SC4021
WASSCE 2021
GENERAL MATHEMATICS/
MATHEMATICS (CORE) 1
Objective Test
1½ hours

1

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination
for School Candidates

SC 2021   GENERAL MATHEMATICS/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', 'SC 2021', 'GENERAL. MATH/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 Adams Smith ACKAH. His *index number* is 7102143958 and he is offering *General Mathematics/ Mathematics (Core)* 1.

THE WEST AFRICAN EXAMINATIONS COUNCIL
ANSWER SHEET

PRINTED IN BLOCK LETTERS. Name:	ACKAH ADAMS SMITH	GHA
Examination: WASSCE		Year: SC 2021
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 0 1 2 3 4 5 6 ▪ 8 9	4 0 1 2 3 ▪ 5 6 7 8 9
1 0 ▪ 2 3 4 5 6 7 8 9	0 ▪ 1 2 3 4 5 6 7 8 9
0 ▪ 1 2 3 4 5 6 7 8 9	2 0 1 ▪ 3 4 5 6 7 8 9
2 0 1 ▪ 3 4 5 6 7 8 9	1 0 ▪ 2 3 4 5 6 7 8 9
1 0 ▪ 2 3 4 5 6 7 8 9	1 0 ▪ 2 3 4 5 6 7 8 9
4 0 1 2 3 ▪ 5 6 7 8 9	2 0 1 ▪ 3 4 5 6 7 8 9
3 0 1 2 ▪ 4 5 6 7 8 9	
9 0 1 2 3 4 5 6 7 8 ▪	**For Supervisors only**
5 0 1 2 3 4 ▪ 6 7 8 9	If candidate is absent
8 0 1 2 3 4 5 6 7 ▪ 9	shade this space. ☐

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SC4021/21/wsc/cg

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⊐   ▬▬▬   ⊏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.   *ggghhh*

1. Correct, 0.00798516 to **three** significant figures.
   - A. 0.008
   - B. 0.0109
   - C. 0.0800
   - D. 0.00799

2. Simplify: $(11_{two})^2$.
   - A. 10001_{two}
   - B. 1001_{two}
   - C. 1101_{two}
   - D. 101_{two}

     ggghhh

3. Solve: $2^{\sqrt{2x+1}} = 32$.

   - A. 24
   - B. 13
   - C. 11
   - D. 12

ggghhh

4. If $\log_{10}2 = m$ and $\log_{10}3 = n$, find $\log_{10}24$ in terms of m and n.
   A. $3mn$
   B. $4mn$
   C. $3m + n$
   D. $m + 3n$

ggghhh

5. Find the 5ᵗʰ term of the sequence: 2, 5, 10, 17, ...

   A. 36

   B. 26

   C. 24

   D. 22

6. If $P = \{-3 < x < 1\}$ and $Q = \{-1 < x < 3\}$, where x is a real number, find $P \cap Q$.
   A. $\{-1 \leq x \leq 1\}$
   B. $\{-3 < x < 1\}$
   C. $\{-3 \leq x \leq 1\}$
   D. $\{-1 < x < 1\}$

7. Factorize $6pq - 3rs - 3ps + 6qr$.
   A. $3(r - p)(s - 2q)$
   B. $3(r - p)(2q + s)$
   C. $3(p - r)(2q - s)$
   D. $3(p + r)(2q - s)$

8. What number should be subtracted from the sum of $2\frac{1}{6}$ and $2\frac{7}{12}$ to give $3\frac{1}{4}$?

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

   B. $1\frac{1}{6}$

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

   D. $\frac{1}{3}$

ggghhh

9. Mensah is 5 years old and Joyce is **thrice** as old as Mensah. In how many years will Joyce be **twice** as old as Mensah?
   A. 15 years
   B. 10 years
   C. 5 years
   D. 3 years

10. If $16 \times 2^{(x+1)} = 4^x \times 8^{(1-x)}$, find the value of x.
    A. 4
    B. 1
    C. -4
    D. -1

Turn over

11. The circumference of a circular track is 9 km. A cyclist rides round it a number of times and stops after covering a distance of 302 km. How far is the cyclist from the starting point?
   A.   3 km
   B.   7 km
   C.   5 km
   D.   6 km

12. Simplify: $2\sqrt{7} - \dfrac{14}{\sqrt{7}} + \dfrac{7}{\sqrt{21}}$.

   ggghhh

   A. $\dfrac{\sqrt{21}}{3}$

   B. $3\sqrt{21}$

   C. $\dfrac{7\sqrt{21}}{3}$

   D. $\dfrac{\sqrt{21}}{21}$

13. If $4x + 2y = 16$ and $6x - 2y = 4$, find the value of $(y - x)$.
   A.   2
   B.   4
   C.   6
   D.   8

14. Given that R is directly proportional to L and inversely proportional to P, $R = 3$ when $L = 9$ and $P = 0.8$, find R when $L = 15$ and $P = 1.8$.
   A.   0.3
   B.   2.2
   C.   3.3
   D.   6.6

   ggghhh

15.

NOT DRAWN TO SCALE
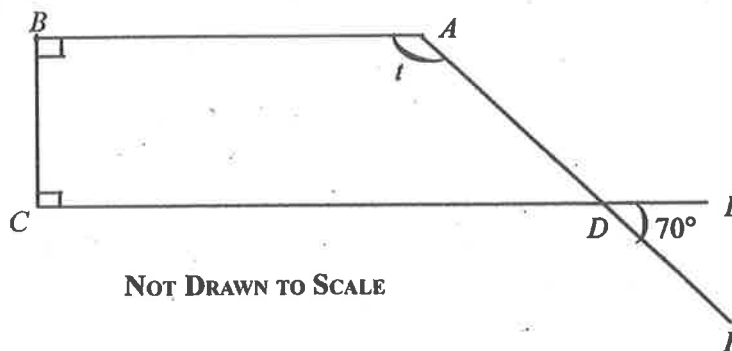
   In the diagram, $\angle ABC$ and $\angle BCD$ are right angles, $\angle BAD = t$ and $\angle EDF = 70°$. Find the value of t.
   A.   165°
   B.   140°
   C.   110°
   D.   70°

16. The sum of the interior angles of a regular polygon with k sides is $(3k - 10)$ right angles. Find the size of the exterior angle.
    A.   60°
    B.   90°
    C.   120°
    D.   40°

17. Make U the subject of the relation: $x = \dfrac{2U - 3}{3U + 2}$.

    A. $U = \dfrac{2x + 3}{3x + 2}$

    B. $U = \dfrac{2x + 3}{3x - 2}$

    C. $U = \dfrac{2x - 3}{3x - 2}$

    D. $U = \dfrac{2x + 3}{2 - 3x}$

    ggghhh

18. A trader paid import duty of 38 kobo in the naira on the cost of an engine. If a total of ₦22,800.00 was paid as import duty, calculate the cost of the engine.
    A.   ₦ 18,000.00
    B.   ₦ 24,000.00
    C.   ₦ 60,000.00
    D.   ₦ 120,000.00

19. The height of an equilateral triangle is $10\sqrt{3}$ cm . Calculate its perimeter.
    A.   60 cm
    B.   40 cm
    C.   30 cm
    D.   20 cm

20. In a $\triangle LMN$, $|\overline{LM}| = 6$ cm, $\angle LMN = 90°$, $\angle LNM = x$ and $\sin x = \dfrac{3}{5}$. Find the area of $\triangle LMN$.

    A.   24 cm^2

    B.   30 cm^2

    ggghhh

    C.   48 cm^2
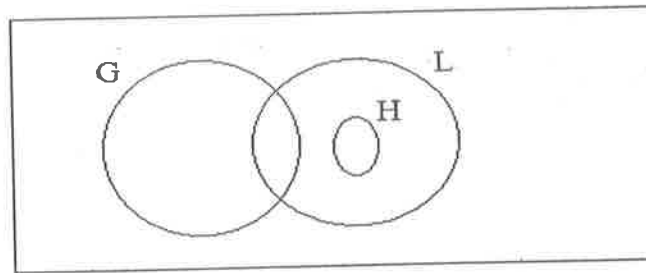
    D.   60 cm^2

Turn over

21. Consider the statements:
    P: All students offering Literature(L) also offer History(H);
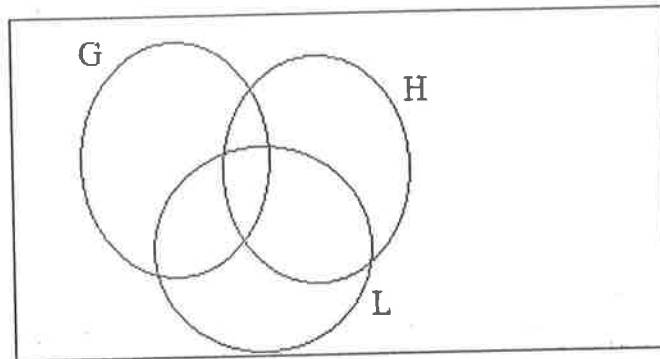   Q: Students offering History(H) do **not** offer Geography(G).
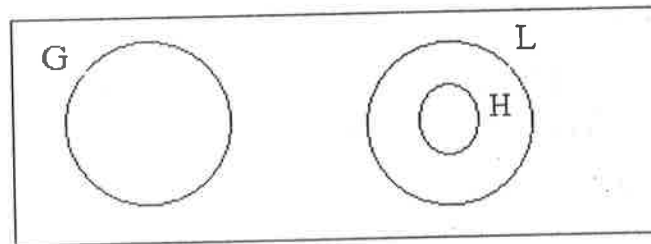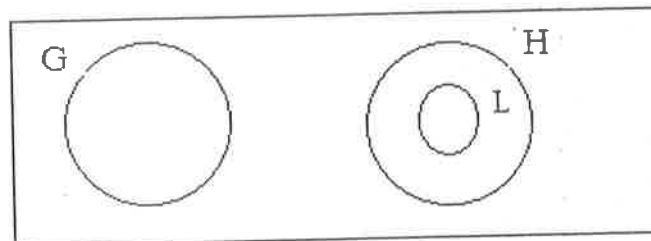   Which of the venn diagrams **correctly** illustrate the two statements?

A.

B.

ggghhh

C.

ggghhh

D.

22. Find the quadratic equation whose roots are $-2q$ and $5q$.

    A. $x^2 + 3qx + 10q^2 = 0$

    B. $x^2 - 3qx + 10q^2 = 0$

    C. $x^2 - 3qx - 10q^2 = 0$

    D. $x^2 + 3qx - 10q^2 = 0$

23. If $\tan \theta = \dfrac{3}{4}$, $180° < \theta < 270°$, Find the value of $\cos \theta$.

    A. $-\dfrac{4}{5}$

    B. $\dfrac{3}{5}$

    C. $\dfrac{4}{5}$

    D. $-\dfrac{3}{5}$

ggghhh

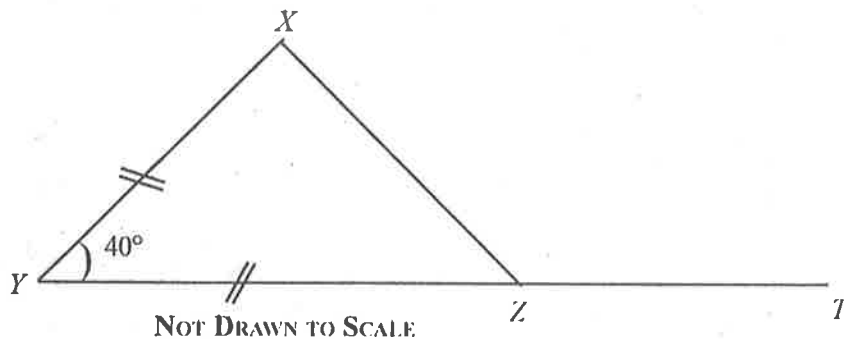24. If $\dfrac{2}{(x-3)} - \dfrac{3}{(x-2)} = \dfrac{p}{(x-3)(x-2)}$, find p.

    A. $-(5x - 13)$
    B. $(13 - x)$
    C. $(5 - x)$
    D. $-(x + 5)$

25. The diagonals of a rhombus are 12 cm and 5 cm. Calculate its perimeter.

    A.   34 cm

    B.   17 cm

    C.   24 cm

ggghhh

    D.   26 cm

26.

NOT DRAWN TO SCALE

In the diagram $\triangle XYZ$ is produced to T. If $|\overline{XY}| = |\overline{ZY}|$ and $\angle XYT = 40°$, find $\angle XZT$.

    A.   130°

    B.   110°

    C.   140°

    D.   120°

27. A solid brass cube is melted and recast as a solid cone of height h and base radius r. If the height of the cube is h, find r in terms of h.

A. $r = \sqrt{\dfrac{3h}{\pi}}$

B. $r = \pi h$

ggghhh

C. $r = h\sqrt{\dfrac{3}{\pi}}$

D. $r = h$

28. Which of the following is **not** an exterior angle of a regular polygon?

A. 66°

B. 24°

C. 15°

D. 72°

29. From a point T, a man moves 12 km due West and then moves 12 km due South to another point Q. Calculate the bearing of T from Q.

A. 315°

B. 225°

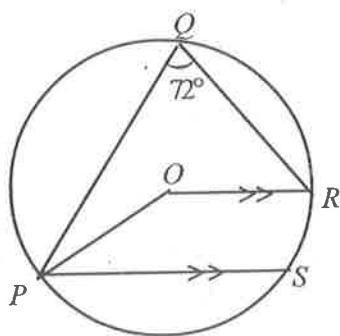*ggghhh*

C. 135°

D. 045°

30.

NOT DRAWN TO SCALE

In the diagram, O is the centre of circle $PQRS$, $\angle PQR = 72°$ and $\overline{OR} \parallel \overline{PS}$. Find $\angle OPS$.

A. 108°
B. 54°
C. 36°
D. 18°

31. A trapezium of sides 10 cm and 21 cm and height 8 cm is inscribed in a circle of radius 7 cm. Calculate the area of the region **not** covered by the trapezium.
[Take $\pi = \frac{22}{7}$]

    A.   94 cm^2

    B.   84 cm^2

    C.   80 cm^2

    D.   30 cm^2

32. Find correct to **two** decimal places the mean of $1\frac{1}{2}$, $2\frac{2}{3}$, $3\frac{3}{4}$, $4\frac{4}{5}$ and $5\frac{5}{6}$.
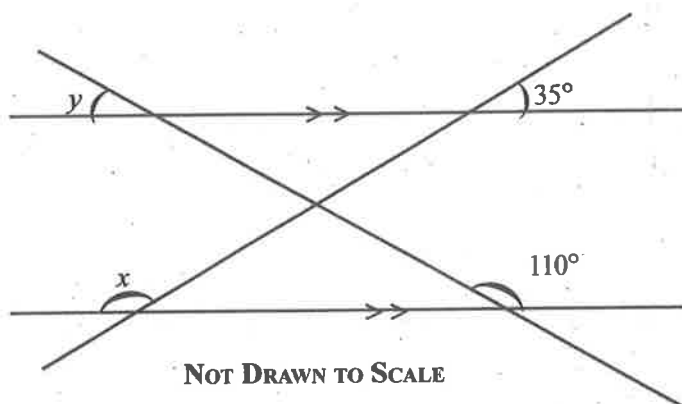
    A.   3.72

    B.   3.71

    C.   3.70

    D.   3.69

ggghhh

33. A cyclist moved at a speed of X km/h for 2 hours. He then increased his speed by 2 km/h for the next 3 hours. If the total distance covered is 36 km, calculate his initial speed, X.

    A.   3 km/h

    B.   4 km/h

    C.   6 km/h
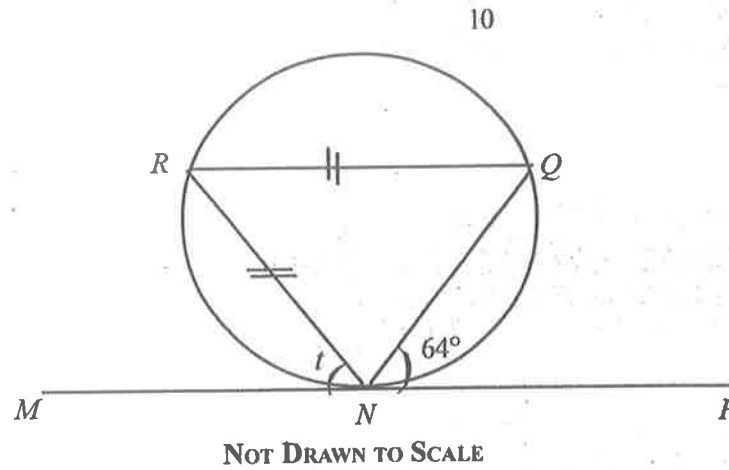
    D.   12 km/h

34.

NOT DRAWN TO SCALE

ggghhh

Find the value of $(x + y)$ in the diagram.

    A.   215°

    B.   145°

    C.   135°

    D.   70°

Turn over

35.

NOT DRAWN TO SCALE

In the diagram $\overline{MP}$ is a tangent to the circle NQR, $\angle PNQ = 64°$ and $|\overrightarrow{RQ}| = |\overrightarrow{RN}|$.
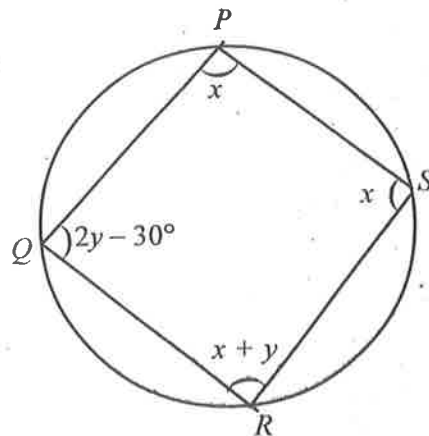Find the angle marked t.

- A.   58°
- B.   64°
- C.   115°
- D.   130°

ggghhh

36.   Find the first quartile of 7, 8, 7, 9, 11, 8, 7, 9, 6 and 8.

- A.   7.0
- B.   7.5
- C.   8.0
- D.   8.5

37.

NOT DRAWN TO SCALE

In the diagram, $PQRS$ is a circle. Find the value of x.

- A.   100°
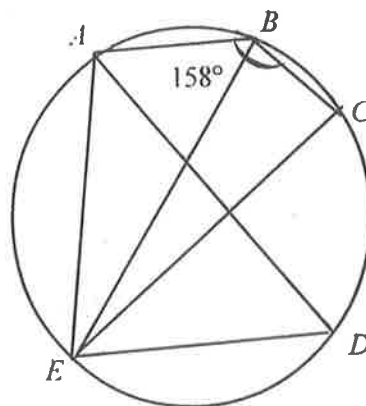- B.   80°
- C.   50°
- D.   30°

38. A cone has a base radius of 8 cm and height 11 cm. Calculate, correct to **two** decimal places, the curved surface area. [Take $\pi = \frac{22}{7}$]

   A. 477.71 cm^2

   B. 341.98 cm^2

   C. 276.57 cm^2

   D. 201.14 cm^2

39. Given that $\sin x = \frac{3}{5}$, $0° \leq x \leq 90°$, evaluate $(\tan x + 2\cos x)$.

   A. $\frac{1}{20}$

   B. $\frac{11}{20}$

   C. $1\frac{11}{20}$

   D. $2\frac{7}{20}$

ggghhh

40.

NOT DRAWN TO SCALE

In the diagram $\overline{EC}$ is a diameter of circle $ABCDE$. If $\angle ABC = 158°$, find $\angle ADE$.

   A. $22°$

   B. $112°$

   C. $90°$

ggghhh

   D. $68°$

Turn over

41.

Height (cm)	160	161	162	163	164	165
Number of players	4	6	3	7	8	9

The table shows the heights of thirty-seven players of a basketball team. Calculate, correct to one decimal place, the mean height of the players.

A. 165.0

B. 163.0

C. 162.0

D. 160.0

42. $\overline{XY}$ is a line segment with the coordinates $X(-8, -12)$ and $Y(p, q)$. If the midpoint of $\overline{XY}$ is $(-4, -2)$, find the coordinates of Y.

A. $(0, 4)$

ggghhh

B. $(4, 10)$

C. $(-6, -10)$

D. $(0, 8)$

43. Five hundred tickets were sold for a concert. Tickets for adults and children were sold at $ 4.50 and $ 3.00, respectively. If the total receipts for the concert was $ 1,987.50, how many tickets for adults were sold?

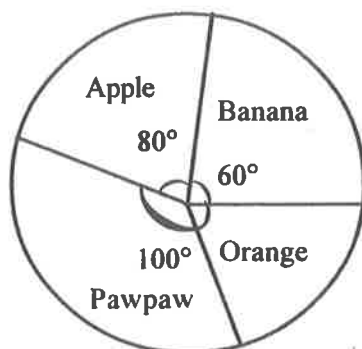A. 400

B. 325

C. 235

ggghhh

D. 175

44. The distance (*d*) between two villages is more than 18 km but **not more than 23 km**. Which of these inequalities represents the statement?

    A. $18 < d \le 23$

    B. $18 \le d < 23$

    C. $18 < d < 23$

    D. $18 \le d \le 23$

ggghhh

45.

NOT DRAWN TO SCALE

The pie chart represents the distribution of fruits on display in a shop. **If there are 60 apples** on display, how many oranges are there?

    A.   270

    B.   120

    C.   90

    D.   80

46. A box contains 40 identical balls of which 10 are red and 12 blue. If a ball is selected at random from the box, what is the probability that it is **neither red nor blue**?

    A. $\dfrac{11}{20}$

    B. $\dfrac{9}{20}$

ggghhh

    C. $\dfrac{3}{10}$

    D. $\dfrac{1}{4}$

Turn (

47. A fair die is tossed twice. What is the probability of getting a sum of **at least** 10?

   A. $\dfrac{2}{3}$

   B. $\dfrac{5}{18}$

   ggghhh

   C. $\dfrac{1}{6}$

   D. $\dfrac{5}{36}$

48. A man will be $(x + 10)$ years old in 8 years time. If 2 years ago he was 63 years, find the value of x.
   A. 67
   B. 63
   C. 57
   D. 55

49. The equation of a line is given as $3x - 5y = 7$. Find its gradient (slope).

   A. $\dfrac{3}{5}$

   B. $-\dfrac{3}{5}$

   C. $-\dfrac{5}{3}$

   D. $\dfrac{5}{3}$

50. For what value of x is $\dfrac{4 - 2x}{x + 1}$ undefined?
   A. -2
   B. -1 *ggghhh*
   C. 1
   D. 2

END OF PAPER