1. Which one of the following amounts to £138 after 1 year if the rate of interest is 15% per annum?

- (a) £123
- (b) £158.7
- (c) £120
- (d) £117.30

2. 0·06 (i.e. 0·0666 . . .) can be written as

- (a) \frac{3}{5}
- (b) \frac{6}{10}
- (c) \frac{6}{100}
- (d) \frac{1}{10}

3. 30 km per minute in metres per second is

- (a) 2000
- (b) 500
- (c) 1800
- (d) 30000

4. 27% of a number is 12. Then 18% of the same number is

- (a) 8
- (b) 3
- (c) 27
- (d) 21

5. \frac{1}{3} : \frac{1}{2} = 3 : y. Then y is

- (a) 2
- (b) 1
- (c) 4\frac{2}{3}
- (d) 9

6. A rotation of 180° about a point is equal to

- (a) an axial symmetry
- (b) a translation
- (c) a central symmetry
- (d) a parallel projection

7. Which one of the following has the greatest number of axes of symmetry?

- (a) square
- (b) semi-circle
- (c) circle
- (d) equilateral triangle

8. Which one of the following maps the plane onto a proper subset of the plane?

- (a) a translation
- (b) a parallel projection
- (c) an axial symmetry
- (d) a central symmetry

9. \( P \) and \( Q \) are two identical rectangles. \( Q \) is the image of \( P \) under the translation

- (a) \( f, k \)
- (b) \( f, t \)
- (c) \( f, h \)
- (d) \( f, y \)

OVER →
10. \( M \) and \( N \) are the two diagonals of the square \( pqrs \). Then \( S_M \circ S_N \) maps (a) \( q \to p \) (b) \( \Delta pqr \to \Delta prs \) (c) \( [qr] \to [qs] \) (d) \( \Delta pqr \to \Delta pqs \)

11. \( xy \parallel rr \). Then \( |\angle krt| = \) (a) 70° (b) 80° (c) 50° (d) 60°

12. \( \sigma \) is the centre of the circle. \( |\angle yor| = 160^\circ \) as shown. Then \( |\angle yxr| = \) (a) 80° (b) 90° (c) 100° (d) 110°

13. If the area of the parallelogram is 10, then \( |xy| \) is equal to (a) \( \frac{5}{\sqrt{3}} \) (b) 2 (c) 4 (d) \( \frac{4}{\sqrt{3}} \)

14. If \( pt \perp qr \), then \( |qr| = \) (a) \( \sqrt{68} \) (b) 12 (c) 8 (d) 10

15. \( \left( \frac{1}{2}, 1 \right) \) are the coordinates of the midpoint of \( [h, k] \). If \( (0, 3) \) are the coordinates of \( h \), then the coordinates of \( k \) are (a) \( \left( \frac{1}{2}, -\frac{1}{2} \right) \) (b) \( (1, -\frac{1}{2}) \) (c) \( \left( \frac{1}{2}, -1 \right) \) (d) \( (1, -1) \)

16. The axial symmetry in the \( x \)-axis maps the line \( y = x + 3 \) onto the line (a) \( y = -x + 3 \) (b) \( y = x - 3 \) (c) \( y = -x - 3 \) (d) \( y = x + 3 \)

17. The slope of the line \( 2x - 5y - 10 = 0 \) is (a) \( \frac{2}{5} \) (b) \( -\frac{2}{5} \) (c) 2 (d) 5

18. The area of the triangle formed by the three points \( (-1, 2), (2, 3), (1, 6) \) is (a) 10 (b) 5 (c) 14 (d) 7

19. If \( \tan A = \frac{1}{2} \) and \( A < 90^\circ \), then \( \sin A \) is (a) \( \frac{2}{\sqrt{5}} \) (b) \( \frac{1}{\sqrt{3}} \) (c) \( \frac{\sqrt{2}}{2} \) (d) \( \frac{1}{\sqrt{3}} 

20. If \( \tan 2A = \frac{2\tan A}{1 - \tan^2 A} \), then \( \tan 120^\circ \) is (a) \( \sqrt{3} \) (b) \( -\sqrt{3} \) (c) \( \frac{1}{\sqrt{3}} \) (d) \( -\frac{1}{\sqrt{3}} \)
1. (a) Calculate the compound interest on £2500 for 2 years at 13% per annum.

(b) The capacity of the petrol tank of a car is 15 gallons. How much does the tank-full of petrol cost at £1.35 per gallon?
In Belgium petrol costs 22 Belgian francs per litre. Calculate the cost in £ of the tank-full in Belgium when the rate of exchange is £1 = 60 Belgian francs.
(Note: 1 litre = 0.22 gallons).

2. (a) Prove that any point on the bisector of an angle is equidistant from the arms of the angle.

(b) Construct the $\triangle abc$ given that $|bc| = 6$ cm, $|ba| = 4$ cm and area of $\triangle abc$ is 9 cm$^2$.
Construct the incircle of the triangle $abc$ and measure its radius as accurately as you can.
All construction lines must be clearly shown.

3. Prove that the composition of two central symmetries is a translation.

$p$ and $q$ are the midpoints of two sides of a square as shown.
Construct the image of the square under the composition of central symmetries $S_q \circ S_p$.

4. Prove that a diameter of a circle which is perpendicular to a chord of the circle bisects the chord.
$K$ is a circle of radius 13 and of centre $c$. A chord of length 24 is drawn in the circle.
Find the distance of this chord from $c$. Hence, or otherwise, show how to draw a chord of length 24 in $K$.
$[ab]$ is any chord of length 24 in the circle $K$. Find the locus of $m$, the midpoint of the chord, and give a reason for your answer.

OVER →
5. Prove that if the angles of two triangles are equal in measure, then the lengths of the corresponding sides are in proportion.

In the \( \triangle abc \),
\[
\angle bac = 90^\circ \text{ and } ad \perp be.
\]
Using similar triangles, or otherwise, prove
\[
|bd| \cdot |bc| = |be|^2.
\]

6. The line \( 3y = 5x - 4 \) cuts the \( x \)-axis at \( p \) and the \( y \)-axis at \( q \). Find the coordinates of \( p \) and \( q \) and hence draw the line.

\( r \) is a point having coordinates \((\frac{8}{3}, 0)\). Write down the slope of \( qr \) and hence write the equation of \( qr \) in the form
\[
yb = ax + t.
\]
Show that the point \((10, 7)\) is on \( qr \) and investigate if this point is nearer to the origin than it is to \( q \).

7. (a) Use your tables to find the angle \( \mathcal{A} \) such that \( \sin \mathcal{A} = 0.4 \) and investigate if \( \sin 3\mathcal{A} \) is equal to \( 3 \sin \mathcal{A} \).

(b) Calculate \( x \) correct to two places of decimals.

(c) Two ships \( K \) and \( T \) set sail from a point \( p \) at the same time. \( T \) sails West 65° North at a steady speed. \( K \) sails East 35° North at a speed of 30 km/hour. After two hours sailing \( T \) is at \( r \) and \( K \) is at \( q \) and \( q \) is directly East of \( r \). Calculate \( |pq| \) correct to the nearest km and hence find the speed of \( T \).