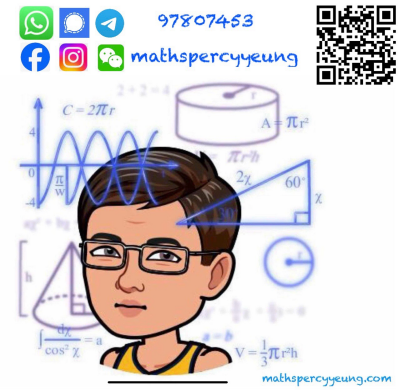
20-21 F.4
2nd TERM EXAM
MATH CP
PAPER 2
MC



2020 – 2021
Form 4 Second Term Examination

MATHEMATICS Compulsory Part

PAPER 2

17th June, 2021
10:15 am – 11:15 am (1 hour)

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF PAPER**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

There are 25 questions in Section A and 11 questions in Section B.
The diagrams in this paper are not necessarily drawn to scale.
Choose the best answer for each question.

Section A

1. $0.0023456789 =$
   A. 0.00235 (correct to 6 decimal places).
   B. 0.002345 (correct to 6 decimal places).
   C. 0.002346 (correct to 6 significant figures).
   D. 0.00234568 (correct to 6 significant figures).

2. $\dfrac{8^{2x}\cdot 4^{3x}}{2^{x}\cdot 16^{2x}} =$
   A. 2^{x}.
   B. 2^{2x}.
   C. 2^{3x}.
   D. 8.

3. $\dfrac{2a}{a^2-4b^2} + \dfrac{1}{2b-a} =$
   A. $\dfrac{1}{a+2b}$.
   B. $\dfrac{2a-1}{(a+2b)(a-2b)}$.
   C. $\dfrac{2a+1}{(a+2b)(a-2b)}$.
   D. $\dfrac{3a+2b}{(a+2b)(a-2b)}$.

4. If $a : b = 1 : 2$ and $b : c = 1 : 3$, then $(a+b):(b+c) =$
   A. $5 : 8$.
   B. $3 : 8$.
   C. $3 : 4$.
   D. $2 : 3$.

5. If the roots of the equation $x^2+ax+5=0$ are equal, then $a =$
   A. ± 20.
   B. ± 10.
   C. $\pm 4\sqrt{5}$.
   D. $\pm 2\sqrt{5}$.

6. If $x^2+2ax+7 \equiv (x-1)(bx-3)+4$, then
   A. $a=-2,\ b=-2$.
   B. $a=-2,\ b=1$.
   C. $a=-2,\ b=-1$.
   D. $a=1,\ b=-1$.

7. If $3^{2x}\left(9^{x}\right)=27$, then $x =$
   A. $\dfrac{1}{2}$.
   B. $\dfrac{1}{3}$.
   C. $\dfrac{2}{3}$.
   D. $\dfrac{3}{4}$.

8. If $f(x)=\dfrac{x}{1+x}$, find the value of $f(3)\bullet f\left(\dfrac{1}{2}\right)$.

A. $\dfrac{9}{4}$

B. $\dfrac{3}{5}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{12}$

9. A child spent $\dfrac{1}{10}$ of his saving on a shirt and $\dfrac{1}{5}$ of his savings on a pair of trousers. He then spent 30% of the rest of his savings on books. What percentage of his saving did he spend altogether?

A. 58%

B. 51%

C. 50.4%

D. 49.6%

10. Set up a quadratic equation in x whose roots are $\dfrac{1}{k}$ and $\dfrac{1}{2k}$.

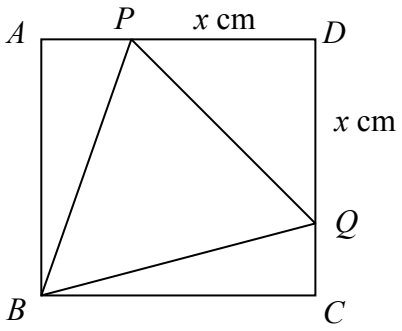
A. $x^2-3kx+2k^2=0$

B. $x^2+3kx+2k^2=0$

C. $2k^2x^2-3kx+1=0$

D. $2k^2x^2+3kx+1=0$

11. In the figure, $ABCD$ is a square of side 10 cm. $PD = QD = x$ cm. If the area of $\Delta BPQ=42\text{cm}^2$, find the value(s) of x.



A. 4 or 6

B. 4

C. 6

D. 7

12. Let $f(x)=(x+3)(2x-5)$. If $f(k)=2k$, then $k=$

A. -3.

B. $\pm\sqrt{\dfrac{15}{8}}$.

C. -3 or $\dfrac{5}{2}$.

D. $-\dfrac{5}{2}$ or 3.

13. Let k be a constant. Solve the equation $(x-k)^2=4k^2$.

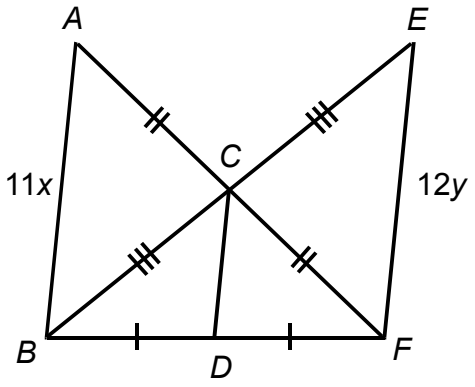
A. $x=3k$

B. $x=5k$

C. $x=-k$ or $x=3k$

D. $x=-3k$ or $x=5k$

14. In the figure, ACF, BCE and BDF are straight lines. Find $x : y$.



A. 24 : 11

B. 12 : 11

C. 6 : 11

D. 1 : 1

15. When $x^{2009}+x^{2008}+x^{2007}+\cdots+x$ is divided by $x + 1$, the remainder is

A. -1.

B. 0.

C. 1.

D. 2009.

16. If $3^x+3^{-x}=4$, then $9^x+9^{-x}=$

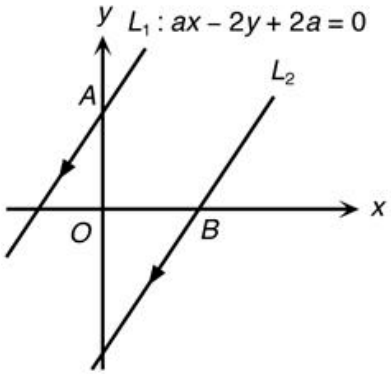
A. 18.

B. 16.

C. 14.

D. 12.

17. In the figure, the straight lines $L_1 : ax-2y+2a=0$ and L_2 are parallel. If $OA = OB$, find the equation of L_2.



A. $y=-\frac{a}{2}x+a$

B. $y=-\frac{a}{2}x-\frac{a^2}{2}$

C. $y=\frac{a}{2}x+a$

D. $y=\frac{a}{2}x-\frac{a^2}{2}$

18. When a polynomial $P(x)$ is divided by $12 - 8x$, the remainder is R. Find the remainder when $P(x)$ is divided by $2x - 3$.

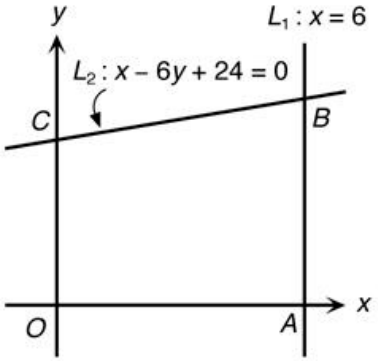
A. $2R$

B. R

C. $\frac{R}{2}$

D. $\frac{R}{4}$

19. In the figure, $OABC$ is a trapezium. Find the area of trapezium $OABC$.



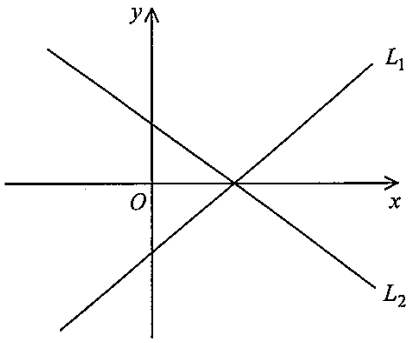
A. 27 sq. units

B. 30 sq. units

C. 33 sq. units

D. 36 sq. units

20. In the figure, the straight lines $L_1 : y = ax + b$ and $L_2 : y = cx + d$ intersect at a point on the positive x-axis. Which of the following must be true?



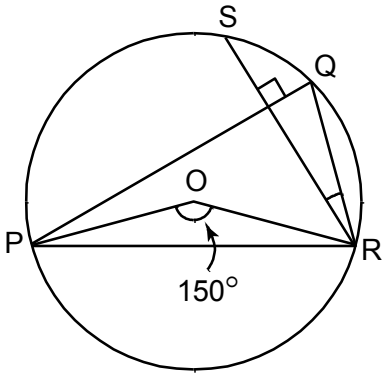
A. $ab > 0$

B. $cd > 0$

C. $ac = bd$

D. $ad = bc$

21. In the figure, PQ and RS are perpendicular chords. O is the centre of the circle and $\angle POR = 150°$. $\angle SRQ =$



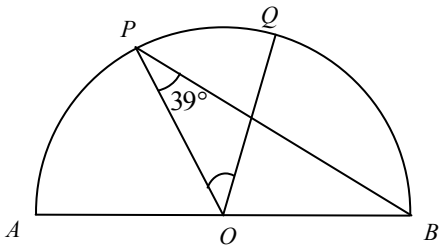
A. 15°.

B. 18°.

C. 25°.

D. 27°.

22. In the figure, AB is the diameter of the semi-circle with centre O. The length of arc BQ is twice the length of arc PQ, $\angle POQ =$



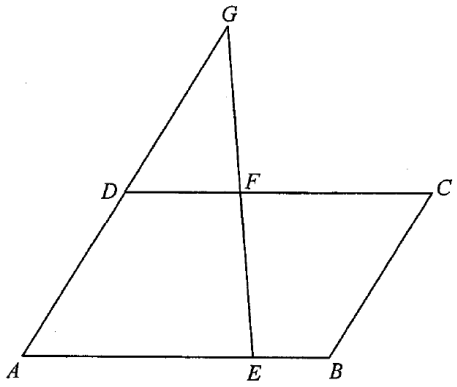
A. 34°.

B. 37°.

C. 39°.

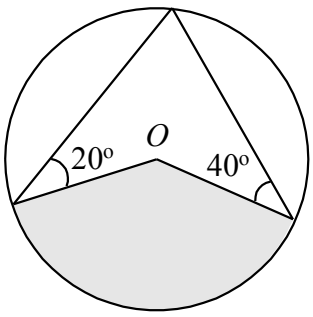
D. 41°.

23. In the figure, $ABCD$ is a parallelogram. E and F are points lying on AB and CD respectively. AD produced and EF produced meet at G. It is given that $DF : FC = 3 : 4$ and $AD : DG = 1 : 1$. If the area of ΔDFG is 3 cm^2, then the area of the parallelogram $ABCD$ is



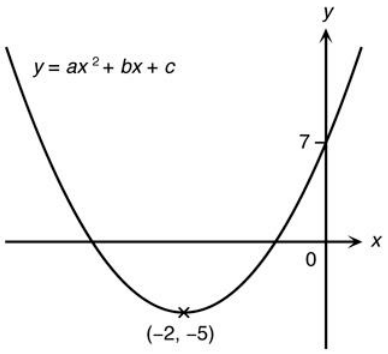
A. 12 cm^2.
B. 14 cm^2.
C. 18 cm^2.
D. 21 cm^2.

24. In the figure, O is the centre of the circle of radius 6 cm. The area of the shaded part is



A. 2π cm^2.
B. 4π cm^2.
C. 9π cm^2.
D. 12π cm^2.

25. The figure shows the graph of $y = ax^2 + bx + c$. The coordinates of its vertex are $(-2, -5)$. Which of the following must be true?



I. The axis of symmetry is $x = -5$.
II. $b < 0$
III. $b^2 > 28a$

A. I only
B. II only
C. III only
D. I and III only

Section B

26. Given that the H.C.F. and L.C.M. of $32a^2b^3c^4$ and a monomial are $8bc^4$ and $160a^2b^3c^5$ respectively, find the monomial.

A. $40bc^5$
B. $80bc^5$
C. $40abc$
D. $80a^2b^3c^5$

27. $a^0 \bullet \sqrt{a^{-1}} \bullet \sqrt[3]{a^{-2}} =$

A. 0.
B. 1.
C. $a^{\frac{1}{3}}$.
D. $\dfrac{1}{a^{\frac{7}{6}}}$.

28. If $\log x^2 + \log y^2 = \log z^2$, where x, y and z are positive numbers, which of the following must be true?

I. $x^2y^2 = z^2$

II. $\log x + \log y = \log z$

III. $x^2 + y^2 = z^2$.

A. I only

B. II only

C. I and II only

D. I, II and III

29. Given α and β are the roots of the quadratic equation $x^2 - 14x + k = 0$ and $(\alpha + 1)(\beta + 1) = -7$, then $k =$

A. −22.

B. −6.

C. 2.

D. 6.

30. If $2 = 3^x$ and $3 = 2^y$, then $xy =$

A. $\frac{2}{3}$.

B. 1.

C. $\frac{3}{2}$.

D. 2.

31. Solve the equation $\log_7(4x + 5) = 0$.

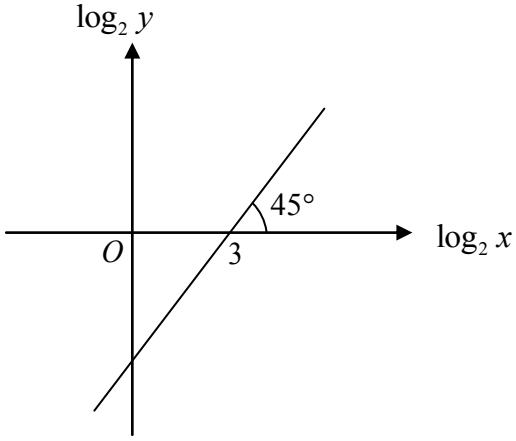
A. $x = -\frac{5}{4}$

B. $x = -1$

C. $x = 0$

D. $x = \frac{1}{2}$

32. The graph in the figure shows the linear relation between $\log_2 y$ and $\log_2 x$. If $y = kx^n$, then $k =$



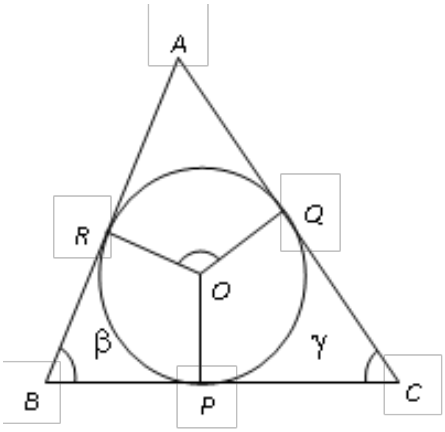
A. -3.

B. $-\frac{1}{8}$.

C. $\frac{1}{8}$.

D. 1.

33. In the figure, the circle with centre O touches the three side of ΔABC at P, Q and R. $\angle B = \beta$, $\angle C = \gamma$. $\angle ROQ =$



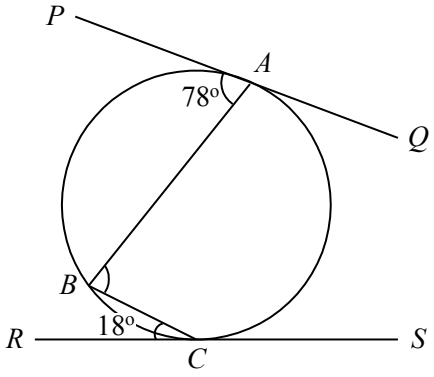
A. $\beta + \gamma$.

B. $(\beta + \gamma) - 180°$.

C. $90° - (\beta + \gamma)$.

D. $180° - (\beta + \gamma)$.

34. In the figure, PQ and RS touch the circle at A and C respectively. $\angle ABC =$



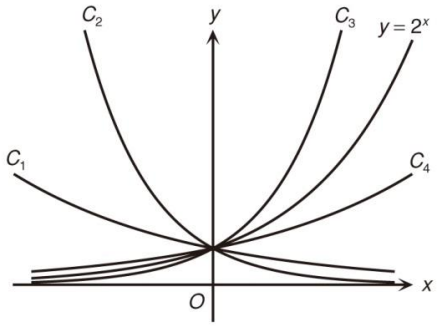
A. 90^o.

B. 84^o.

C. 60^o.

D. 48^o.

35. The figure shows the graph of $y = 2^x$ and four curves C_1, C_2, C_3 and C_4. Which of the curves can be the graph of $y = \left(\frac{2}{3}\right)^x$?



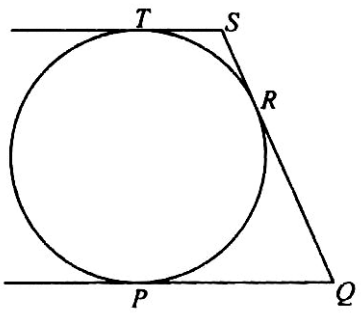
A. C_1

B. C_2

C. C_3

D. C_4

36. In the figure, TS, SQ and QP are tangents to the circle at T, R and P respectively. If $TS \,//\, PQ$, $TS = 3$ and $QP = 12$, then the radius of the circle is



A. 12.

B. 9.

C. 7.5.

D. 6.

End of Paper