S4021 WASSCE
May/June 2012
MATHEMATICS (CORE) 1
Objective Test
1½ hours

1

Name...

Index Number...

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

May/June 2012   MATHEMATICS (CORE) 1   1½ hours
OBJECTIVE TEST
[50 marks]

*Do **not** open this booklet until you are told to do so. While you are waiting, read and observe the following instructions carefully. Write your **name** and **index number** in the spaces provided above.*

*Answer **all** the questions on your Objective Test answer sheet.*

1. Use 2B pencil throughout.
2. On the pre-printed answer sheet, check that the following details are **correctly** printed:
   (a) In the space marked *Name*, check your **surname** followed by your **other names**.
   (b) In the spaces marked *Examination, Year, Subject* and *Paper*, check 'WASSCE May/June', '2012', 'MATHEMATICS (CORE)', and '1' in that order.
   (c) In the box marked *Index Number*, your **index number** has been printed vertically in the spaces on the left-hand side, and each numbered space has been shaded in line with each digit. **Reshade** each of the shaded spaces.
   (d) In the box marked *Subject Code*, the digits 402112 are printed vertically in the spaces on the left-hand side. **Reshade** the corresponding numbered spaces as you did for your index number.
3. An example is given below. This is for a male candidate whose *name* is Paul Abdul MIEZAH. His *index number* is 7102143958 and he is offering *Mathematics (Core)* 1.

THE WEST AFRICAN EXAMINATIONS COUNCIL
ANSWER SHEET

PRINTED IN BLOCK LETTERS.

Name: MIEZAH PAUL ABDUL   GHA

Examination: WASSCE May/June   Year: 2012

Subject: MATHEMATICS (CORE)   Paper: 1

INSTRUCTIONS TO CANDIDATES
1. Use grade 2B pencil throughout.
2. Answer each question by choosing one letter and shading it like this: ⊏A⊐ ▉ ⊏C⊐ ⊏D⊐ ⊏E⊐
3. Erase completely any answer you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right hand edge of your answer sheet.

INDEX NUMBER	SUBJECT CODE
7	4
1	0
0	2
2	1
1	1
4	2
3	
9	For Supervisors only
5	If candidate is absent shade this space.
8	

© 2012 *The West African Examinations Council*

mjWAS/S4021.12/sp.ch

Answer **all** *the questions.*

Mathematical tables may be used in any question. The use of non-programmable, silent and cordless calculator is allowed.

Each question is followed by four options lettered A to D. Find the **correct** *option for* **each** *question and shade in* **pencil** *on your answer sheet, the answer space which bears the same letter as the option you have chosen.*

Give only **one** *answer to* **each** *question. An example is given below.*

The ages, in years, of four boys are 10, 12, 14 and 18. What is the average age of the boys?

A.   12 years

B.   12½ years

C.   13 years

D.   13½ years

The correct answer is 13½ years, which is lettered D, and therefore answer space D would be shaded.

⊏A⊐   ⊏B⊐   ⊏C⊐   ◼D◼   ⊏E⊐

Think carefully before you shade the answer spaces; erase completely any answers you wish to change.

Do all rough work on this question paper.

Now answer the following questions:

1.   If $P = \{2, 4, 6, 8, 10\}$, $Q = \{3, 6, 9, 12, 15\}$ and $R = \{5, 10, 15, 20, 25\}$, find $n(P \cap Q \cap R)$.
    A.   0
    B.   1
    C.   2
    D.   3

2.   Evaluate $2^0 + 2^{-1} + 2^{-2}$.
    A. $\frac{1}{8}$
    B. $\frac{3}{4}$
    C. $1\frac{1}{8}$
    D. $1\frac{3}{4}$

3.   The sides of a triangle of perimeter 260 cm are in the ratio 1½:2:3. What is the length of the **longest** side?
    A.   160 cm
    B.   120 cm
    C.   80 cm
    D.   60 cm

4.   Given that $\log_{10} y = 1 + 3\log_{10} x$, express y in terms of x.
    A. $y = 10x^3$
    B. $y = 10x^{-3}$
    C. $y = x^3$
    D. $y = x^{-3}$

mjWAS/S4021.12/sp.ch

5. If $X_{\text{four}} = 145_{\text{six}}$, find X.
   A. 1101
   B. 1111
   C. 1010
   D. 1001

6. A sequence is defined by the recurrence relation. $T_n = 1 + 2T_{n-1}$, for $n \geq 1$. If $T_1 = 8$, find T_3.
   A. 21
   B. 33
   C. 35
   D. 37

7. If $\frac{5}{6}$ of a number is 5 greater than $\frac{2}{3}$ of it, find the number.
   A. 60
   B. 36
   C. 30
   D. 18

8.
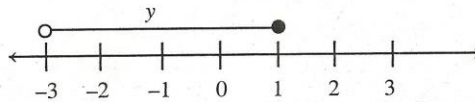
   Which of the following inequalities is represented on the number line?
   A. $-3 < y < 1$
   B. $-3 \leq y < 1$
   C. $-3 < y \leq 1$
   D. $1 < y \leq 3$

9. Find the value of k if $a^2 + 6a + k = (a + 3)^2$.

   A. $\frac{2}{9}$

   B. $\frac{9}{2}$

   C. 6

   D. 9

10. What are the coordinates of the point where the straight lines $x + 3y = -7$ and $5x - 2y = 16$ intersect?
    A. $(-2, -3)$
    B. $(2, -3)$
    C. $(-2, 3)$
    D. $(2, 3)$

11. If $(x - 2)$ and $(x + 1)$ are factors of $x^2 + bx + c = 0$, find the value of $(b + c)$.
    A. -3
   B. -2
    C. 1
    D. 2

Turn over

12. If p, q, r, s are all positive and $p = \sqrt{q^2 - \dfrac{r^2}{s^2}}$, make s the subject of the relation.

   A. $\quad s = \dfrac{r}{q^2 - p^2}$

   B. $\quad s = \dfrac{r}{p^2 - q^2}$

   C. $\quad s = \dfrac{r}{\sqrt{q^2 - p^2}}$

   D. $\quad s = \dfrac{\sqrt{p^2 - q^2}}{r}$

13. Multiply $\dfrac{mk}{3m + 3k}$ by $\dfrac{m + k}{m}$.

   A. $\quad \dfrac{k}{3}$

   B. $\quad \dfrac{m - k}{3}$

   C. $\quad \dfrac{m + k}{3}$

   D. $\quad \dfrac{mk}{3}$

14. The equation of a straight line is $2x + 3y - 6 = 0$. Find the intercept on the y-axis.
   A. (0, 3)
   B. (0, 2)
   C. (2, 0)
   D. (3, 0)

15. The angle of a sector of a circle of radius 6 cm is 120°. Find the area of the sector in terms of π.
   A. 4π cm^2
   B. 8π cm^2
   C. 12π cm^2
   D. 24π cm^2

16. Find the volume, in litres, of a cylindrical drum of diameter 28 cm and height 50 cm. [Take $\pi = \dfrac{22}{7}$]
   A. 31.8 litres
   B. 30.8 litres
   C. 29.8 litres
   D. 28.8 litres

17. A pendulum of a clock is 7 cm long and swings through an arc of length 12 cm. Through what angle, corrected to the **nearest** degree, does the pendulum swing? [Take $\pi = \dfrac{22}{7}$]
   A. 72°
   B. 92°
   C. 98°
   D. 118°

18. The lengths of the sides of a triangle, in centimetres , are l, $(l + 7)$ and $(l + 8)$. If its perimeter is 30 cm, find the length of its **longest** side.
   A. 13 cm
   B. 12 cm
   C. 6 cm
   D. 5 cm

19. If the interior angles of a pentagon are $2x$, x, $2x$, $3x$ and x, find the value of x.
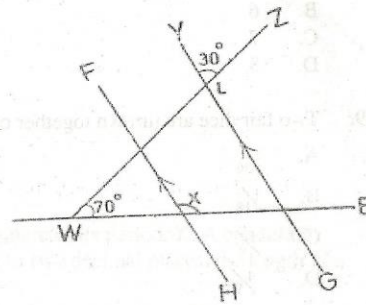   A. 30°
   B. 40°
   C. 50°
   D. 60°

20. In the diagram, O is the centre of circle $PQRS$ and $\angle PQR = 65°$. Find the value of the angle x.
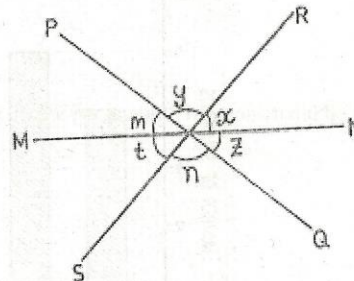   A. 115°
   B. 130°
   C. 230°
   D. 255°
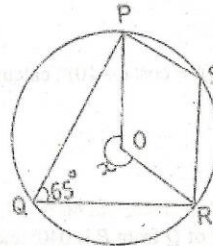
21. In the diagram, $PQ//EG$, PHQ is an isosceles triangle and $\angle HFG$ is 130°. Find $\angle PHQ$.
   A. 110°
   B. 80°
   C. 70°
   D. 55°
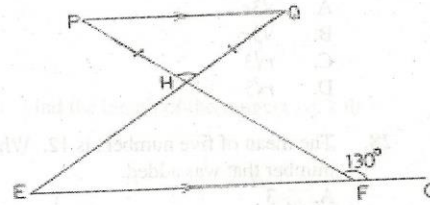
22. In the diagram, $FH//YG$, $\angle EWZ = 70°$ and $\angle YLZ = 30°$. Find the value of x.
   A. 40°
   B. 60°
   C. 100°
   D. 150°

23. In the diagram, MN, PQ and RS are three interseting straight lines. Which of the following statements is/are **true**?
   I. $t = y$
   II. $x + y + z + m = 180°$
   III. $x + m + n = 180°$
   IV. $x + n = m + z$

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

24. Which of the following statements is **not** true of a rectangle?
   A. The diagonals are equal.
   B. There are only two lines of symmetry.
   C. The diagonals bisect each other.
   D. The diagonals intersect at right angles.

Turn over

6

25. The dimensions of a rectangle are 14 cm by 4 cm. Calculate, correct to the **nearest** degree, the acute angle between its diagonals.
    A. 26°
    B. 32°
    C. 64°
    D. 74°

26. If $\sin(x-10)° = \cos(x+10)°$, calculate the value of x.
    A. 90°
    B. 60°
    C. 45°
    D. 40°

27. The bearing of Q from P is 040° and the bearing of R from P is 130°. If $|PQ| = r$ and $|PR| = 2r$, find $|QR|$.
    A. $\sqrt{3}r$
    B. $\sqrt{5}r$
    C. $r\sqrt{3}$
    D. $r\sqrt{5}$

28. The mean of five numbers is 12. When another number is added, the mean becomes 11. Find the number that was added.
    A. 3
    B. 6
    C. 7
    D. 8

29. Two fair dice are thrown together once. What is the probability of getting the sum of 9?
    A. $\frac{1}{36}$
   B. $\frac{1}{18}$
    C. $\frac{1}{9}$
    D. $\frac{4}{9}$
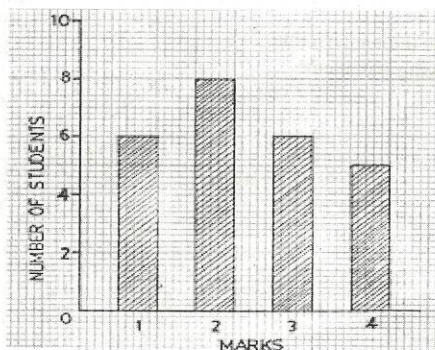
The bar chart shows the frequency distribution of marks scored by students in a class test.
Use it to answer Questions 30 and 31.

30. How many students took the test?
    A. 10
   B. 24
    C. 25
    D. 30

31. What is the median of the distribution?
    A. 2
    B. 4
    C. 6
    D. 8

32. If $x < 0$, solve the equation $x^2 = 3(2x + 9)$.
    A. -1
    B. -3
    C. -6
    D. -9

33. The ages of five students in a class are 13, 14, 17, 18 and 19. Find the standard deviation of their ages correct to **two** decimal places.
    A. 2.32
    B. 2.49
    C. 2.55
    D. 2.61

34. The dimensions of a cuboid are 20 cm, 30 cm and 60 cm. Find the length of the **longest** stick that can fit into the cuboid.
    A. 62.5 cm
    B. 65.0 cm
    C. 70.0 cm
    D. 73.3 cm.

35. Correct 0.081778 to **three** significant figures.
    A. 0.0810
    B. 0.0817
    C. 0.0818
    D. 0.0820

36. The length, l of a simple pendulum varies directly as the square of its period, T. A pendulum of length 99.4 cm has a period of 2 seconds. Find, correct to **two** decimal places, the length of a pendulum of period 2.5 seconds.
    A. 63.62 cm
    B. 79.52 cm
    C. 124.25 cm
    D. 155.31 cm

37. Mr. Nagbe borrowed GH¢8,400 at a simple interest rate of 26½% per annum. How much did he pay back after 8 months?
    A. GH¢8,784.00
    B. GH¢9,884.00
    C. GH¢11,780.00
    D. GH¢12,620.00

38. Make x the subject of the relation $\frac{x}{q} - 2 = \frac{x}{p}$.
    A. $x = \frac{2pq}{p+q}$
    B. $x = \frac{pq}{p-q}$
    C. $x = \frac{pq}{p+q}$
    D. $x = \frac{2pq}{p-q}$

Turn over

39. Find the value of x in the diagram.
    A. 120°
    B. 60°
    C. 40°
    D. 30°
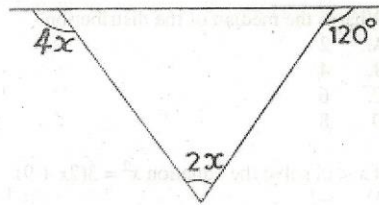
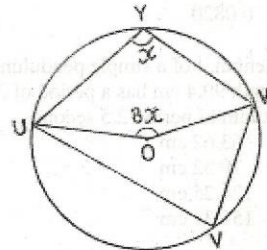40. Which of the following graphs **best** illustrates the equation $y = x - 2$?
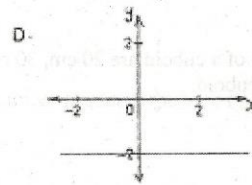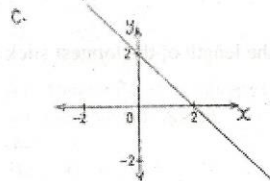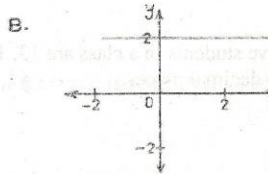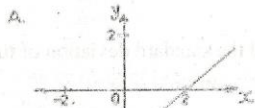
41. A straight line passes through the points (1, 6), (3, −2) and (7, y). Find the value of y.
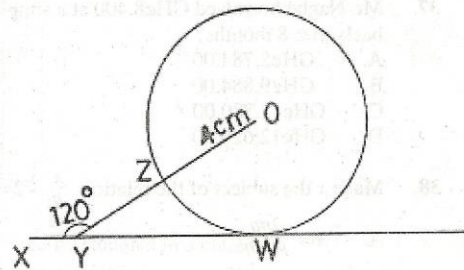   A. −18
    B. −14
    C. 14
    D. 18

42. The diagram is a circle with centre O.
    U, V, W and Y are points on the circle. Find $\angle UVW$.
    A. 144°
    B. 72°
    C. 40°
    D. 36°

43. The diagram shows a circle of radius $|OZ| = 4$ cm.
    XW is a tangent to the circle at W.
    If $\angle XYO = 120°$, find $|YZ|$.
    A. 2.32 cm
    B. 1.84 cm
    C. 0.62 cm
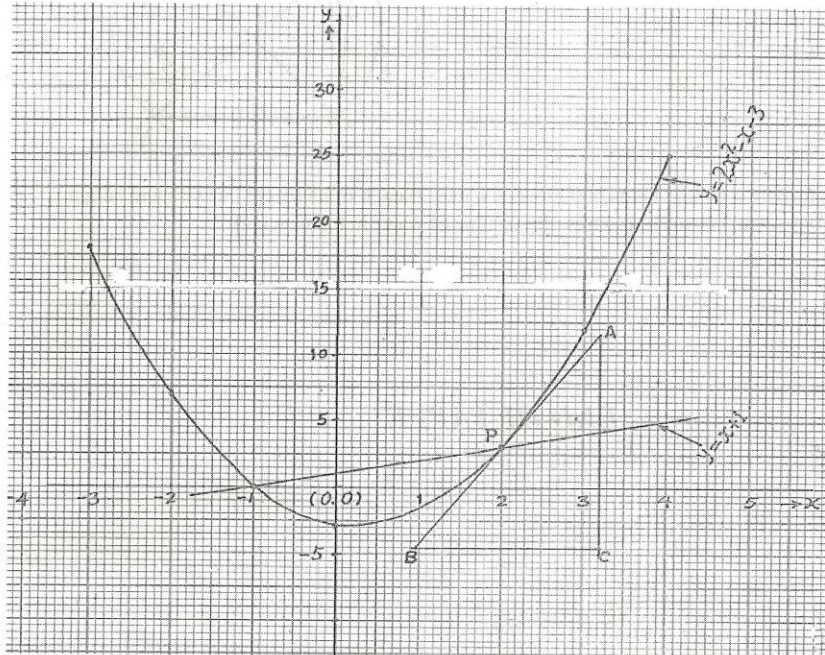   D. 0.26 cm

44. A side and a diagonal of a rhombus are 10 cm and 12 cm, respectively. Find its area.
    A. 20 cm²
    B. 24 cm²
    C. 48 cm²
    D. 96 cm²

The graphs are of the relations $y = 2x^2 - x - 3$ *and* $y = x + 1$.

*Use the graphs to answer Questions* **45** *and* **46**.

45. Find the gradient of the curve $y = 2x^2 - x - 3$ at the point P, correct to the **nearest** whole number.
    A.   6
    B.   7
    C.   8
    D.   9

46. Find the roots of the equation $2x^2 - 2x - 4 = 0$.
    A. $x = -1, x = 2$
    B. $x = 2, x = -\frac{1}{2}$
    C. $x = 3, x = 1$
    D. $x = -2, x = -2$

47. If $8^{(x - \frac{2}{3})} = 2^{x^2}$, find x.
    A. -2 or -1
    B. -2 or 1
    C. 2 or -1
    D. 2 or 1

48. In the figure, QR is parallel to ST. If $|PT| = 15$ cm, find $|RT|$.
    A.   4 cm
    B.   6 cm
    C.   8 cm
    D.   10 cm
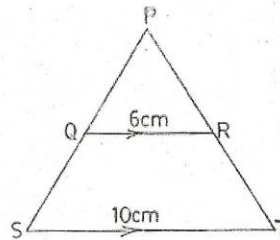
Turn over

49. In the diagram, $|ZY| = |XY|$, $\angle WYZ = 65°$ and $\angle XWY = 48°$.
Find $\angle WYX$.
A. 19°
B. 25°
C. 45°
D. 65°
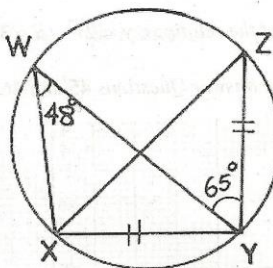
50. A tank in the form of a cuboid holds 500 litres of water. If **each** of its length, breadth and height is reduced by 10 percent, calculate, in litres, the volume of water in the new tank.
A. 490.0
B. 450.0
C. 364.5
D. 256.5

END OF PAPER

Follow Larnedu on Twitter, Facebook and Google Plus…

Visit

www.Larnedu.com for

more!!!