WEST MATHEMATICS TEACHERS' PEDAGOGIC GROUP

GENERAL CERTIFICATE OF EDUCATION MOCK EXAMINATION

0575 ADDITIONAL MATHEMATICS 1

MARCH 2020 **ORDINARY LEVEL**

Centre Number	
Centre Name	
Candidate Identification No.	
Candidate Name	

Mobile phones are NOT allowed in the examination room.

MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

   Before the examination begins:
3. Check that this question booklet is headed **Ordinary Level-0575 Additional Mathematics 1.**
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil:

   Candidate Name, Exam Session, Subject Code and Candidate Identification Number.

   Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions. ***How to answer the questions in this examination:***
6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** andD. Decide which answer is appropriate. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.

   For example, if **C** is your correct answer, mark **C** as shown below:

   $[A][B][C][D]$
9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

1. $\dfrac{1+\sqrt{3}}{1-\sqrt{3}}$ simplifies to

A $1+\frac{1}{2}\sqrt{3}$
B $-2-\sqrt{3}$
C $2+\sqrt{3}$
D $-2-2\sqrt{3}$

2. $\sqrt{288}$ in its simplest form is

A $12\sqrt{2}$
B $6\sqrt{8}$
C 24
D $2\sqrt{74}$

3. $125^a \times 5^b =$

A 5^{a+3b}
B 625^{a+b}
C 5^{3a+b}
D 625^{ab}

4. The value of m for which $36^{-m} = \dfrac{1}{6}$

A -2
B $-\frac{1}{2}$
C $\frac{1}{2}$
D 2

5. The real value of x for which $\log_6 x = 2$ is

A $\frac{1}{3}$
B 3
C 12
D 36

6. Suppose that $\log 2 = a$ and $\log 5 = b$. Using the properties of logarithms to write $\log 20$, in terms of a and b is

A $2a+b$
B $2a+2b$
C $4b$
D $a+b$

7. If α and β are the roots of the equation $4x^2+3x+7=0$, then the value of $\dfrac{1}{\alpha}+\dfrac{1}{\beta}=$

A $-\frac{3}{4}$
B $-\frac{3}{7}$
C $\frac{3}{7}$
D $\frac{7}{4}$

8. The quadratic equation whose one root is $3+\sqrt{2}$ is

A $x^2-7x+5=0$
B $x^2+7x+6=0$
C $x^2-7x-6=0$
D $x^2-6x+7=0$

9. The remainder when the expression x^3-x^2+x+4 is divided by $(x+1)$ is

A 6
B 5
C 3
D 1

10. Given that $(x+3)$ is a factor of the polynomial $f(x)=x^3+kx+6$, then the value of the real constant k is

A -7
B -3
C 0
D 7

11. The quadratic equation having roots -3 and $\dfrac{3}{4}$ is

A $4x^2-9x+9=0$
B $4x^2+9x+9=0$
C $4x^2-9x-9=0$
D $4x^2+9x-9=0$

12. The sum of the roots of the quadratic equation $3x^2 - 9x + 5 = 0$ is

A 2
B 3
C 6
D -3

13. The sum of the first n terms of a sequence is given by $S_n = 3^n - 1$. Then the third term is

A 26
B 18
C 10
D 8

14. The sum to infinity of a geometric progression is 60. If its first term is 80, then the common ratio is

A $\frac{1}{3}$
B $\frac{1}{4}$
C $-\frac{1}{2}$
D $-\frac{1}{3}$

15. Given that 6 and 150 are two terms of a geometric progression, separated by only one term, this term is

A 900
B 144
C 30
D 25

16. The term independent of x in the expansion of $\left(x^2 - \frac{1}{x^2}\right)^6$ is

A 40
B 20
C -20
D -40

17. The coefficient of x^4 in the expansion of $(2x + 1)^8$ is

A 1 120
B 1 680
C 256
D 16

18. The expansion of $(2 + 3x)^{-5}$ is valid for values of x in the range

A $-\frac{3}{2} < x < \frac{3}{2}$
B $-\frac{2}{3} < x < \frac{2}{3}$
C $-3 < x < 3$
D $-2 < x < 2$

19. There are four bus lines between A and B, and three bus lines between B and C. The number of ways a person can travel by bus from A to C by way of B will be

A 24
B 14
C 12
D 10

20. The number of ways of arranging the letters of the word "CHEESE" are

A 60
B 120
C 240
D 720

21. $2 \sin x \cos x =$

A $\cos 2x$
B $-\cos^2 x$
C $\sin\left(\frac{x}{2} + 1\right)$
D $\sin 2x$

22. Given that $0° \leq x \leq 360°$ and $4 \sin x - 1 = -5$, then $x =$

A $0°$
B $90°$
C $180°$
D $270°$

23. $\tan^2 x = 1$ where $0 \leq x \leq \pi$, then $x =$

A $\frac{\pi}{4}, \frac{3}{4}\pi$

B $1, -1$

C 0

D $\frac{\pi}{4}$

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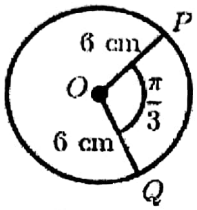
24. The diagram shows a circle, centre O and radius 6 cm. The length of the minor arc PQ in centimetres is

A 6π

B 12π

C 2π

D $\frac{\pi}{3}$



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25. The equation of the line passing through the point $(-3, 2)$ that is parallel to $4x - y = 7$ is

A $y = 4x + 4$

B $y = -4x - 10$

C $y = -\frac{1}{4}x + \frac{5}{4}$

D $y = -\frac{1}{4}x + \frac{11}{4}$

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26. The coordinates of the point P that divides the line AB externally in the ratio 4 : 3, where $A(7, 1)$ and $B(2, 5)$ are

A $(-13, 17)$

B $(13, -17)$

C $(13, 17)$

D $(-13, -17)$

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27. The solution of the quadratic inequality $x^2 - 2x - 35 < 0$ in interval notation is

A $(-5, 7)$

B $[-5, 7]$

C $[-5, 7)$

D $(-5, 7]$

---

28. $|2x + 7| \leq$ has as solution

A $x \leq -3$

B $3 \leq x \leq 4$

C $-4 \leq x \leq -3$

D $0 \leq x \leq 3$

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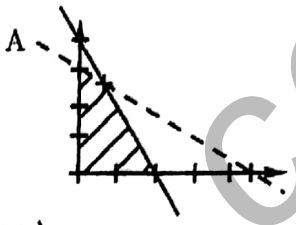
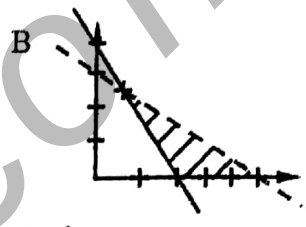
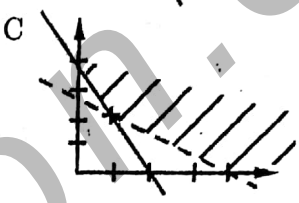
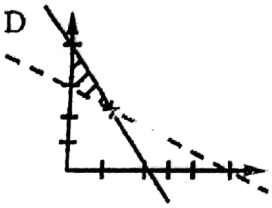
29. Which of the shaded regions below satisfies the set of inequalities
$y \geq 0,\ x \geq 0,\ 2x + y \leq 4,\ 3x + 5y < 15$

A 

B 

C 

D 

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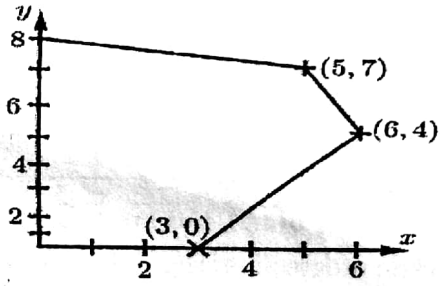
30. The minimum value of the objective function $P = \frac{1}{2}x + \frac{3}{2}y$ in the feasible region shown below is



A 9

B 12

C 13

D 15

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31. Let $f(x) = \begin{cases} 3x, & \text{if } x < -1 \\ 2x - 1, & \text{if } -1 \leq x \leq 5 \\ x + 3, & \text{if } x > 5 \end{cases}$

then $f(3) =$

A 3

B 5

C 6

D 9

---

32. Let $h(x) = 3x + 1$ and $g(x) = \sqrt{x-1}$, then $f \circ g(5) =$

A 0

B $\sqrt{15}$

C 4

D 7

33. The function f is defined on $\mathbb{R}$, the set of real numbers by $f : x \mapsto \dfrac{x+3}{x-5}$, the domain of f is

A $\{x : x \in \mathbb{R},\ x \neq -3\}$

B $\{x : x \in \mathbb{R},\ x \neq 3\}$

C $\{x : x \in \mathbb{R},\ x \neq -5\}$

D $\{x : x \in \mathbb{R},\ x \neq 5\}$

34. Which of the following matrix equations would give the solution to the indicated system of equations?

$$\begin{aligned} 4x - 3y &= 6 \\ 5x + 7y &= 9 \end{aligned}$$

A $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 & -3 \\ 5 & 7 \end{pmatrix}^{-1} \begin{pmatrix} 6 \\ 9 \end{pmatrix}$

B $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 6 \\ 9 \end{pmatrix} \begin{pmatrix} 4 & -3 \\ 5 & 7 \end{pmatrix}^{-1}$

C $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 & -3 \\ 5 & 7 \end{pmatrix} \begin{pmatrix} 6 \\ 9 \end{pmatrix}^{-1}$

D $(x, y)(6, 9) \begin{pmatrix} 4 & -3 \\ 5 & 7 \end{pmatrix}^{-1}$

35. The value of k for which the matrix $A = \begin{pmatrix} k & -3 \\ -4 & -6 \end{pmatrix}$ is singular is

A 3

B -3

C -2

D 2

36. The invariant line under the transformation N, where $N = \begin{pmatrix} 3 & 1 \\ 2 & 2 \end{pmatrix}$ is

A $2x - y = 0$

B $2x + y = 0$

C $3x + y = 0$

D $2x + 2y = 0$

37. The binary operation $*$ is defined on $\mathbb{Z}$, the set of integers by $a * b = a + b + 1$, where $a, b \in \mathbb{Z}$. Given that $\mathbb{Z}$ forms a group under $*$, then the identity element is

A -1

B 0

C 1

D 12

38. The operation table for the group $(S, *)$ is shown below

$*$	p	q	r	s
p	r	p	s	q
q	p	q	r	s
r	s	r	q	p
s	q	s	p	r

One subgroup of the group is

A $(\{p, q\}, *)$

B $(\{q, s\}, *)$

C $(\{r, s\}, *)$

D $(\{q, r\}, *)$

39. The order of the group $S = \{2, 4, 6, 8\}$ under the operation "multiplication mod 10" is

A 2

B 4

C 6

D 8

40. Given that $3\mathbf{i} + a\mathbf{j}$ is parallel to the vector $-9\mathbf{i} + 6\mathbf{j}$, then the value of the real constant a is

A -3

B -2

C 2

D 3

41. The vector equation of the line joining the points with position vectors $3\mathbf{i}+\mathbf{j}$ and $2\mathbf{i}+3\mathbf{j}$ is

A $\mathbf{r} = 3\mathbf{i}+\mathbf{j}+\lambda(5\mathbf{i}+4\mathbf{j})$

B $\mathbf{r} = \mathbf{i}+2\mathbf{j}+\lambda(3\mathbf{i}+\mathbf{j})$

C $\mathbf{r} = 3\mathbf{i}+\mathbf{j}+\lambda(-\mathbf{i}+2\mathbf{j})$

D $\mathbf{r} = 3\mathbf{i}+2\mathbf{j}+\lambda(\mathbf{i}-2\mathbf{j})$

42. A vector $\mathbf{a}$ has components $\begin{pmatrix}-6\\-8\end{pmatrix}$. A unit vector parallel to $\mathbf{a}$ is

A $-\frac{3}{5}\mathbf{i}-\frac{4}{5}\mathbf{j}$

B $-\frac{4}{5}\mathbf{i}+\frac{3}{5}\mathbf{j}$

C $-6\mathbf{i}-8\mathbf{j}$

D $-\frac{3}{50}\mathbf{i}-\frac{4}{50}\mathbf{j}$

43. For the function $f : x \mapsto -3x+4$, $\frac{f(x+h)-f(x)}{h}$ in its simplest form is

A $-3x+4$

B $-3x-3h+4$

C $-3h$

D -3

44. $\frac{d}{dx}(x\sin x) =$

A $x\cos x$

B $\cos x$

C $\sin x + x\cos x$

D $\sin x - x\cos x$

45. A curve passes through the point $P(1,-3)$ and its gradient function is $2x-1$, its equation is

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

B $y = x^2 + x - 3$

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

D $y = x^2 + x + 3$

46. The equation of the normal to the curve of $y = x^2+4x$ at the point where $x = -1$ is

A $x+2y-7=0$

B $x-2y+7=0$

C $x-2y-7=0$

D $x+2y+7=0$

47. The coordinates of the turning point on the curve of $y = x^2-4x-5$ are

A $(-2,9)$

B $(2,-9)$

C $(2,9)$

D $(-2,-9)$

48. $\int (x+\sin x)dx =$

A $1+\cos x+k$

B $\frac{1}{2}x^2+\cos x+k$

C $1-\cos x+k$

D $\frac{1}{2}x^2-\cos x+k$

49. $\int_{-1}^{a}(2x-1) = 4$, then $a =$

A 2

B 3

C 4

D 8

50. Physically, $\int_a^b f(x)dx$ means finding the

A area under the curve from a to b

B area to the left point of a

C area to the right point of b

D Area above the curve from a to b

STOP

GO BACK AND CHECK YOUR WORK