St. Stephen's Girls' College
Final Examination 2021-2022

Form 2 **LL, SCHL, TYL, CYN**
145 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 answers should be either exact or correct to 3 significant figures.*
- *This paper carries 100 marks.*

Marks:
/ 100

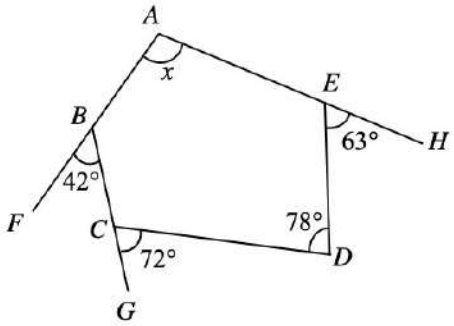
		Answers	Marks
1.	Determine whether each of the following is an identity. Circle the correct answers.	1.	
	(a) $(2y + 3)^2 = 4y^2 + 6y + 9$	(a) Yes / No	1
	(b) $(a - 5)^2 = a^2 - 25$	(b) Yes / No	1
2.	Factorize the following expressions.	2.	
	(a) $18x^2y + 12xy^3$	(a) _____	2
	(b) $9a(5b - 7a) + 7a - 5b$	(b) _____	2
3.	If $(P - x)(3 + x) \equiv -x^2 - Qx + 9$, where P and Q are constants, find the values of P and Q.	3. P = _____	1
		Q = _____	1
4.	A train travels at a speed of 42 km/h. How long does the train take to travel 294 km?	4. _____	2
5.	Simplify 250 mL : 2 L.	5. _____	2
6.	If $a:b = 2:5$ and $4a = 3c$, find $a:b:c$.	6. _____	2
7.	The scale of a map is 1 : 4 000. If the distance between a restaurant and a cinema on the map is 5 cm, find the actual distance between the two places in km.	7. _____	3
8.	Change the subject of the following formula to the letter in the square brackets. $a = \frac{3b+4c}{5}$ [b]	8. _____	2
9.	Simplify $\frac{3x}{4(x-5)} - \frac{x}{6(5-x)}$.	9. _____	3
10.	Solve the simultaneous equations $\begin{cases} 5x + 2y = 11 \\ 2x - 3y = 12 \end{cases}$.	10. x = _____	1
		y = _____	1
11.	The total price of 4 rulers and 9 rubber erasers is \$55. If the price of a ruler is higher than that of a rubber eraser by \$4, find the price of a ruler.	11. _____	3
		Subtotal:	**/ 27**

12. It is given that the graph of the equation $4x-5y=8$ passes through $A(a+3, a)$ and the point B on the x-axis. Find the value of a and the coordinates of B.

12. $a =$ _____ 2

$B = (\_\_\_\_, \_\_\_\_)$ 2

13. In the figure, ABF, BCG and AEH are straight lines. Find x.

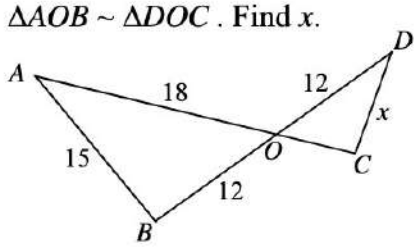


13. $x =$ _____ 3

14. If 5 times an exterior angle of a regular polygon is less than its interior angle by $60°$, find the number of sides of the regular polygon.

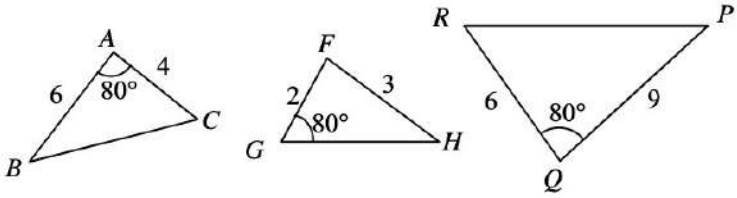
14. _____ 3

15. In the figure, $\Delta AOB \sim \Delta DOC$. Find x.



15. $x =$ _____ 2

16. In the figure, name a pair of similar triangles and give reasons.

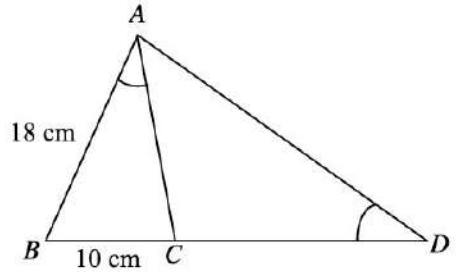


16. _____ 2

Reason:

_____ 1

17. In the figure, BCD is a straight line and $\angle BAC = \angle BDA$. $AB = 18$ cm and $BC = 10$ cm. Find CD.



17. _____ 3

18. (a) Round off 195.7648 to 3 significant figures.

(b) Round up 195.7648 to 2 decimal places.

(c) Round down 195.7648 to the nearest integer.

18.

(a) _____ 1

(b) _____ 1

(c) _____ 1

Subtotal: **/ 21**

19. How many significant figures are there in each of the following numbers?

(a) 0.10340

(b) 850 000 (correct to the nearest thousand)

19. (a) _____ 1

(b) _____ 1

20. If the time to cook a fish well is measured as 9 minutes with a percentage error of 4%, find the maximum absolute error in second.

20. _____ 3

21. The lifetime of a light bulb is measured as 1800 hours, correct to the nearest 3 hours. Find the relative error and give your answer in the form of $\frac{1}{n}$.

21. _____ 3

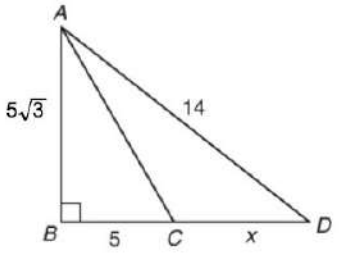
22. The length of a pen is measured as x cm by using a ruler with a scale interval of 1 mm. If the percentage error is 0.4%, find the value of x.

22. _____ 3

23. X and Y are two square plots of land. The length of each side of X is 4 km. The area of Y is 4 times that of X. Find the length of each side of Y.

23. _____ 3

24. In the figure, BCD is a straight line. Find the value of x.



24. _____ 3

25. Which of the following is/are true? Circle the correct answers.

(a) $\sqrt[3]{27} = 3$ or -3

(b) $\sqrt{\frac{1}{4^2}} = \frac{1}{4}$

25. (a) Yes / No 1

(b) Yes / No 1

26. Which of the following numbers is/are rational number(s)? Circle the correct answers.

(a) π

(b) $\sqrt{16}$

(c) $0.\dot{5}$

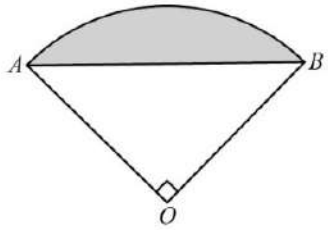
26. (a) Yes / No 1

(b) Yes / No 1

(c) Yes / No 1

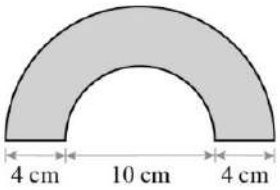
Subtotal: **/ 22**

27. In the figure, AOB is a sector with centre O. If the area of the shaded region is $50\ cm^2$, find the length of OA correct to 3 significant figures.



27. _____ 3

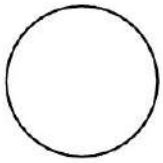
28. The following figure is formed by semi-circles and straight lines.

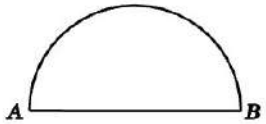


(a) Find its perimeter correct to 3 significant figures.
(b) Find its area correct to 3 significant figures.

28.
(a) _____ 2
(b) _____ 2

29. The figure shows a circle and a semi-circle. It is given that the circumference of the circle is equal to the length of $\overset{\frown}{AB}$. Which of the following is/are true? Circle the correct answers.

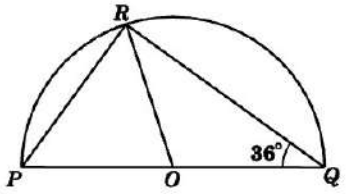




(a) The radius of the semi-circle is twice the radius of the circle.
(b) The area of the semi-circle is twice the area of the circle.

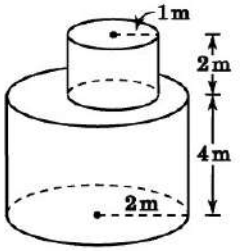
29.
(a) Yes / No 1
(b) Yes / No 1

30. In the figure, PRQ is a semi-circle with centre O and $\angle PQR = 36°$. If the radius of the semi-circle is 1 cm, find $\overset{\frown}{PR} : \overset{\frown}{RQ}$.



30. _____ 3

31. In the figure, the solid is formed by two right circular cylinders. Find the total surface area of the solid. (Give your answer correct to 3 significant figures.)

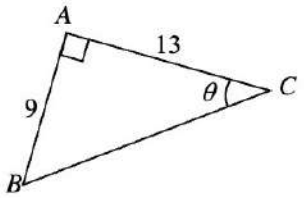


31. _____ 3

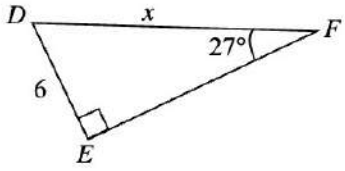
Subtotal: **/ 15**

32. In each of the following figures, find the unknown. (Give your answers correct to 3 significant figures if necessary.)

(a)



(b)



32.

(a) $\theta =$ _____ 2

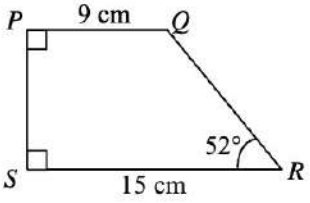
(b) $x =$ _____ 2

33. Find the acute angle θ in the following correct to the nearest degree.

$$\tan\theta = \frac{\tan 30°}{2} + 1$$

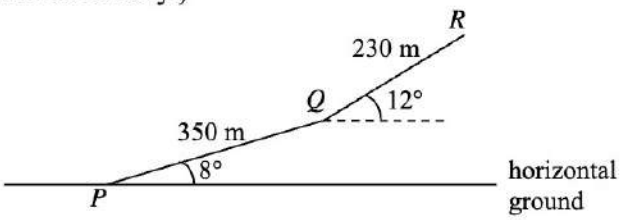
33. _____ 2

34. In the figure, *PQRS* is a trapezium. Find the area of *PQRS*. (Give your answer correct to 3 significant figures if necessary.)



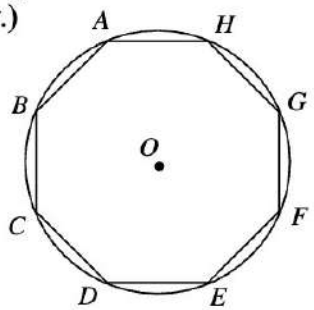
34. _____ 3

35. In the figure, *PQ* and *QR* are two inclined roads. *PQ* = 350 m and *QR* = 230 m. It is known that the angles made by *PQ* and *QR* with the horizontal are 8° and 12° respectively. Find the vertical distance from *R* to the horizontal ground. (Give your answer correct to 3 significant figures if necessary.)



35. _____ 3

36. In the figure, *O* is the centre of a circle of radius 10 cm. *A*, *B*, *C*, *D*, *E*, *F*, *G* and *H* are points on the circle such that *ABCDEFGH* is a regular octagon. Find the perimeter of *ABCDEFGH*. (Give your answer correct to 3 significant figures if necessary.)



36. _____ 3

Subtotal: **/ 15**

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答案

1. a) No
   b) No
2. a) $6xy(3x+2y^2)$
   b) (5b – 7a)(9a – 1) or (7a – 5b)(1 – 9a)
3. P = 3
   Q = 0
4. 7 h
5. 1 : 8
6. 6 : 15 : 8
7. 0.2 km
8. $b = \frac{5a-4c}{3}$
9. $\frac{11x}{12(x-5)}$ or $-\frac{11x}{12(5-x)}$
10. x = 3
    y = -2
11. $7
12. a = 4
    B = (2, 0)
13. x = 99°
14. 18
15. x = 10
16. $\Delta ABC \sim \Delta QPR$
    Reason: ratio of 2 sides, inc. $\angle$
17. 22.4 cm
18. a) 196
    b) 195.77
    c) 195
19. a) 5
    b) 3
20. 21.6 s
21. $\frac{1}{1200}$
22. 12.5
23. 8 km
24. 6

25. a) No
    b) Yes
26. a) No
    b) Yes
    c) Yes
27. 13.2 cm
28. a) 52.0 cm
    b) 88.0 cm^2
29. a) Yes
    b) Yes
30. 2 : 3
31. 88.0 m^2
32. a) $\theta = 34.7^\circ$
    b) x = 13.2
33. 52°
34. 92.2 cm^2
35. 96.5 m
36. 61.2 cm