**St. Stephen's Girls' College**
**Final Examination 2017-2018**

**Form 2** **LC, WMC, LL, WYL, CYN**
**170 students**

**MATHEMATICS**
**Paper II**
**Time Allowed: 1 hour**

**Name: _____ No.: _____ Class: _____ Division: _____**

***Instructions:***

- *Answer **ALL** questions in the spaces provided in this **Question-Answer Paper**.*
- *All rough work should be done on the rough work paper provided, but will not be marked.*
- *The diagrams in this paper are not necessarily drawn to scale.*
- *Unless otherwise specified, numerical answer should be either exact or correct to 3 significant figures.*
- *This paper carries 100 marks.*

| Marks: |
| --- |
| / 100 |

| | | Answers | Marks |
|---|---|---|---|
| 1. | Simplify $\left(\frac{a}{b}\right)^3 \times a^4$. | 1. _____ | 2 |
| 2. | Expand the following expressions. | 2. | |
| | (a) $b\,(2b + 1)$ | (a) _____ | 1 |
| | (b) $(x + 3)(4 – 2x)$ | (b) _____ | 2 |
| 3. | If $x = 6$ is a solution of $3(x – 3) = 4(x + k) – 7$, find $k$. | 3. _____ | 3 |
| 4. | Determine whether the following statements are true or false and circle the correct answers. | 4. | |
| | (a) $2x^2 – 8 = 2(x – 2)^2$ | (a) True / False | 1 |
| | (b) $(9a – b)(9a + b) = 18a^2 – b^2$ | (b) True / False | 1 |
| | (c) $(–a + 4)^2 = (–4 + a)^2$ | (c) True / False | 1 |
| 5. | If $(2x + 3)(x + a) \equiv 2x^2 + b(x + 1)$, find the value of $a$. | 5. _____ | 3 |
| 6. | The volume of a solid is measured as 200 $cm^3$, correct to 2 significant figures. Find the upper limit of the actual volume of the solid. | 6. _____ | 2 |
| 7. | The base and the height of a triangle are measured as 6.0 cm and 2.0 cm correct to the nearest 0.5 cm respectively. Let $x$ $cm^2$ be the actual area of the triangle. Find the range of values of $x$. | 7. _____ | 3 |
| 8. | Solve $\begin{cases} x-4y=5 \\ x+4y=9 \end{cases}$. | 8. $x =$ _____ | 1 |
| | | $y =$ _____ | 1 |
| 9. | Mark bought 2 bars of chocolate and 2 bottles of apple juice for \$26. Susan bought 1 bar of chocolate and 4 bottles of apple juice for \$37. How much is a bottle of apple juice? | 9. _____ | 2 |
| 10. | (2, 3) is the solution of the simultaneous equations $\begin{cases} 4x+3y=17 \\ x-y=-1 \end{cases}$. Solve $\begin{cases} \frac{4}{x}+9y=17 \\ \frac{1}{x}-3y=-1 \end{cases}$. | 10. | |
| | | $x =$ _____ | 2 |
| | | $y =$ _____ | 2 |

**Subtotal:** / 27

11. The following frequency distribution table shows the time taken (in min) by a group of students to finish their lunch.

| Time (min) | 8 – 12 | 13 – 17 | 18 – 22 | 23 – 27 | 28 – 32 |
|---|---|---|---|---|---|
| Frequency | 6 | 12 | 18 | 10 | 4 |

11.

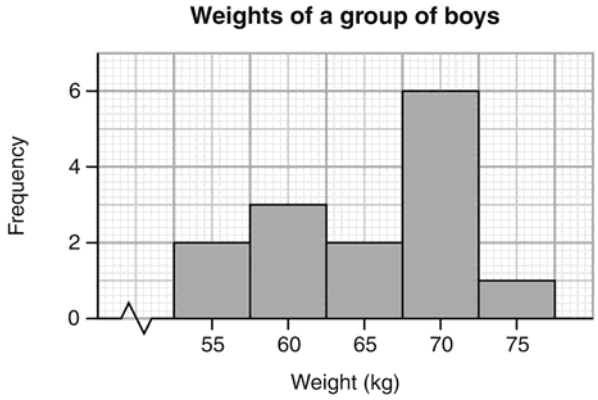
(a) If the time taken by a student is 27.5 minutes, which class interval does it belong to? (a) _____ 1

(b) Find the class width of each class interval. (b) _____ 1

(c) Find the percentage of students who finish their lunch in less than 17.5 minutes. (c) _____ 2

12. The following histogram shows the weight distribution of a group of boys.

12.

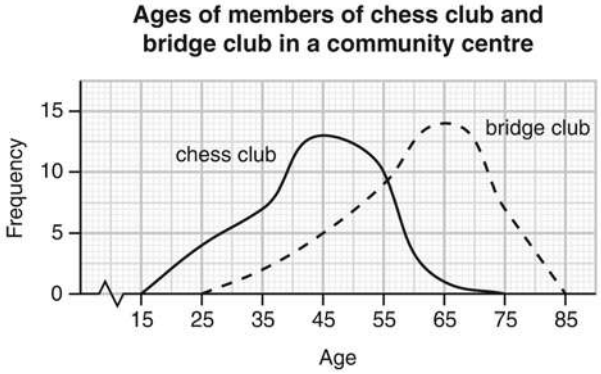



(a) How many boys are in the group? (a) _____ 2

(b) What is the lowest possible weight of the heaviest boy? (b) _____ 2

13. The following frequency curves show the distribution of the ages of members of the chess club and the bridge club in a community centre. Determine whether the members of the chess club or the bridge club are older on the whole.

13. _____ 1




14. A shop sells 518 pairs of shoes in 2 weeks. Express the rate of selling shoes in pairs/day.

14. _____ 2

**Subtotal:** **/ 11**

15. Jay's home is 1.8 km from his office. His average walking speed is 1.2 m/s. If he leaves home and walks to his office at 6:30 a.m., when will he arrive at his office? 15. _____ 3

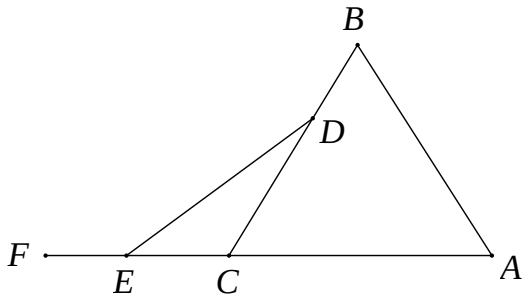
16. If $6x = 7y$, find $x : y$. 16. _____ 2

17. If $a : b = 4 : 9$ and $a : c = 3 : 7$, find $a : b : c$. 17. _____ 2

18. The prices of a book and a dictionary are in the ratio 4 : 5, and the price of the book is \$50 lower than that of the dictionary. Find the price of the book. 18. _____ 2

19. If the length of a highway on a map is 8 cm and its actual length is 12 km, express the scale of the map in the form $1 : n$. 19. _____ 2

20. In the figure, $ACEF$ and $BDC$ are straight lines, $\Delta ABC$ is an equilateral triangle and $\angle CDE = 22°$. Find $\angle DEF$. 20. _____ 3

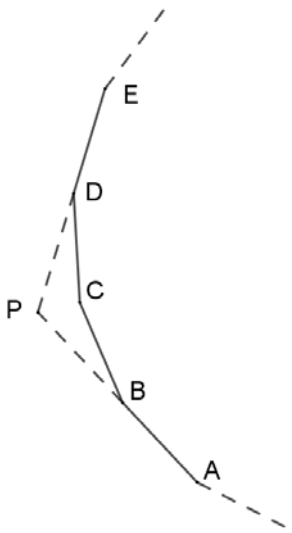



21. In $\Delta ABC$, $AB = AC$ and $\angle B = 46°$. Find $\angle A$. 21. _____ 2

22. Find the sum of interior angles of a 22-sided polygon. 22. _____ 3

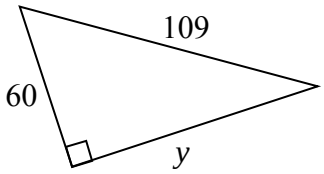
23. The size of each interior angle of a regular $n$-sided polygon is 150°. Find the value of $n$. 23. _____ 3

24. In the figure, $ABCDE$ is a part of a regular polygon. $AB$ produced and $ED$ produced intersect at $P$. If $\angle C = 162°$, find $\angle P$. 24._____ 3



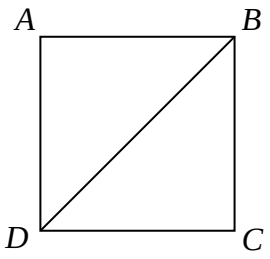

**Subtotal:** **/ 25**

25. In the figure, find the value of $y$.




25. _____ 2

26. In the figure, $ABCD$ is a square. If the area of $ABCD$ is 32, find the length of $BD$.

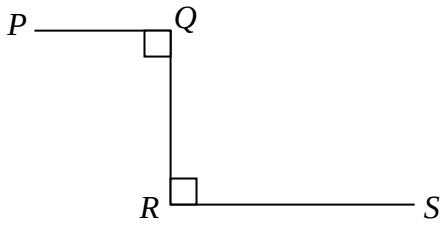



26. _____ 2

27. In $\Delta DEF$, $\angle E = 90°$ and $DE = 20$ cm. If the area of $\Delta DEF$ is 210 cm$^2$, find the perimeter of $\Delta DEF$.

27. _____ 3

28. In the figure, $PQ = x$ cm, $QR = 8$ cm and $RS = 10$ cm. If the distance between $P$ and $S$ is $(x + 12)$ cm, find the value of $x$.




28. _____ 3

29. Simplify the following expressions:

(a) $\sqrt{48} + \sqrt{12}$

(b) $\sqrt{3} \times \sqrt{18}$

29.

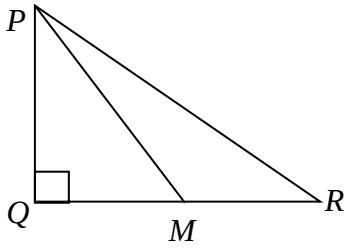
(a) _____ 2

(b) _____ 2

30. In the figure, $M$ is the mid-point of $QR$. If $PQ = 5$ and $QR = 8$, find

(a) $\angle PMQ$,

(b) $\angle MPR$.



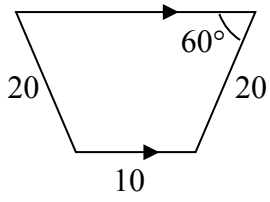

30.

(a) _____ 2

(b) _____ 3

31. In the figure, find the area of the trapezium.

(Leave the radical sign "$\sqrt{\ }$" in the answer.)




31. _____ 3

**Subtotal:** **/ 22**

32. In $\Delta ABC$, $\angle B = 90°$, $AC = 5$ and $BC = 4$.

Find $\angle A$ and $\angle C$.

32.

$\angle A =$ _____ 2

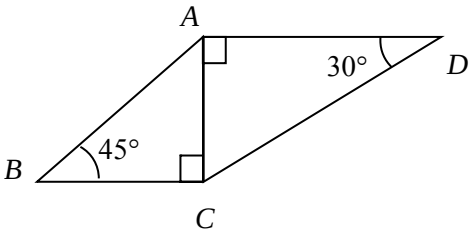
$\angle C =$ _____ 2

33. In the figure,

$AB : CD = 1 : n$.

Find the value of $n$.

(Leave the radical sign "$\sqrt{\ }$" in the answer.)




33. _____ 3

34. If $x$ is an acute angle such that $\cos x = \frac{4}{7}$, find the value of $\tan x$ in surd form. Simplify and rationalize the denominator of your answer if necessary.

34. _____ 3

35. Find the acute angle $x$ in each of the following.

35.

(a) $\tan 2x = \frac{1}{\tan 30°}$

(a) _____ 2

(b) $\cos 5x = \sin 4x$

(b) _____ 3

**Subtotal:** **/ 15**

**---End of Paper ---**