20-21 F.4
2nd TERM UT
MATH CP

2020 – 2021

Form 4 Second Term Uniform Test

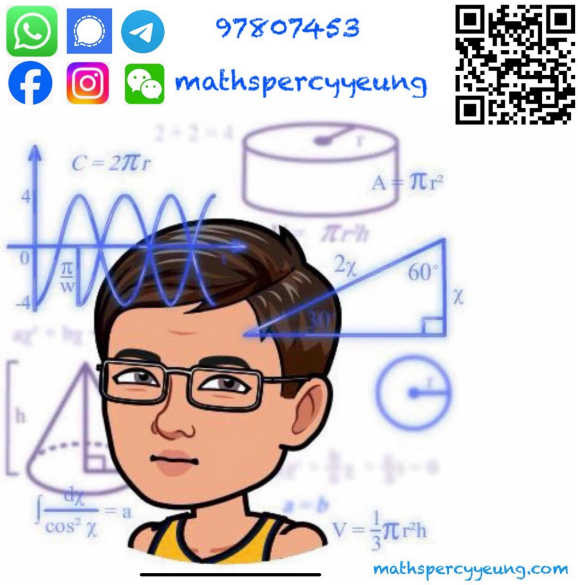
MATHEMATICS

Question–Answer Book

22nd April, 2021

8:15 am – 9:30 am (1 hour 15 minutes)

This paper must be answered in English



Sections	Marks
A Total	**/26**
B (14 – 17)	
B (18 – 20)	
B Total	**/31**
C Total	**/13**
TOTAL	**/70**

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. Answer ALL questions in Section A. You are advised to use an HB pencil to mark all the 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. You should mark only ONE answer for each question. If you mark more than one answer, you will receive NO MARKS for that question.

3. Attempt ALL questions in Sections B and C. Write your answers in the spaces provided in this Question – Answer Book.

4. Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.

5. The diagrams in this paper are not necessarily drawn to scale.

Section A (26 marks)

Choose the best answer for each question.

1. $\dfrac{(a^2b^{-3})^2}{a^{-2}b}$ =

   A. $\dfrac{a^2}{b^7}$.

   B. $\dfrac{a^2}{b^5}$.

   C. $\dfrac{a^6}{b^6}$.

   D. $\dfrac{a^6}{b^7}$.

2. $\dfrac{6}{x^2-9}-\dfrac{5}{x^2+x-6}$ =

   A. $\dfrac{1}{(x-2)(x-3)}$.

   B. $\dfrac{1}{(x+2)(x+3)}$.

   C. $\dfrac{1}{(x+2)(x-3)}$.

   D. $\dfrac{1}{(x-2)(x+3)}$.

3. The marked price of a book is \$240. If the book is sold at a discount of 20%, the profit will be 20% of the cost price. What is the cost price of the book?

   A. \$153.6

   B. \$160

   C. \$192

   D. \$200

4. If x and y are non-zero numbers such that $\dfrac{6x+5y}{3y-2x}=7$, then $x:y=$

   A. $5:4$.

   B. $4:13$.

   C. $4:5$.

   D. $13:4$.

5. If p and q are constants such that $px(x-1)+x^2\equiv qx(x-2)+4x$, then $p=$

   A. 1.

   B. 2.

   C. 3.

   D. 4.

6. The equation of the straight line passing through (1, −1) and perpendicular to the x-axis is

   A. $x-1=0$.

   B. $x+1=0$.

   C. $y-1=0$.

   D. $y+1=0$.

7. $\dfrac{b^{\frac{1}{2}}}{b(m^{\frac{3}{2}}n^{-\frac{7}{5}})^0} =$

A. $b^{\frac{1}{2}}$.

B. $\dfrac{1}{b^{\frac{1}{2}}}$.

C. $\dfrac{n^{\frac{7}{5}}}{b^{\frac{1}{2}}m^{\frac{3}{2}}}$.

D. $\dfrac{b^{\frac{1}{2}}n^{\frac{7}{5}}}{m^{\frac{3}{2}}}$.

8. $\sqrt[n]{2^{2n}\times 3^n}$ =

A. 12.

B. 12^n.

C. 6.

D. 6^n.

9. Let a and b be constants. If $3x^3-ax^2+5x-3b$ is divisible by $x+3$, then $3a+b=$

A. 32.

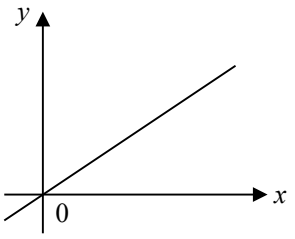
B. 22.

C. −22.

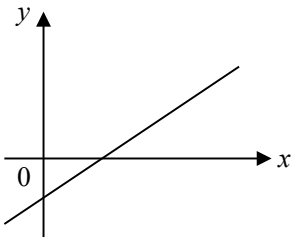
D. −32.

10. If a, b and c are positive real numbers, which of the following graphs could represent the line $ax + by + c = 0$?

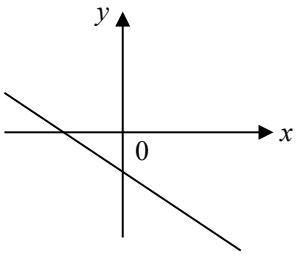
A.



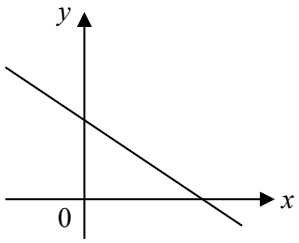
B.



C.



D.



11. Two perpendicular straight lines $kx+y-4=0$ and $x-2y+3=0$ intersect at the point (h,k). Find h and k.

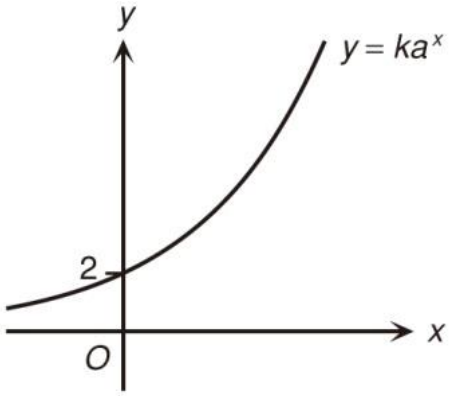
A. $h=-3, k=2$

B. $h=1, k=2$

C. $h=-4, k=-\dfrac{1}{2}$

D. $h=-7, k=-2$

12. In the figure, the y-intercept of the graph of $y = ka^x$ is 2. Find the value of k.



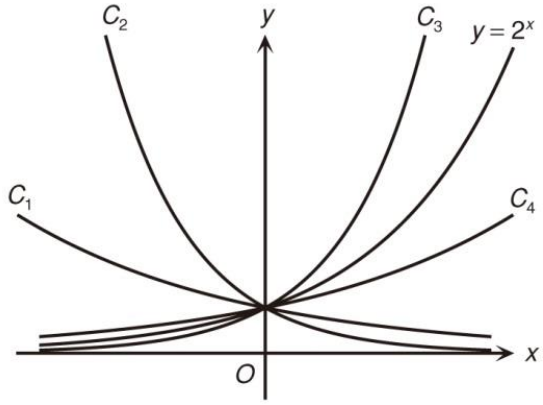
A. $\frac{1}{2}$

B. $-\frac{1}{2}$

C. -2

D. 2

13. 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 $y = 3^x$?



A. C_1

B. C_2

C. C_3

D. C_4

Section B(1) (14 marks)

14. Simplify $\frac{(a^{-1}b^2)^3}{a^{-5}}$ and express with positive indices. (3 marks)

15. Make m the subject of the formula $\frac{m}{p} = \frac{m-3}{6}$. (3 marks)

16. (a) Factorize $x^2 - 4y^2$.

(b) Factorize $5x^2 - 7xy - 6y^2$.

(c) Simplify $\dfrac{x^2 - 4y^2}{5x^2 - 7xy - 6y^2}$.

(4 marks)

17. In a football league, each team gains 3 points for a win, 1 point for a draw and 0 point for a loss. The champion of the league plays 36 games and gains a total of 84 points. Given that the champion does not lose any games, find the number of games that the champion wins.

(4 marks)

Section B(2) (17 marks)

18. Solve the simultaneous equations $\begin{cases} 36^x(6^y)=216 \\ \dfrac{10^{2x}}{10^y}=1 \end{cases}$. (5 marks)

19. $f(x)=5^x+10$.

(a) Find $f(x+1)-f(x)$. (3 marks)

(b) Solve the equation $f(x+1)-f(x)=\dfrac{4}{25}$. (3 marks)

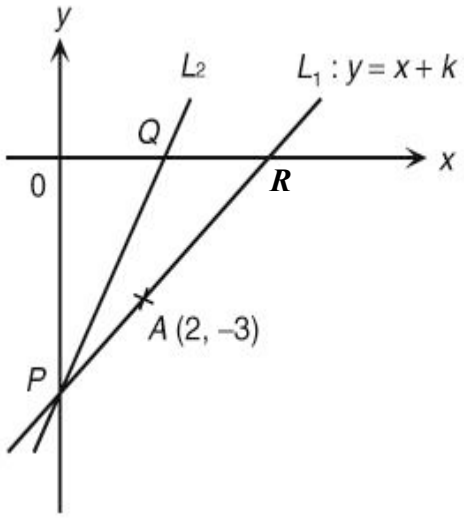
20. Let $f(x) = ax^3 - 6x^2 + bx + 10$ and $g(x) = bx^3 - ax^2 - 27x + 9$. It is given that $f(x)$ is divisible by $x - 2$, and the remainder when $g(x)$ is divided by $x + 2$ is 35.

(a) Find the values of a and b. (3 marks)

(b) Cherry claims that $f(x)$ and $g(x)$ have common factor(s). Do you agree? Explain your answer. (3 marks)

Section C (13 marks)

21. In the figure, the straight line L_1: $y = x + k$ passes through $A(2, -3)$ and cuts the x-axis and y-axis at R and P respectively. The straight line L_2 cuts the x-axis and the y-axis at Q and P respectively. The slope of L_2 is 2 times that of L_1.



(a) (i) Find the value of k.

(ii) Hence, find the coordinates of P. (3 marks)

(b) Find the equation of L_2. (2 marks)

(c) (i) Find the coordinates of Q.

(ii) Find the shortest distance from Q to L_1.

(5 marks)

(d) Given that L_3 passes through Q and is perpendicular to L_2, find the equation of L_3. (3 marks)

End of Paper