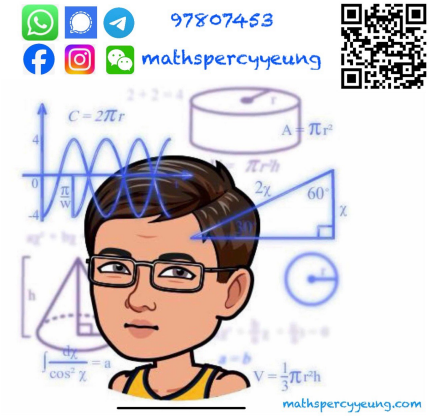
20-21 F.4
1st TERM EXAM
MATH CP
PAPER 2



2020 - 2021

F.4 First Term Examination

MATHEMATICS Compulsory Part

PAPER 2

6th January, 2021

9:30 am – 10:15 am

Time Allowed：45 minutes

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. 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 20 questions in Section A and 7 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. $\left(\frac{1}{9^{555}}\right)3^{444} =$

   A. 0.
   B. $\frac{1}{3^{111}}$.
   C. $\frac{1}{3^{222}}$.
   D. $\frac{1}{3^{666}}$.

2. If a and b are constants such that $(x-8)(x-a)-6 \equiv (x-9)^2 + b$, then $b =$

   A. -26.
   B. -10.
   C. -7.
   D. -6.

3. $u^2 - v^2 + 6v - 6u =$

   A. $(u-v)(u+v-6)$.
   B. $(u-v)(u+v+6)$.
   C. $(u+v)(u-v-6)$.
   D. $(u+v)(u-v+6)$.

4. Simplify $(2\sqrt{7}+1)(\sqrt{63}-2)$.

   A. $40-\sqrt{7}$
   B. $40-2\sqrt{7}$
   C. $40+\sqrt{7}$
   D. $52-\sqrt{7}$

5. Which of the following statements is/are correct?

   I. Zero is an even number.
   II. All integers are rational numbers.
   III. All non-negative integers are positive.

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

6. Given that $f(x) = 3x^2 - x - 2$. If k is a constant, then $f(1+k) - f(1-k) =$

   A. $2k$.
   B. $10k$.
   C. $6k^2 - 2$.
   D. $6k^2 - 2k$.

7. Which of the following represent that y is a function of x?

I. $y=5-x^2$

II. $y^3=5x+1$

III. $y^2=4x$

A. I only

B. I and II only

C. II and III only

D. I, II and III

8. If $h(x)=5x^2+2x-6$ and $h(s)=-5s$, then

A. $s=-2$.

B. $s=\frac{3}{5}$.

C. $s=\frac{3}{5}$ or $s=-2$.

D. $s=2$ or $s=-\frac{3}{5}$.

9. Let m be a constant. Solve the equation $x(x+m)=x$.

A. $x=-m$

B. $x=1-m$

C. $x=0$ or $x=-m$

D. $x=0$ or $x=1-m$

10. If $x^2+k(x+5)=16$ has equal roots, where k is a constant. Find the value(s) of k.

A. –8

B. 12

C. 4 or 16

D. 8 or 20

11. If –2 is a root of the equation $x^2+(1-p)x-p=0$, where p is a constant, then $p=$

A. 6.

B. 4.

C. 2.

D. –2.

12. If the sum of the squares of two positive consecutive integers is 365, find the larger number.

A. 13

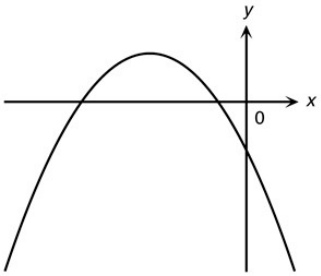
B. 14

C. 15

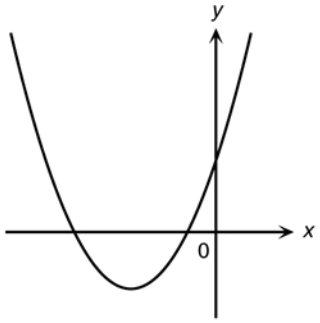
D. 16

13. Which of the following may represent the graph of $y=4(x-h)^2+k$, where $hk<0$?

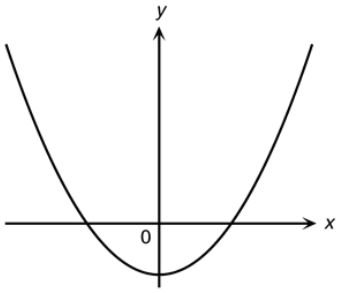
A.



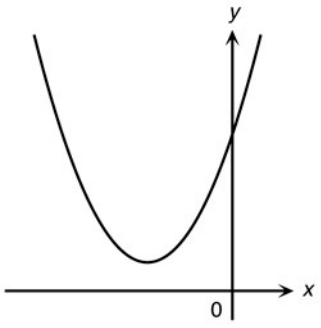
B.



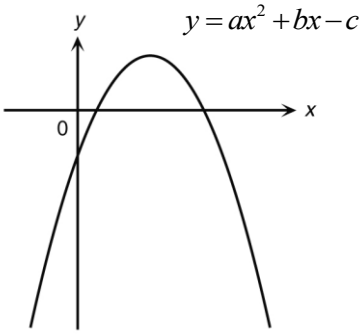
C.



D.



14. The figure shows the graph of $y=ax^2+bx-c$. Which of the following is true?



A. $a<0, c<0$ and $b^2>4ac$

B. $a<0, c>0$ and $b^2>4ac$

C. $a>0, c>0$ and $b^2<4ac$

D. $a>0, c<0$ and $b^2<4ac$

15. Which of the following quadratic function has a maximum value of -2?

A. $f(x)=(x+1)^2-2$

B. $f(x)=-(x-2)^2+1$

C. $f(x)=-(x+1)^2-2$

D. $f(x)=(x-2)^2+1$

16. When $3x^3-5x^2-5x+2$ is divided by $3x+1$, the remainder is

A. 3.

B. $\frac{29}{9}$.

C. $\frac{37}{9}$.

D. 53.

17. Let $f(x)=6x^3-5x^2-17x+6$. Which of the following are factors of $f(x)$?

I. $x-2$

II. $2x-1$

III. $2x+3$

A. I and II only

B. II and III only

C. I and III only

D. I, II and III

18. If $f(x)=ax^3+4ax^2-24$ is divisible by $x+2$, where a is a constant. $f(2)=$

A. –96.

B. 0.

C. 3.

D. 48.

19. When $3x^3+11x^2-8x+2$ is divided by a polynomial $g(x)$, the quotient and the remainder are $3x+11$ and $13-5x$ respectively. Find $g(x)$.

A. $-x^2-1$

B. $-x^2+1$

C. x^2-1

D. x^2+1

20. $\dfrac{8x-12}{2x^3+3x^2}\times\dfrac{4x^2+6x}{4x^2-9}=$

A. $\dfrac{4}{2x-3}$.

B. $\dfrac{4}{2x+3}$.

C. $\dfrac{8}{x(2x-3)}$.

D. $\dfrac{8}{x(2x+3)}$.

Section B

21. The H.C.F. of $4a^3b^3, 8a^4, 12ab^2$ is

A. $4a$.

B. $4ab^2$.

C. $24a^4b^3$.

D. $24a^8b^5$.

22. Let $f(x)=2x^3+ax^2+5x+b$. When $f(x)$ is divided by $x+2$, the remainder is -53. When $f(x)$ is divided by $4-2x$, the remainder is

A. –53.

B. –1.

C. 1.

D. 53.

23. $\dfrac{-3}{x^2+x-2}+\dfrac{4}{x^2+2x-3}=$

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

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

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

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

24. Let α and β be the roots of the quadratic equation $x^2+mx+n=0$, where m and n are non-zero constants. Which of the following equations has the roots $\dfrac{\alpha}{\beta}$ and $\dfrac{\beta}{\alpha}$?

A. $nx^2+(m^2-2n)x+1=0$

B. $nx^2+(2n-m^2)x+n=0$

C. $nx^2+(m^2-2n)x+n=0$

D. $nx^2-nx-(m^2-2n)=0$

25. If $\alpha\neq\beta$ and $\begin{cases}\alpha^2-5\alpha=4\\ \beta^2-5\beta=4\end{cases}$, find the value of $(\alpha-1)(\beta-1)$.

A. –8

B. 0

C. 2

D. 10

26. Consider $f(x)=-x^2+6x+3$ and the graph of the function. Which of the following is/are true?

I. The maximum value is 12.

II. The vertex is (3,12).

III. The axis of symmetry is $x+3=0$.

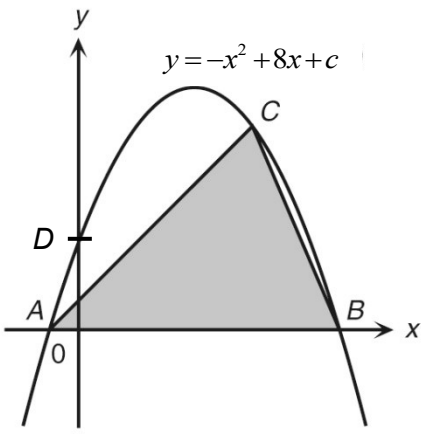
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

27. In the figure, the graph of $y=-x^2+8x+c$ cuts the x-axis at A and B, where c is a constant. Also the graph cuts the y-axis at $D(0,9)$. C is a moving point on the curve above the x-axis. Find the maximum possible area of ΔABC.



A. 20 sq. units

B. 100 sq. units

C. 125 sq. units

D. 250 sq. units

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