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0178/02

May/June 2024

1 hour 30 minutes

Marks: 70

Candidates answer on the Question Paper.

- 1 Add a pair of brackets in the statement $126 \div 9 \times 7 + 27 - 19 = 10$ to make it correct.

$$126 \div 9 \times 7 + 27 - 19 = 10 \quad [1]$$

- 2 (a) Simplify.

$$\frac{n^2 + 3n}{n}$$

..... [1]

- (b) Evaluate.

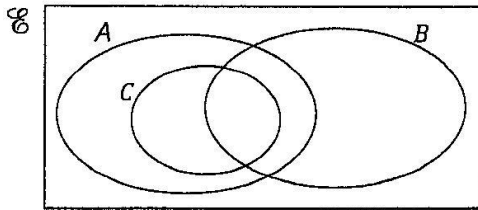
$$\left(\sqrt[3]{15\frac{5}{8}} \right)^{-1}$$

..... [2]

- 3 Given that the ratio $x : y = 5 : 6$, find the ratio of $(5x - 2y) : (2x + y)$.

..... [2]

- 4 (a) Shade $A \cap B'$ in the Venn diagram.

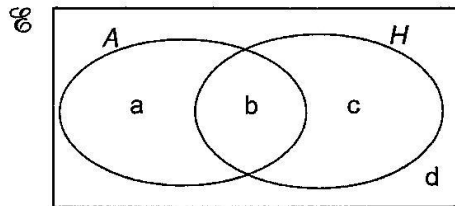


[1]

- (b) The Venn diagram shows 150 people at a party.

$A = \{\text{Amapiano music}\}$ and $H = \{\text{House music}\}$

$n(U) = 150, n(A) = 60$ and $n(H) = 35$.



Find

- (i) the smallest possible value of d ,

$d = \dots\dots\dots$ [1]

- (ii) the value of c if $a = 40$.

$c = \dots\dots\dots$ [2]

5 Given $\mathbf{A} = \begin{pmatrix} 4 & 1 \\ 0 & 2 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} -2 & 1 \\ 3 & 0 \end{pmatrix}$,

evaluate

(a) $-2\mathbf{B}$,

..... [1]

(b) $\mathbf{AB}$.

..... [2]

6 Find, in its simplest form, the n th term of the sequence 9, 12, 15, 18, ...

..... [2]

- 7 Molungoa is given 40% discount and a further reduction of 20% for using a reward card when buying a table.

Calculate the original price of the table if the final selling price is M960.

M..... [3]

- 8 The areas of three similar square flower beds R , S and T are 64 m^2 , 144 m^2 and 400 m^2 respectively.

Find, in its simplest form, the ratio of the **sides** of R , S and T .

..... : : [3]

9 (a) $T = \sqrt{b - n^2}$.

Make b the subject of the formula.

$$b = \dots\dots\dots [2]$$

(b) Solve the simultaneous equations.

$$5x - 2y = 5$$

$$3x - 2y = -1$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [3]$$

- 10 (a) Given that $8^{2x-1} = 18$,
find the value of 8^x .

..... [3]

- (b) Find the value of k when $(x + k)^2 = x^2 + 12x + m$.

..... [3]

11 Factorise fully.

(a) $3x^2 + 11x - 20$

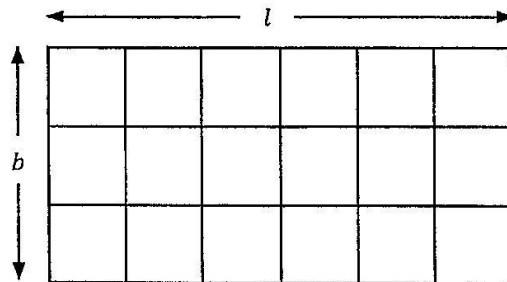
..... [2]

(b) $(a + b)^2 - (a + b)$

..... [1]

12 The diagram shows a rectangle drawn using squares.

The length $l = 15$ cm and width is b cm.

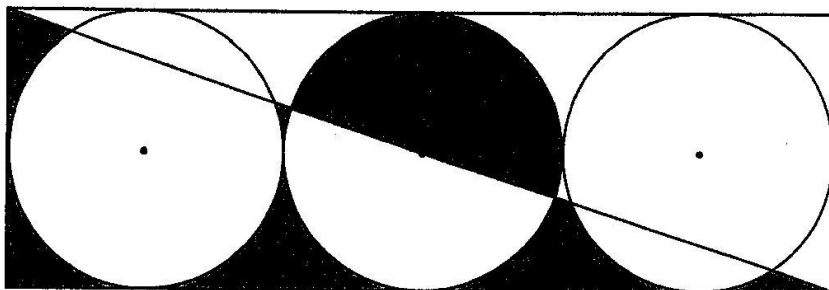


NOT TO
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Calculate the perimeter of the rectangle.

..... cm [2]

- 13 The diagram shows 3 identical circles of radius 5 cm inscribed in a rectangle.



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Calculate, in terms of π , the area of the shaded region.

Give your answer in the form $a + b\pi$, where a and b are integers.

..... [2]

- 14 $\vec{AB} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$, $\vec{BC} = \begin{pmatrix} -5 \\ 2 \end{pmatrix}$ and the coordinates of point B are $(7,0)$.

Find

(a) $|\vec{AB}|$,

.....units [2]

- (b) the coordinates of the point C .

..... [2]

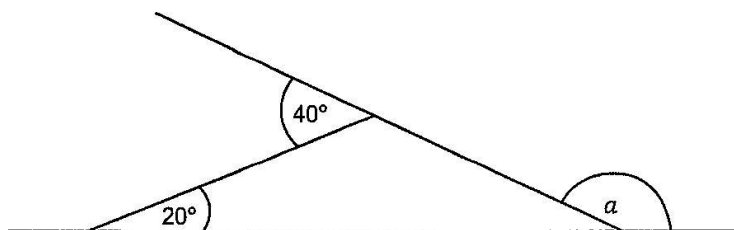
- 15 A point (4,6) is transformed using the matrix $\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}$ followed by translation vector $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$.
Find the x – coordinate of the image.

..... [2]

- 16 y is directly proportional to x^3 .
The difference in the values of y when $x = 1$ and $x = 2$ is 35.
Find the value of y when $x = -3$.

$y =$ [3]

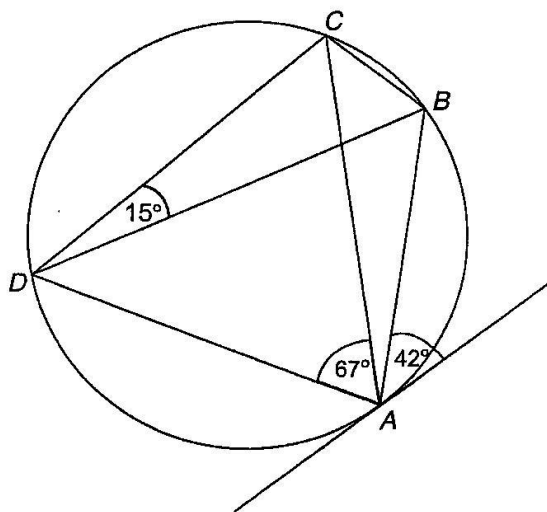
- 17 Find the size of the angle marked a in the diagram.



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.....° [2]

- 18 A quadrilateral $ABCD$ is inscribed in a circle.
A tangent at A makes an angle 42° with the chord AB .
Angle $BDC = 15^\circ$ and angle $CAD = 67^\circ$.



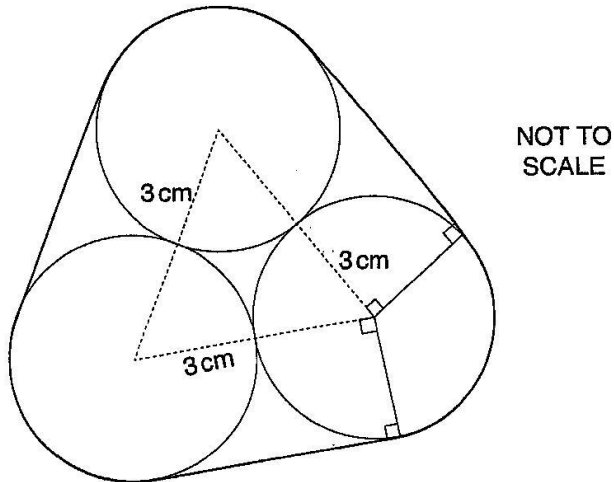
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Calculate the size of the angle ABD .

.....° [2]

- 19 The diagram shows three equal circles of radius 3 cm enclosed by a rubber band such that they touch each other.

The straight part of the rubber band is tangential to the radius of the circles.

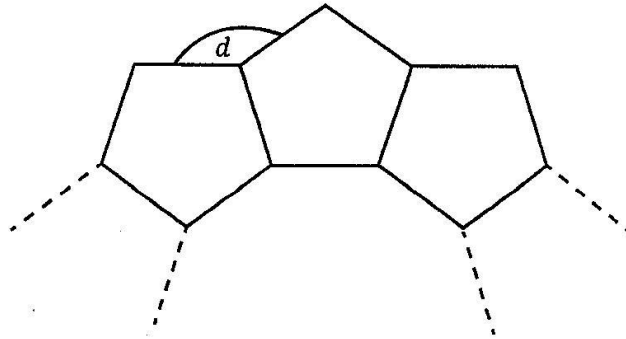


Find, in terms of π , the length of the rubber band.

✓ ✓

..... [3]

- 20 The diagram shows regular pentagons placed to form a necklace which is incomplete.



Find the size of the angle marked d .

$d = \dots\dots\dots^\circ$ [3]

- 21 Given a set of numbers $-5, 7, 9, 10, 12, 14, 15, 19$,
find

(a) the median,

$\dots\dots\dots$ [2]

(b) the range.

$\dots\dots\dots$ [1]

22 Bag **A** contains 6 red balls and 4 blue balls.

Bag **B** contains 4 red balls and 8 blue balls.

A bag is selected at random and then a ball is chosen at random from it.

Find the probability that

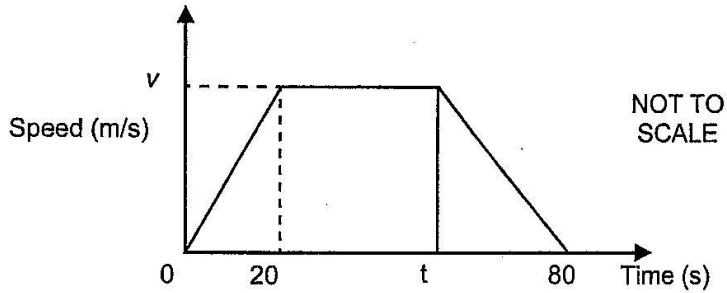
(a) bag **A** is selected and a blue ball is chosen from it,

..... [2]

(b) a blue ball is selected from each bag.

..... [2]

- 23** A motorist accelerates from rest at 1.25 m/s^2 to a speed $v \text{ m/s}$ in 20 seconds. He then travels at constant speed until t seconds, decelerates and stops at 80 seconds. The speed-time graph represents his journey.



- (a) Calculate the maximum speed, v .

.....m/s [2]

- (b) The total distance travelled is 1450m.
Calculate the time, t .

..... seconds [3]

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