5) LHS $= 2x(5x-3) + 5$
$= 10x^2 - 6x + 5$
RHS $= (10x+14)(x-2) + 33$
$= 10x^2 - 20x + 14x - 28 + 33$
$= 10x^2 - 6x + 5$
$\because$ LHS = RHS
$\therefore 2x(5x-3) + 5 \equiv (10x+14)(x-2) + 33$

6a) $\frac{m+2}{m} = \frac{5-n}{n}$
$n(m+2) = 5m - mn$
$n(m+2) + mn = 5m$
$n(m+2+m) = 5m$
$n = \frac{5m}{2m+2}$

b) If $m = -6$,
$n = \frac{5(-6)}{2(-6)+2}$
$= \frac{-30}{10}$
$= -3$

7a) 80 books

b) 13.95 cm

c) 27.55 cm

d) $80 - 16$
$= 64^{th}$.
Length of the books = 2295 cm

9a) $3.34 \times 5\% = 0.167\text{ kg}$

b) $3.173\text{kg} \leq x < 3.507\text{kg}$

c) $\because 3.173\text{kg} \leq 3.5\text{kg} < 3.507\text{kg}$

$\therefore$ It is possible.

10) $x = 39°$ (alt. $\angle$s, AB // CD)

$y = 180° - 90° - 39°$ ($\angle$ sum of $\triangle$)

$= 51°$

$\angle ADE = 180° - 61° - 51°$ (adj. $\angle$s on st. line)

$= 68°$

$z = 68°$ (base $\angle$s, isos $\triangle$)

11a) Length = 23cm

Width = 41cm

Estimated area $= 23 \times 41$

$= 943\text{ cm}^2$

b) Actual area $= 23.4 \times 40.8$

$= 954.72\text{ cm}^2$

The absolute error $= 954.72 - 943$

$= 11.72\text{ cm}^2$

12a)

Class mark

95

100

105

110

13a) $7.5 \times 80$

$= 600\text{cm}$

$= 6\text{m}$

b) $800 \times \frac{1}{80}$

$= 10\text{cm}$

c) $(z + 1.8)\text{cm}$

$\frac{z}{z+1.8} = \frac{13}{25}$

$25z = 13z + 23.4$

$z = 1.95$

The length of the door in scale drawing:

$1.95 + 1.8$

$= 3.75\text{cm}$

d) $3.75 \times 80$

$= 300\text{cm}$

$= 3\text{m}$