

CXC (CSEC) MATHEMATICS MAY 2011 BOOTCAMPS

WORKOUT 4C – Geometry 1 (Transformation, Construction), Trigonometry 1, Vectors, Matrices

GEOMETRY 1. TRIGONOMETRY 1

PAPER 2 (Structured)

#1 – June 2008 #4b	#11 – June 2004 #5	#21 – June 2000 #7
#2 – June 2008 #6	#12 – June 2003 #3b	#22 – June 1999 #4
#3 – June 2007 #3b	#13 – June 2003 #4	#23 – June 1999 #6b
#4 – June 2007 #6	#14 – June 2002 #3	#24 – Jan 2009 #3b
#5 – June 2006 #3a	#15 – June 2002 #5a	#25 – Jan 2009 #6
#6 – June 2006 #4	#16 – June 2002 #7	#26 – Jan 2008 #3b
#7 – June 2006 #6	#17 – June 2001 #3b	#27 – Jan 2008 #6
#8 – June 2005 #5	#18 – June 2001 #4a	#28 – Jan 2007 #4a
#9 – June 2005 #6a	#19 – June 2001 #5	#29 – Jan 2007 #5b
#10 – June 2004 #4b	#20 – June 2000 #4a,b	

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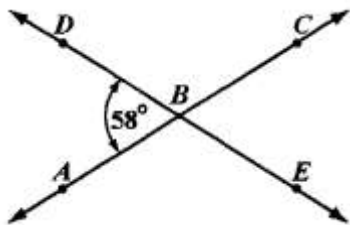
PAPER 1– (Multiple Choice)

GEOMETRY 1, TRIGONOMETRY 1, VECTORS, MATRICES

Item 1 refers to the diagram below.

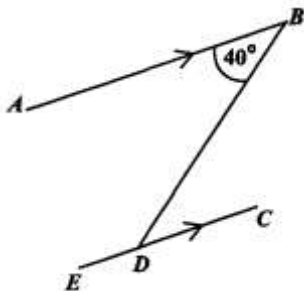
AC and DE are straight lines intersecting at B .

B . Angle $DBA = 58^\circ$.



1. The measure of angle ABE is

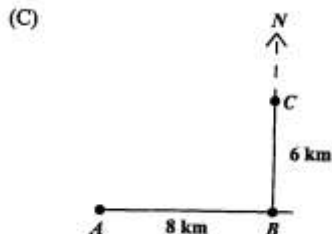
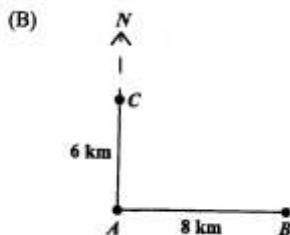
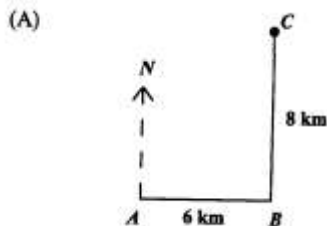
- (A) 58°
- (B) 122°
- (C) 142°
- (D) 302°



2. AB is parallel to EC . The measure of $\angle BDE$ is

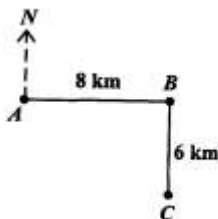
- (A) 40°
- (B) 50°
- (C) 140°
- (D) 180°

3. A ship sailed 8 km due east from A to B . It then sailed 6 km due north to C . Which diagram below BEST represents the path of the ship?

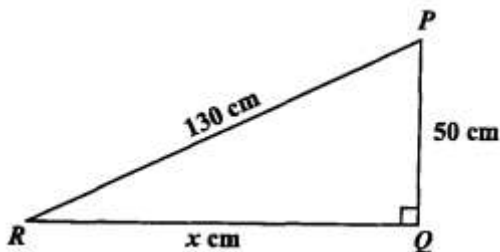


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(D)



Item 4 refers to the following diagram.



4. In the right-angled triangle above, **not drawn to scale**, $\hat{Q} = 90^\circ$, $PQ = 50$ cm, $PR = 130$ cm, and $RQ = x$ cm.

$\tan \hat{PRQ} =$

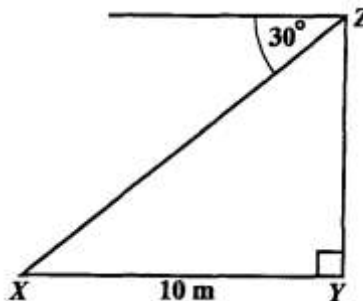
- (A) $\frac{50}{x}$
 (B) $\frac{x}{50}$
 (C) $\frac{50}{130}$
 (D) $\frac{x}{130}$

5. Which of the following **BEST** describes the properties of an equilateral triangle?

- I. All sides are equal.
 II. All angles are equal.
 III. Only two sides are equal.
 IV. Only two angles are equal.

- (A) I and II
 (B) II and III
 (C) III only
 (D) IV only

Item 6 refers to the diagram below.

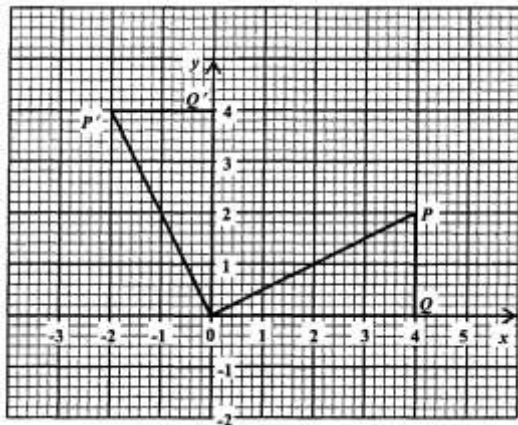


6. The diagram above, **not drawn to scale**, shows that the angle of depression of a point X from Z is 30° . If X is 10 metres from Y , the height of YZ , in metres, is

- (A) $10 \tan 30^\circ$
 (B) $10 \sin 30^\circ$
 (C) $10 \cos 30^\circ$
 (D) $10 \cos 60^\circ$

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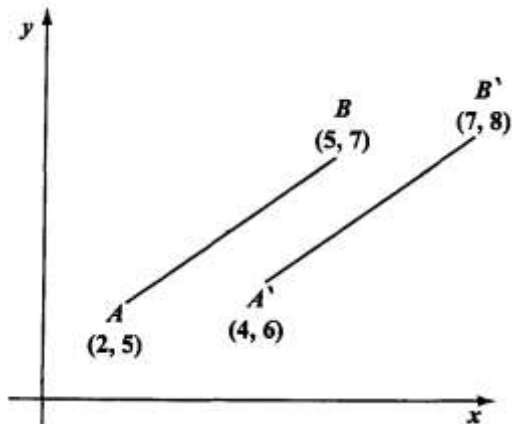
Item 7 refers to the diagram below.



7. In the figure above, ΔOPQ is mapped to $\Delta OP'Q'$. What type of transformation has taken place?

- (A) Reflection
- (B) Enlargement
- (C) Translation
- (D) Rotation

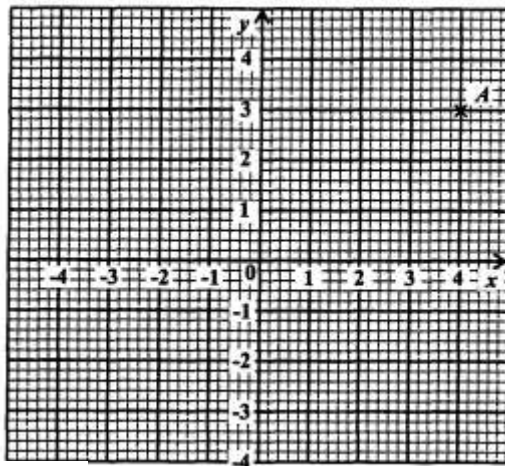
Item 8 refers to the diagram below.



8. In the diagram, the translation by which AB is mapped onto $A'B'$ is represented by

- (A) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$
- (B) $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$
- (C) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$
- (D) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$

Item 9 refers to the following graph which shows the point A.



9. What are the co-ordinates of the image of A under reflection in the y -axis?

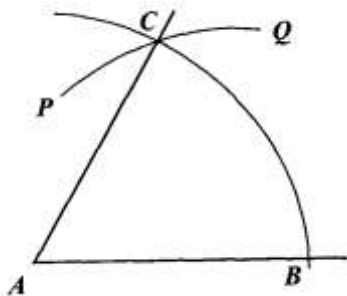
- (A) $(-3, 4)$
- (B) $(3, -4)$
- (C) $(4, -3)$
- (D) $(-4, 3)$

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10. A boat was travelling on a bearing of 270° .
In what direction is it travelling?

- (A) West
- (B) East
- (C) North
- (D) South

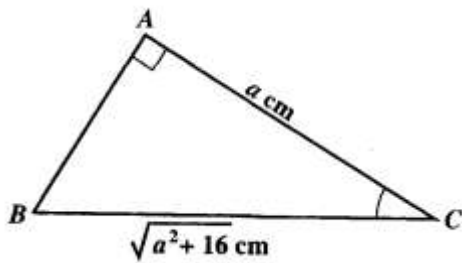
Item 11 refers to the diagram below of a construction. With centre A , an arc BC is drawn. With centre B , and the same radius, the arc PCQ is drawn.



11. What is the measure of $\angle BAC$?

- (A) 30°
- (B) 45°
- (C) 60°
- (D) 75°

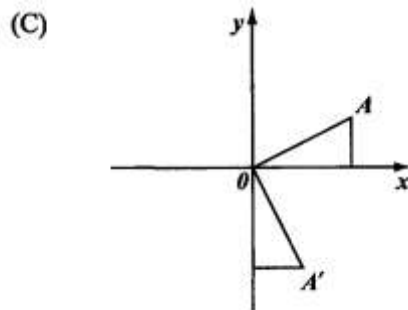
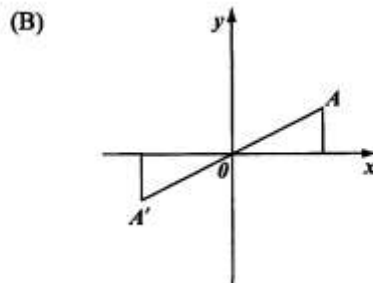
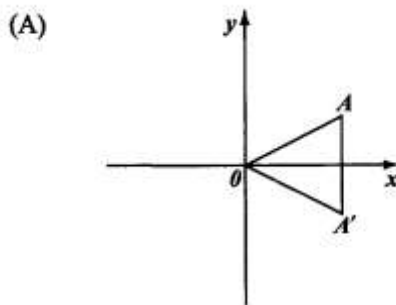
Item 12 refers to the following diagram.



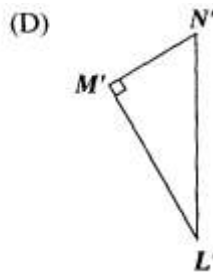
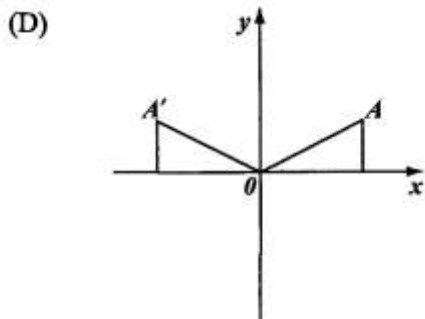
12. The length, in cm, of AB is

- (A) 4
- (B) a
- (C) $a + 4$
- (D) $a - 4$

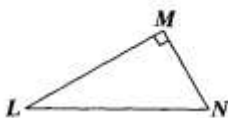
13. In each of the diagrams shown below, A' is the image of A . Which of the diagrams shows a reflection in the x -axis?



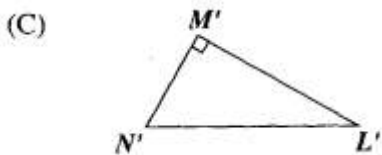
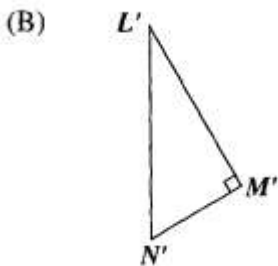
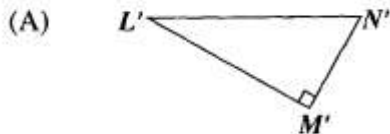
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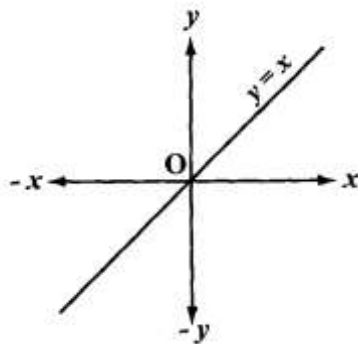
14.



The triangle LMN above is rotated in a clockwise direction about L through an angle of 90° . What is its image?



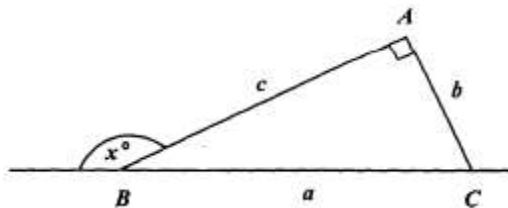
Item 15 refers to the following diagram.



15. In the diagram above, if the line $y=x$ is rotated anti-clockwise about O through 90° , what is its image?

- (A) $y=0$
- (B) $x=0$
- (C) $y=x$
- (D) $y=-x$

Item 16 refers to the diagram below.



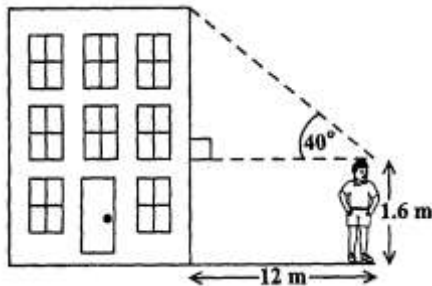
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16. The value of $\tan (180^\circ - x^\circ)$ is equal to

- (A) a/b
- (B) b/c
- (C) a/c
- (D) b/a

Item 17 refers to the diagram of a building below.

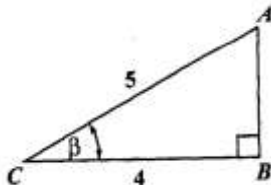
A boy stands 12 metres from the foot of the building and observes the angle of elevation of the top of the building.



17. The height of the building is approximately

- (A) $12 \tan 40^\circ$
- (B) $1.6 + 12 \sin 40^\circ$
- (C) $1.6 + 12 \cos 40^\circ$
- (D) $1.6 + 12 \tan 40^\circ$

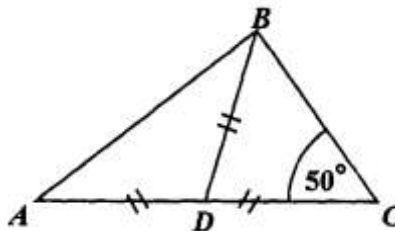
Item 18 refers to the following diagram.



18. From the diagram above, $\sin \beta$ is

- (A) $\frac{3}{5}$
- (B) $\frac{3}{4}$
- (C) $\frac{4}{5}$
- (D) $\frac{5}{3}$

Item 19 refers to the following diagram.



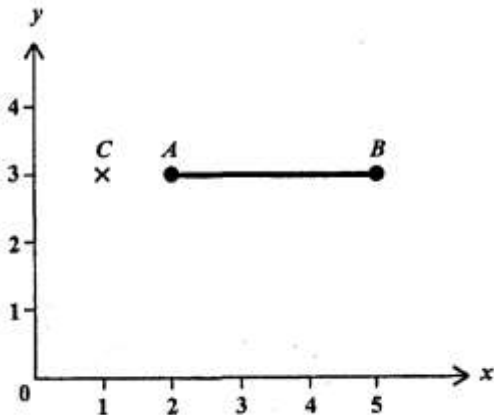
19. In the figure above, ABC is a triangle in which $AD = BD = CD$.

The angle ABC is

- (A) 40°
- (B) 50°
- (C) 80°
- (D) 90°

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Item 20 refers to the diagram below.



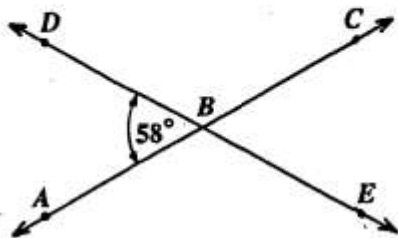
20. Line AB is rotated through 90° clockwise about the point C .

The coordinates of A' , the image of A are

- (A) (1, 1)
- (B) (1, 2)
- (C) (1, 4)
- (D) (2, 2)

Items 21-22 refer to the diagram below.

AC and DE are straight lines intersecting at B . Angle $DBA = 58^\circ$.



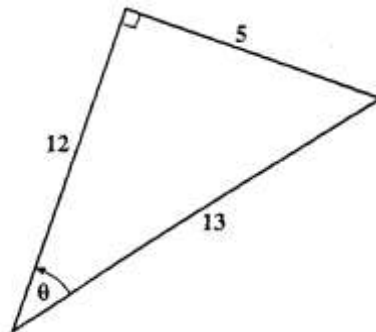
21. The measure of angle ABE is

- (A) 302°
- (B) 142°
- (C) 122°
- (D) 58°

22. Which of the following angles are equal?

- (A) $\angle DBC$ and $\angle CBE$
- (B) $\angle CBE$ and $\angle ABE$
- (C) $\angle ABD$ and $\angle CBD$
- (D) $\angle ABD$ and $\angle CBE$

23.



In the right-angled triangle above, $\tan \theta$ is

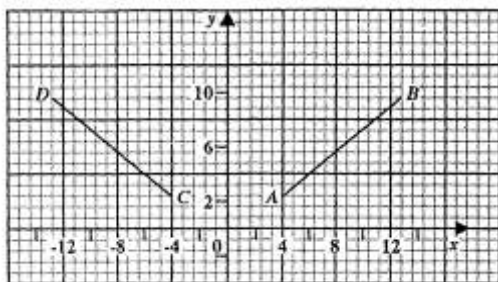
- (A) $\frac{5}{13}$
- (B) $\frac{5}{12}$
- (C) $\frac{12}{5}$
- (D) $\frac{13}{5}$

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24. In a triangle ABC , angle $A = x^\circ$ and angle $B = 2x^\circ$. What is the size of angle C ?

- (A) 45°
- (B) 60°
- (C) $(180 - 3x)^\circ$
- (D) $\left(\frac{180}{3x}\right)^\circ$

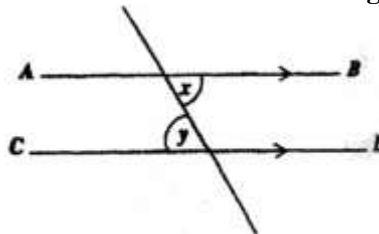
Item 25 refers to the diagram below.



25. In the figure above, the line CD is the image of AB after a

- (A) a rotation through 90° centre O
- (B) an enlargement of scale factor -1
- (C) a translation by vector $\begin{pmatrix} -4 \\ -8 \end{pmatrix}$
- (D) a reflection in the y -axis

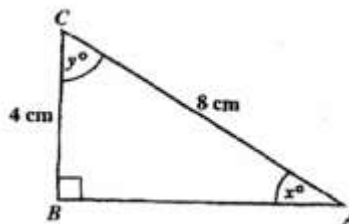
Item 26 refers to the following diagram.



26. In the figure above AB and CD are parallel. Which of the following BEST describes the relation between x and y ?

- (A) $x + y < 2x$
- (B) $x = y$
- (C) $x + y > 2x$
- (D) $x < y$

Item 27 refers to the following diagram.



27. In the right-angled triangle above, which trigonometric ratio is equal to $\frac{4}{8}$?

- (A) $\tan y$
- (B) $\cos x$
- (C) $\sin x$
- (D) $\tan x$

28. A rectangle has rotational symmetry of order

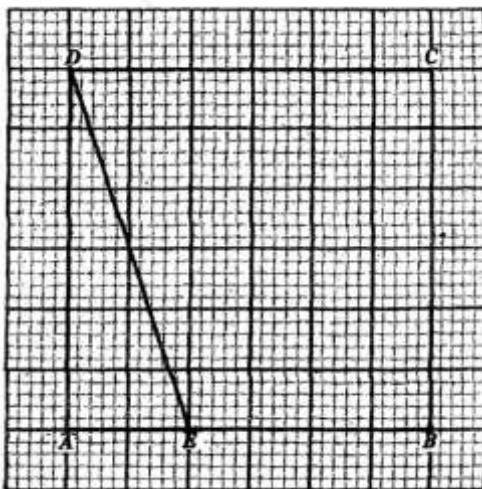
- (A) 1
- (B) 2
- (C) 3
- (D) 4

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29. If the sum of the interior angles of a polygon is 4 right angles, then the polygon is a

- (A) triangle
- (B) hexagon
- (C) pentagon
- (D) quadrilateral

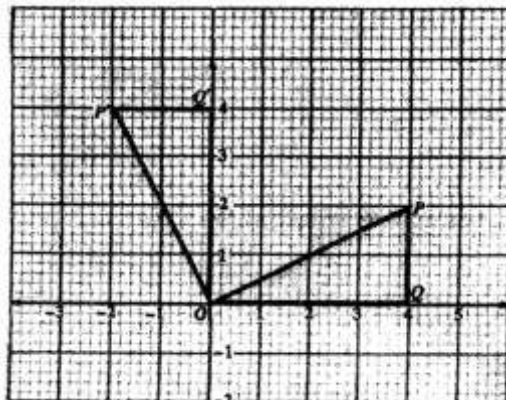
Item 30 refers to the following graph.



30. How many triangles congruent to $\triangle ADE$ would be needed to cover the square $ABCD$ entirely?

- (A) 2
- (B) 4
- (C) 6
- (D) 8

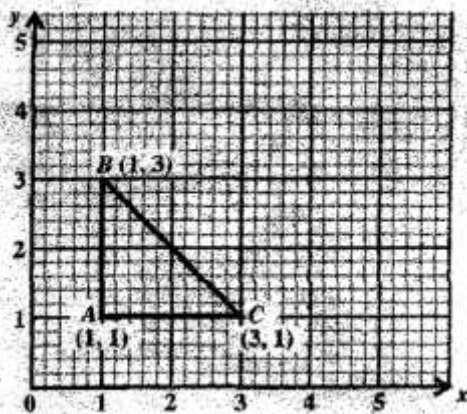
Item 31 refers to the diagram below.



31. In the figure above, $\triangle OPQ$ is mapped to $\triangle OP'Q'$. What type of transformation has taken place?

- (A) Reflection
- (B) Shear
- (C) Translation
- (D) Rotation

Item 32 refers to the following diagram.



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32. $A'B'C'$ is the image of ABC under an enlargement by a scale factor 2. The area, in square units, of $A'B'C'$ is

(A) 2
 (B) 4
 (C) 8
 (D) 12

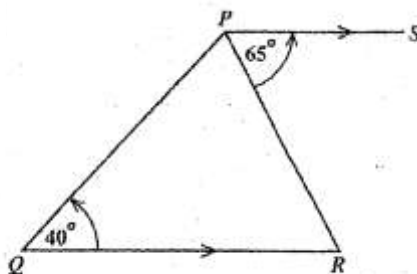
33. A rectangle has rotational symmetry of order

(A) 1
 (B) 2
 (C) 3
 (D) 4

34. A five-metre-long ladder which rests on the horizontal ground is leaning against a vertical wall. The foot of the ladder is 3 m away from the wall. How far up the wall does the ladder reach?

(A) 4 m
 (B) 6 m
 (C) 8 m
 (D) 15 m

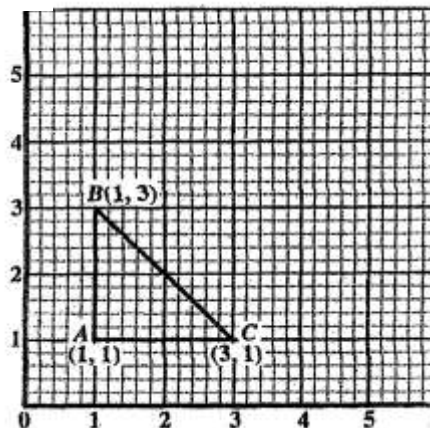
35.



In the figure above, not drawn to scale, angle $PQR = 40^\circ$. QR is parallel to PS . The size of angle QPR is

(A) 25°
 (B) 40°
 (C) 65°
 (D) 75°

36.

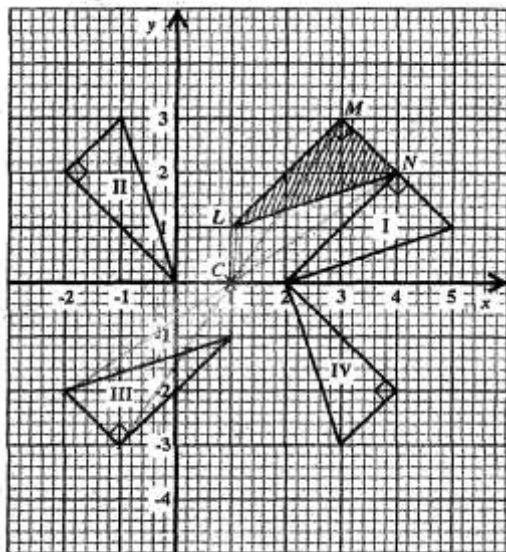


$\triangle ABC$ is enlarged using a scale factor of 2. The area, in cm^2 , of the enlarged triangle is

(A) 2
 (B) 4
 (C) 8
 (D) 12

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37.



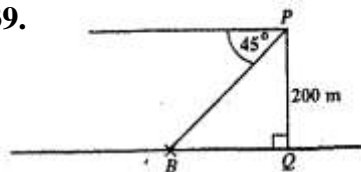
The shaded triangle LMN above is rotated in a clockwise direction about $C(1,0)$ through an angle of 90° . Its image is triangle

- (A) I
- (B) II
- (C) III
- (D) IV

38. Which of the following shapes does NOT have a line of symmetry?

- (A)
- (B)
- (C)
- (D)

39.

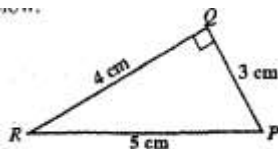


In the diagram above, not drawn to scale, PQ represents a cliff, 200 m high, and B represents a boat. The angle of depression of the boat from P is 45° . The distance of the boat from the bottom of the cliff, is

- (A) 100 m
- (B) 200 m
- (C) 420 m
- (D) 900 m

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Items 40 refers to the diagram below,



40. In the triangle above, $\cos P$ is

- (A) $\frac{4}{5}$
- (B) $\frac{4}{3}$
- (C) $\frac{3}{4}$
- (D) $\frac{3}{5}$

41.



In the isosceles triangle shown above, the value of x is

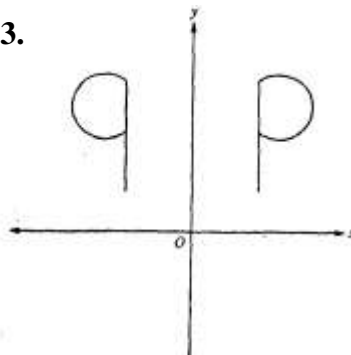
- (A) 30
- (B) 60
- (C) 120
- (D) 150

42. The image of the point $P(-3, 2)$ under

the translation $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$ is

- (A) $(-5, 3)$
- (B) $(-2, 4)$
- (C) $(-1, 1)$
- (D) $(-1, 3)$

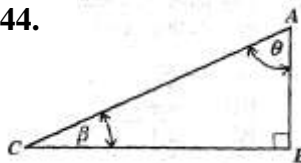
43.



In the diagram above, the image of 'P' can be obtained by a

- (A) reflection in the x -axis
- (B) reflection in the y -axis
- (C) translation parallel to the x -axis
- (D) rotation anticlockwise about O through 90°

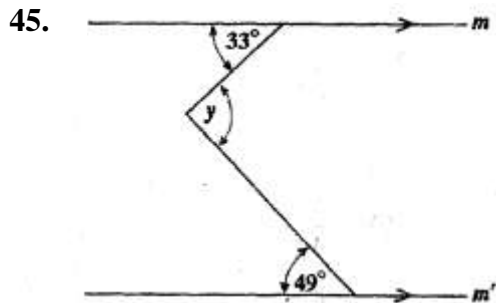
44.



In the figure above $\sin \theta = \frac{4}{5}$. What is the value of $\tan \beta$?

- (A) $\frac{3}{5}$
- (B) $\frac{3}{4}$
- (C) $\frac{4}{5}$
- (D) $\frac{5}{3}$

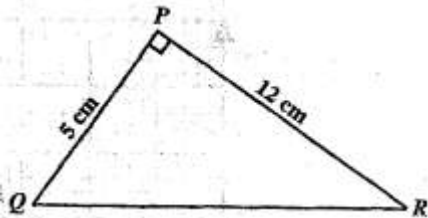
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In the diagram above the lines m and m' are parallel. The value of y is

- (A) 82°
- (B) 90°
- (C) 98°
- (D) 278°

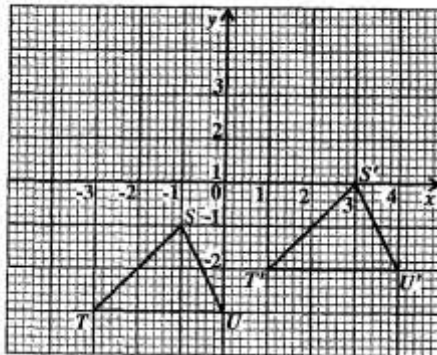
Item 46 refers to the triangle PQR , in which angle $QPR = 90^\circ$, $PR = 12$ cm and $PQ = 5$ cm.



46. The length of QR in centimetres is

- (A) 7
- (B) 11
- (C) 13
- (D) 17

47.

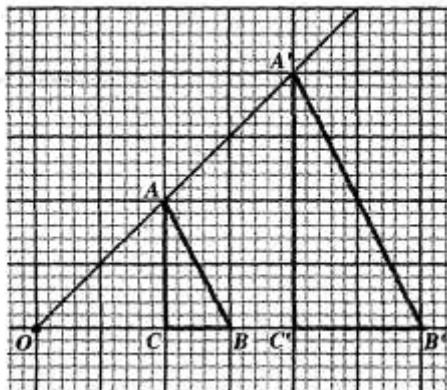


In the figure above, triangle STU is translated to triangle $S'T'U'$. The translation vector is described by

- (A) $\begin{pmatrix} -1 \\ -4 \end{pmatrix}$
- (B) $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$
- (C) $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$
- (D) $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$

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48.



In the above diagram O is the centre of enlargement, and ΔABC is enlarged to form $\Delta A'B'C'$.

What is the scale factor?

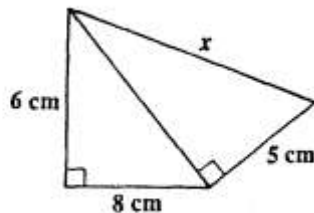
- (A) $-\frac{1}{2}$
- (B) -2
- (C) $\frac{1}{2}$
- (D) 2

49.

In a triangle ABC , angle $A = x^\circ$ and angle $B = 2x^\circ$. If angle C is less than 120° , then angle A is

- (A) less than 20°
- (B) exactly 60°
- (C) between 20° and 60°
- (D) between 60° and 120°

50.



In the figure above, $x =$

- (A) 10 cm
- (B) $\sqrt{125}$ cm
- (C) 9 cm
- (D) $\sqrt{75}$ cm

51.

Which of the following is NOT a quadrilateral?

- (A) Square
- (B) Pentagon
- (C) Parallelogram
- (D) Rhombus

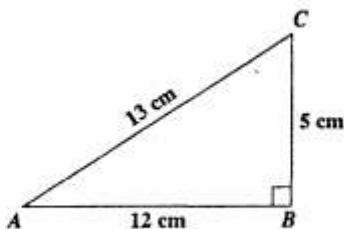
52.

$P'(2, -3)$ is the image of P after a translation $T \begin{pmatrix} 4 \\ -5 \end{pmatrix}$. The co-ordinates of P , are:

- (A) $(6, -8)$
- (B) $(2, -2)$
- (C) $(1, -3)$
- (D) $(-2, 2)$

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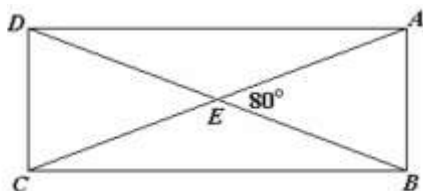
53.



In triangle ABC above, $AB = 12$ cm, $AC = 13$ cm, $BC = 5$ cm. What is $\tan C$?

- (A) $\frac{5}{13}$
- (B) $\frac{12}{13}$
- (C) $\frac{12}{5}$
- (D) $\frac{13}{5}$

54.



In the rectangle above, if $\angle AEB = 80^\circ$, then $\angle DAC =$

- (A) 10°
- (B) 40°
- (C) 50°
- (D) 80°

55.

Which of the following BEST describes a quadrilateral with all its sides equal?

- (A) Rhombus
- (B) Rectangle
- (C) Parallelogram
- (D) Trapezium

56.

A boat is travelling on a bearing of 270° . In what direction is it travelling?

- (A) West
- (B) East
- (C) North
- (D) South

57.

The point $(3, 2)$ is reflected in the line $x = 5$. Its image point is

- (A) $(2, 7)$
- (B) $(3, 8)$
- (C) $(7, 2)$
- (D) $(8, 3)$

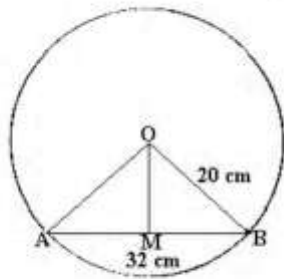
58.

Under the translation $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$ the image of $(3, -5)$ is

- (A) $(1, -2)$
- (B) $(6, 15)$
- (C) $(0, -3)$
- (D) $(5, -8)$

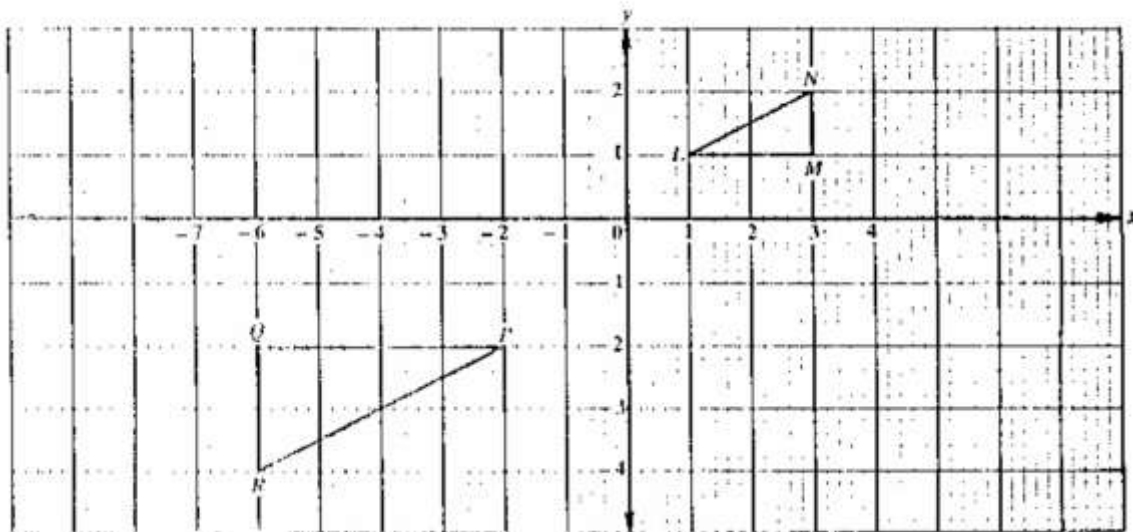
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59. In the figure above, **not drawn to scale**, O is the centre of the circle, AB is a chord and OM is perpendicular to AB . If $OB = 20\text{cm}$ and $AB = 32\text{cm}$, then OM is



- (A) 8cm
- (B) 10cm
- (C) 12cm
- (D) 16cm

60.



The transformation that maps $\triangle LMN$ onto $\triangle PQR$ is

- (A) a rotation through 180° about the origin
- (B) a rotation of 180° about $\left(-\frac{1}{2}, -\frac{1}{2}\right)$
- (C) an enlargement about $\left(\frac{1}{2}, -\frac{1}{2}\right)$ of scale factor 2
- (D) an enlargement about the origin of scale factor -2