

2021 Advanced Mathematics 2 Paper 1

1. Given that $f(1 - 2x) = 4x + 7$, find the value of $f^{-1}(-5)$. Ans. B [14. Functions]

A - 13

B 7

C 11

D 19

2. When the polynomial $f(x)$ is divided by $(x - a)(x - b)$, $(x - b)(x - c)$, $(x - c)(x - a)$, the remainders are $3x + 2$, $5x - 4$, $4x - 3$ respectively. Find the value of $a + b + c$. Ans. C

[2. Polynomial]

A 3

B 5

C 9

D 10

3. Which of the followings is equivalent to "If $a = b$, then $c = d$ "? Ans. A [13. Logic]

A $a \neq b$ or $c = d$

B $a = b$ and $c \neq d$

C $a = b$ or $c = d$

D $a \neq b$ and $c \neq d$

4. In the expansion of $\frac{(1+x)^2}{(1-x)^{\frac{1}{2}}}$, find the coefficient of x^2 . Ans D [10. Binomial theorem]

A $\frac{1}{4}$

B $\frac{17}{21}$

C $\frac{9}{16}$

D $\frac{19}{8}$

5. Given that \underline{a} and \underline{b} are nonzero vectors. If $|\underline{a} - \underline{b}| = |\underline{a}| = |\underline{b}|$, find the angle between \underline{a} and \underline{b} . Ans. C [12. Vectors]

A 30°

B 45°

C 60°

D 75°

6. Given that the complex number $\frac{m^2+i}{n-8mi}$ is real, find the relation between m and n . Ans. A

[17. Complex numbers]

A $n + 8m^3 = 0$

B $n - 8m^3 = 0$

C $mn - 8 = 0$

D $mn + 8 = 0$

7. Mr.Tan has 3 RM1 notes, 2 RM5 notes and 2 RM10 notes. He would like a tip a waiter at least RM5. Suppose that two notes of equal value are considered identical how many different combinations of notes are there? Ans. B [9. Permutation and Combination]

A 36

B 32

C 24

D 12

8. Given that the largest value of $y = 3\sin x + m\cos x$ is 5, find all the possible values of m .

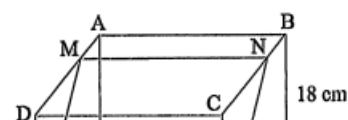
Ans. D [19. Trigonometric functions of any angle]

A 2

B ± 2

C 4

D ± 4



9. As in Fig.1 $ABCDSPQR$ is a cuboid box with length 20cm, width 12cm and height 18cm. $MNRS$ is a square mirror placed in the box at an angle. When the mirror is completely inside the box, find the largest angle between the mirror and the base of the box. Ans. A [23. Problems in three dimensions]

A 64.16°

B 56.13°

C 53.13°

D 25.84°

10. How many solutions does the equation $6|\sin x| - x = 0$ have in $[0, 2\pi]$? Ans. D

[22. Trigonometrical equations]

A 1

B 2

C 3

D 4

11. Given that $\sin\theta + \cos\theta = \frac{3}{4}$, find $\frac{1}{2} + \frac{1}{2}\sin 2\theta + \frac{1}{4}\sin^2 2\theta + \dots + \frac{1}{2^n}\sin^n 2\theta + \dots$ Ans. B

[19. Trigonometric functions of any angle]

A $\frac{16}{39}$

B $\frac{25}{78}$

C $\frac{31}{26}$

D $\frac{11}{50}$

12. If $\frac{x^2}{k^2-4k-5} + \frac{y^2}{k^2-8k+12} = 1$ is an ellipse, find the possible values of k . Ans A

[30. The ellipse]

A $(-\infty, -1) \cup (6, \infty)$

B $(-\infty, 2) \cup (6, \infty)$

C $(-1, 6)$

D $(2, 6)$

13. Given a circle $x^2 + y^2 + 2(m+2)x + 2(m+2)y + 4m^2 - 9 = 0$, where m is a real number. Find the largest radius of this circle. Ans. C [28. The circle]

A 3

B 4

C 5

D 6

14. Given a parabola $y = 2x^2 + x - 3$. When the origin is translated to $(-1, 3)$ find the equation of this parabola under the new coordinate system $x'Oy'$. Ans. A

[29. The parabola] [32. Coordinate transformation]

A $y' = 2x'^2 - 3x' - 5$

B $y' = 2x'^2 + 5x' + 3$

C $y' = 2x'^2 - 3x' + 5$

D $y' = 2x'^2 + 3x' - 5$

15. What is the graph represented by the parametric equations $\{x = \frac{e^t - 2e^{-t}}{3} \quad y = \frac{e^t + 2e^{-t}}{5}\}$, given that t

is parameter? Ans. D [34. Parametric equations] [31. The hyperbola]

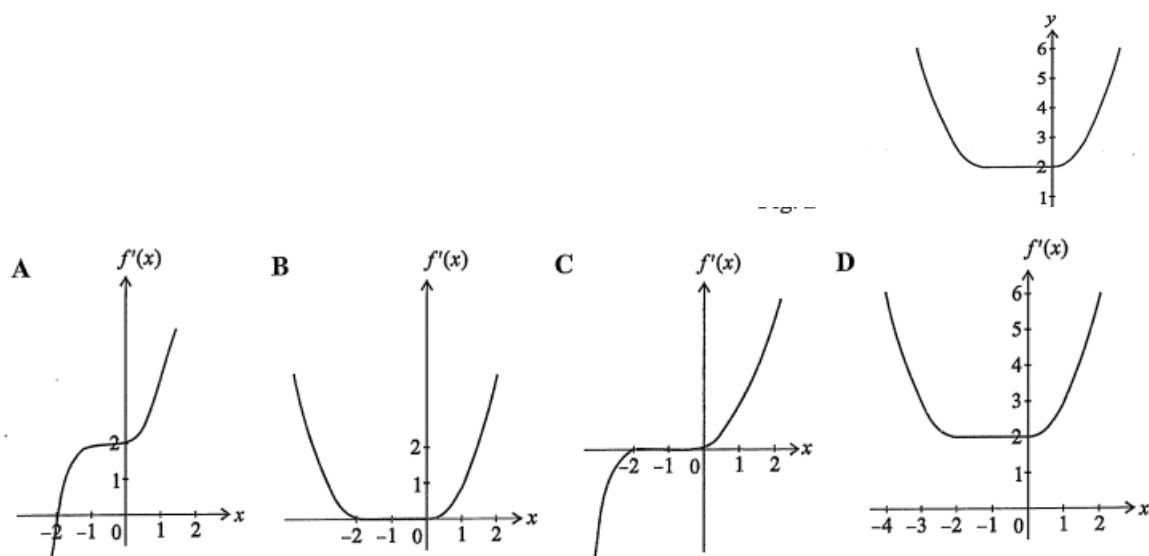
A line

B ellipse

C parabola

D hyperbola

16. Fig.2 shows the graphs of a function $y = f(x)$. Which of the following options is the graphs of $f'(x)$? Ans. C [37. Applications of differentiation]



17. Suppose that $f(x) = \begin{cases} x^k, & x > 0 \\ k, & x \leq 0 \end{cases}$ is a continuous function, find the value of k . Ans. B [35. Limit and Continuity]

A 0

B 1

C $\frac{1}{e}$

D e

18. Given that $f'(x) = (x - 1)^2(x - 2)(x - 3)(x - 4)(x - 5)^2$. Which of the following statements is TRUE? Ans B [37. Applications of differentiation]

A $f(1)$ is local minimum value

B $f(2)$ is local minimum value

C $f(4)$ is local maximum value

D $f(5)$ is local maximum value

19. Find $\int_0^1 (\cos x) \cdot e^{-\int_0^x \cos \theta d\theta} dx$ Ans C [38. Indefinite integrals]

A $1 - e^{-\cos 1}$

B $1 - e^{\cos 1}$

C $1 - e^{-\sin 1}$

D $1 - e^{\sin 1}$

20. Given that $f(x) = \int_0^x t\sqrt{t+1} dt$, $x \geq -1$ find $f'(3)$.

Ans. C [39. Definite integrals and its application]

A 4

B 5

C 6

D 7