

**G9 ECZ
MATHEMATICS
2018
PAPER 1
SOLUTIONS
(BONUS)**

Grade 9 ECZ Mathematics 2018 Paper 1 (401/1) -- recovered fragment, pages 3-8 of 8

Worked Solutions with Step-by-step Explanations

ed from a scan artifact; the paper's own pages 1-2 (cover) are not available. The available question pages appear first -- worked answers are a

SECTION A [10 MARKS]

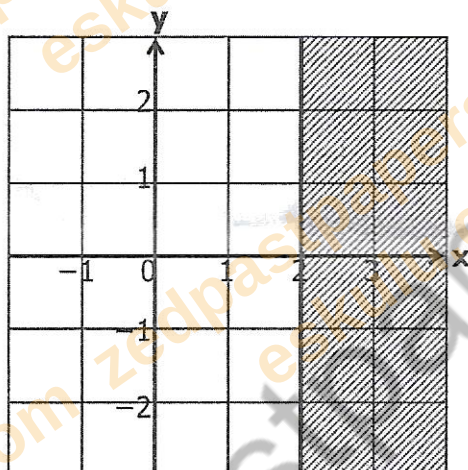
1 Round off 267.583 to the nearest ten.

- A 26
- B 27
- C 260
- D 270

2 Evaluate $-2 \times (-7)$.

- A 14
- B 9
- C -9
- D -14

3 The diagram below shows the XOY plane with a shaded region.



Which statement represents the shaded region?

- A $y \geq 2$
- B $x \geq 2$
- C $y \leq 2$
- D $x \leq 2$

4 Simplify the expression $3(2 - y) + 15$.

- A $3y + 9$
- B $-3y + 9$
- C $-3y + 21$
- D $-y + 15$

5 Which of the following is **not** a rational number?

A $\sqrt{4}$

B $\sqrt{3}$

C $\frac{2}{5}$

D $\frac{1}{4}$

6 Mr Chuma deposited K600.00 in a bank at the rate of 15% simple interest per annum for 9 months. How much interest did he earn?

A K67.50

B K120.00

C K810.00

D K6 750.00

7 Find the mean of 8, 4, 1, 4, 6 and 7.

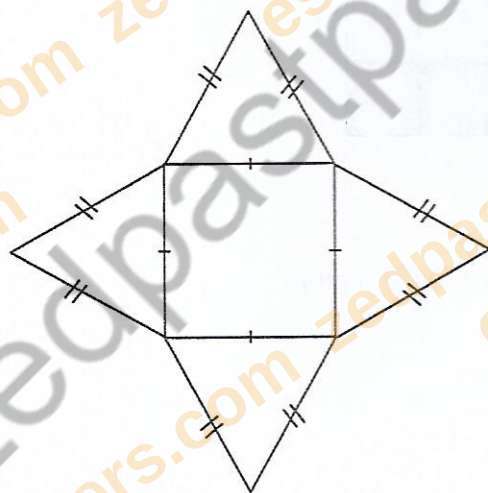
A 2

B 3

C 4

D 5

8 The figure below is a net of a ...



A triangular pyramid.

B square pyramid.

C rectangular pyramid.

D hexagonal pyramid.



Space for
working

9 Given that $v = u + at$, find the value of v when $u = 30$, $t = 4$ and $a = 5$.

- A 140
- B 75
- C 50
- D 39

10

State the order of the matrix $\begin{pmatrix} 2 \\ 3 \\ -3 \end{pmatrix}$.

- A 3×1
- B 1×3
- C 3×3
- D 1×1

SECTION B [40 MARKS]

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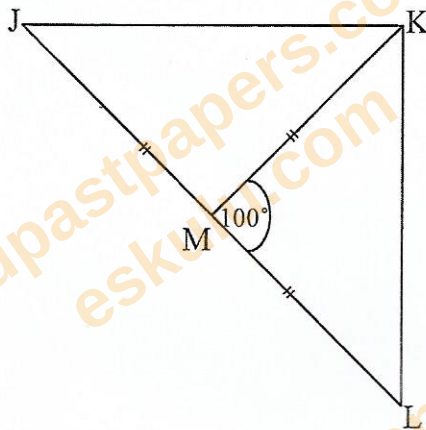
11 (a) Simplify $\frac{20x^4}{-5x}$.

(b) Given that $f(x) = 3x + 2$, find $f(-3)$.

12 Evaluate $\sqrt{81} + 2^3$.

13 Find the value of a in $3a + 2 = 11$.

14 In the diagram below, $JM = ML = MK$ and angle $KML = 100^\circ$.

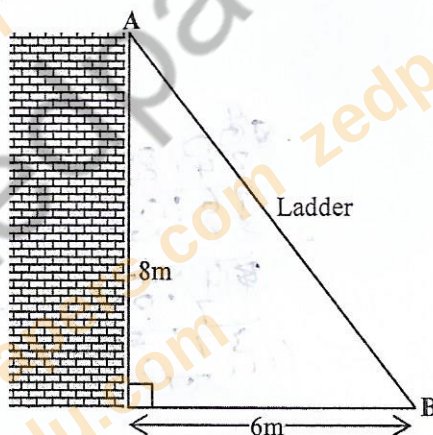


Calculate angle KJM.

15 Convert 0.101_2 to a number in base 10.

16 Given that $E = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and $A \subset E$ such that $A = \{\text{prime numbers}\}$, list A' .

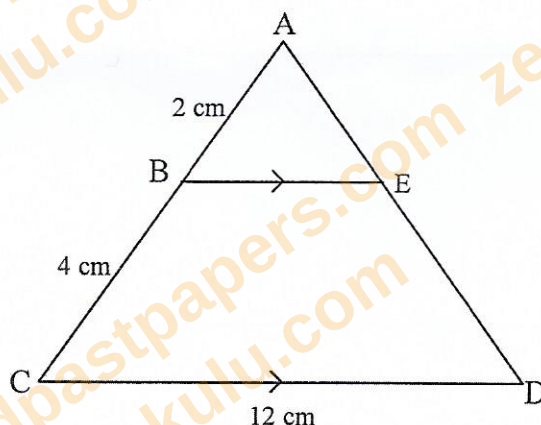
17 The diagram below shows a ladder AB leaning against a wall.



Calculate the length of the ladder AB.

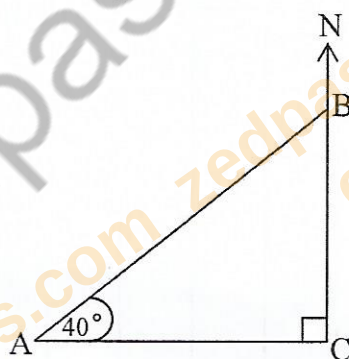
18 A road which is 1.5km long on the ground, is 15cm on a map. Find the scale of this map.

- 19 The size of each exterior angle of a regular polygon is 30° . Calculate the number of sides that the polygon has.
- 20 Given that $A = \begin{pmatrix} 9 & 12 \\ 6 & -15 \end{pmatrix}$, find $\frac{1}{3}A$.
- 21 In the diagram below, BE and CD are parallel, $AB = 2\text{cm}$, $BC = 4\text{cm}$ and $CD = 12\text{cm}$.



Find the ratio of BE to CD in its lowest terms.

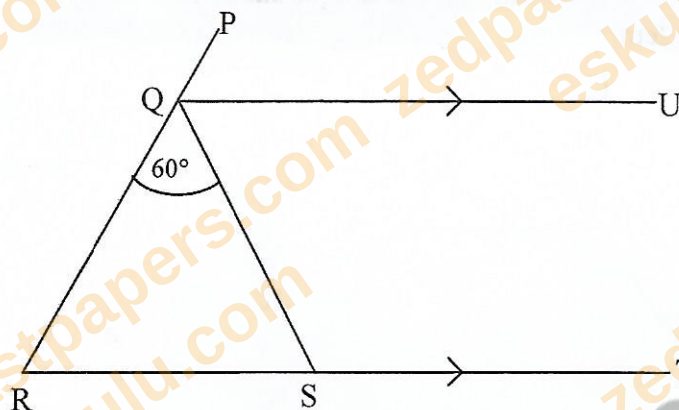
- 22 The volume of a solid is 540cm^3 . Calculate its mass if its density is 0.04g/cm^3 .
- 23 (a) Name the symbol used for input in a flow chart.
(b) How many faces does a cone have?
- 24 Evaluate $5^0 \div 5^2$.
- 25 The diagram below shows three points A, B and C on horizontal ground. Angle $BAC = 40^\circ$ and angle $ACB = 90^\circ$.



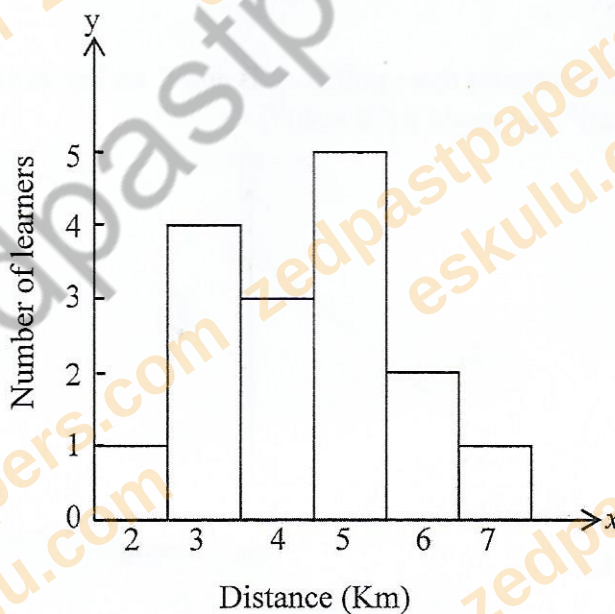
Find the bearing of A from B.

- 26 Factorise completely $3t^2 - 15tu$.

- 27 The cost of buying a radio for cash is K4 200.00. The same radio can be bought on hire purchase by paying a deposit of K1 500.00 plus 9 equal instalments of K420.00. Kasamba wants to buy this radio on hire purchase. How much more will he pay on hire purchase?
- 28 In the diagram below, QU is parallel to RT and angle $RQS = 60^\circ$.



- Given that QU bisects angle PQS, calculate angle QST.
- 29 Katumwa was given K100.00 to buy two packets of sugar at K24.50 each, one bottle of cooking oil at K34.00 and one bottle of Fanta at K7.00. How much was her change?
- 30 A survey was conducted among a group of learners in a certain school on how far they walked to school. The results are given in the bar chart below.



How many learners took part in the survey?

Question 1. Round off 267.583 to the nearest ten.

The units digit is 7 (≥ 5), so round up: 267.583 $\rightarrow$ 270

Answer: D -- 270

Question 2. Evaluate $-2 \times (-7)$.

Negative times negative is positive: 2×7

Answer: A -- 14

Question 3. The XOY plane shows a shaded vertical band to the right of the line $x = 2$ (spanning all y). Which statement represents the shaded region?

The region is everywhere to the right of the vertical line $x = 2$

Answer: B -- $x \geq 2$

Question 4. Simplify the expression $3(2 - y) + 15$.

$6 - 3y + 15 = 21 - 3y$

Answer: C -- $-3y + 21$

Question 5. Which of the following is not a rational number?

A number that cannot be written as an exact fraction (like $\sqrt{3}$) is irrational; the rest are rational

Answer: B -- $\sqrt{3}$

Question 6. Mr Chuma deposited K600.00 in a bank at the rate of 15% simple interest per annum for 9 months. How much interest did he earn?

Interest = $600 \times 0.15 \times (9/12) = 600 \times 0.15 \times 0.75$

Answer: A -- K67.50

Question 7. Find the mean of 8, 4, 1, 4, 6 and 7.

$(8+4+1+4+6+7) / 6 = 30 / 6$

Answer: D -- 5

Question 8. The figure below is a net of a square-based solid with 4 triangular flaps folding up to a common apex. Name the solid.

Answer: B -- Square pyramid

Question 9. Given that $v = u + at$, find the value of v when $u=30$, $t=4$ and $a=5$.

$$v = 30 + (5)(4) = 30 + 20$$

Answer: C -- 50

Question 10. State the order of the matrix $\begin{pmatrix} 2 \\ 3 \\ -3 \end{pmatrix}$ written as a column.

The matrix has 3 rows and 1 column

Answer: A -- 3×1

Question 11. (a) Simplify $(20x^4)/(-5x)$. (b) Given that $f(x) = 3x + 2$, find $f(-3)$.

(a)

$$20/-5 = -4, x^4/x = x^3$$

Answer: = $-4x^3$

(b)

$$f(-3) = 3(-3) + 2 = -9 + 2$$

Answer: = -7

Question 12. Evaluate $\sqrt{81} + 2^3$.

$$9 + 8$$

Answer: = 17

Question 13. Find the value of a in $3a + 2 = 11$.

$$3a = 9$$

Answer: $a = 3$

Question 14. In the diagram, $JM = ML = MK$ and angle $KML = 100$ degrees (J, M, L collinear). Calculate angle KJM .

Since J, M, L are collinear, angle $JMK = 180 - \text{angle } KML = 180 - 100 = 80$ degrees

Triangle JMK is isosceles ($JM = MK$), so angle $KJM = \text{angle } MKJ = (180 - 80) / 2$

Answer: = 50 degrees

Question 15. Convert 0.101 (base 2) to a number in base 10.

$$0.101_2 = 1 \times 0.5 + 0 \times 0.25 + 1 \times 0.125$$

Answer: = 0.625

Question 16. Given that $E = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and A is a subset of E such that $A = \{\text{prime numbers}\}$, list A' .

$$A = \{2, 3, 5, 7\}. A' = E \text{ minus } A$$

Answer: $A' = \{1, 4, 6, 8\}$

Question 17. The diagram shows a ladder AB leaning against a wall. The wall is 8m high and the foot of the ladder is 6m from the wall. Calculate the length of the ladder AB .

$$AB = \sqrt{8^2 + 6^2} = \sqrt{64 + 36} = \sqrt{100}$$

Answer: = 10 m

Question 18. A road which is 1.5km long on the ground, is 15cm on a map. Find the scale of this map.

$$1.5\text{km} = 150\,000 \text{ cm. Scale} = 15 : 150\,000$$

Answer: = 1 : 10 000

Question 19. The size of each exterior angle of a regular polygon is 30 degrees. Calculate the number of sides that the polygon has.

$$\text{Number of sides} = 360 / 30$$

Answer: = 12 sides

Question 20. Given that $A = \begin{bmatrix} 9 & 12 \\ 6 & -15 \end{bmatrix}$, find $(1/3)A$.

$$\text{Answer: } (1/3)A = \begin{bmatrix} 3 & 4 \\ 2 & -5 \end{bmatrix}$$

Question 21. In the diagram, BE and CD are parallel, $AB=2\text{cm}$, $BC=4\text{cm}$ and $CD=12\text{cm}$. Find the ratio of BE to CD in its lowest terms.

$$AC = AB + BC = 2 + 4 = 6\text{cm. Triangles } ABE \text{ and } ACD \text{ are similar (BE parallel CD): } BE/CD = AB/AC = 2/6$$

Answer: $BE : CD = 1 : 3$

Question 22. The volume of a solid is 540cm^3 . Calculate its mass if its density is 0.04g/cm^3 .

$$\text{Mass} = \text{volume} \times \text{density} = 540 \times 0.04$$

Answer: = 21.6 g

Question 23. (a) Name the symbol used for input in a flow chart. (b) How many faces does a cone have?

(a)

Answer: Parallelogram

(b)

Answer: 2 faces

Question 24. Evaluate 5^0 divided by 5^2 .

$1 / 25$

Answer: = 0.04

Question 25. The diagram shows three points A, B and C on horizontal ground. Angle BAC = 40 degrees and angle ACB = 90 degrees (N marked at B). Find the bearing of A from B.

Angle ABC = $180 - 40 - 90 = 50$ degrees (angle sum of triangle ABC)

Answer: Bearing of A from B = $180 + 50 = 230$ degrees

Question 26. Factorise completely $3t^2 - 15tu$.

Common factor 3t: $3t^2 - 15tu = 3t(t - 5u)$

Answer: = $3t(t - 5u)$

Question 27. The cost of buying a radio for cash is K4 200.00. The same radio can be bought on hire purchase by paying a deposit of K1 500.00 plus 9 equal instalments of K420.00. Kasamba wants to buy this radio on hire purchase. How much more will he pay on hire purchase?

Hire purchase total = $1\,500 + 9(420) = 1\,500 + 3\,780 = \text{K}5\,280$

Answer: Extra = $5\,280 - 4\,200 = \text{K}1\,080.00$

Question 28. In the diagram, QU is parallel to RT and angle RQS = 60 degrees. Given that QU bisects angle PQS (P, Q, R collinear), calculate angle QST.

Angle PQS = $180 - \text{angle RQS} = 180 - 60 = 120$ degrees (angles on the straight line PR at Q)

QU bisects angle PQS, so angle UQS = $120 / 2 = 60$ degrees

Answer: Angle QST = angle UQS = 60 degrees (alternate angles, QU parallel to RT, transversal QS)

Question 29. Katumwa was given K100.00 to buy two packets of sugar at K24.50 each, one bottle of cooking oil at K34.00 and one bottle of Fanta at K7.00. How much was her change?

$$2(24.50) + 34 + 7 = 49 + 34 + 7 = \text{K}90.00$$

Answer: Change = 100 - 90 = K10.00

Question 30. A bar chart shows the number of learners against the distance (km) they walked to school: 1 (2km), 4 (3km), 3 (4km), 5 (5km), 2 (6km), 1 (7km). How many learners took part in the survey?

$$1 + 4 + 3 + 5 + 2 + 1$$

Answer: = 16 learners

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