

Review exercise — Chapter 3 & 6.1–6.5

Paper 1 style questions

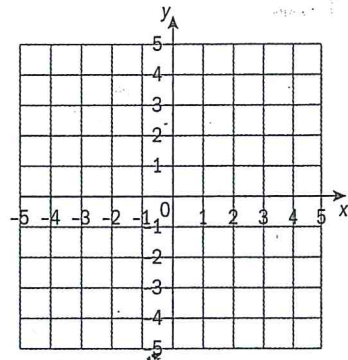
EXAM-STYLE QUESTIONS

Give answers correct to 3 sf.

- Line L_1 passes through the points $A(1, 3)$ and $B(5, 1)$.
 - Find the gradient of the line AB . *Also find the length of AB and its midpoint.*
Line L_2 is parallel to line L_1 and passes through the point $(0, 4)$.
 - Find the equation of the line L_2 .
- Line L_1 passes through the points $A(0, 6)$ and $B(6, 0)$.
 - Find the gradient of the line L_1 .
 - Write down the gradient of all lines perpendicular to L_1 .
 - Find the equation of a line L_2 perpendicular to L_1 and passing through $O(0, 0)$.
- Consider the line L with equation $y = 2x + 3$.
 - Write down the coordinates of the point where
 - L meets the x -axis
 - L meets the y -axis.
 - Draw L on a grid like this one.
 - Find the size of the acute angle that L makes with the x -axis.
- Consider the line L_1 with equation $y = -2x + 6$.
 - The point $(a, 4)$ lies on L_1 . Find the value of a .
 - The point $(12.5, b)$ lies on L_1 . Find the value of b .

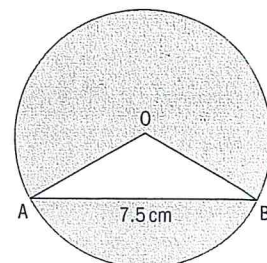
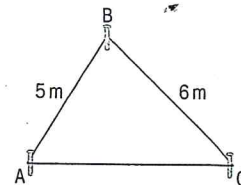
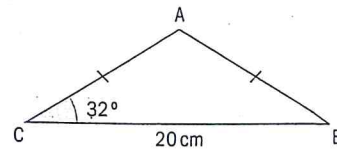
Line L_2 has equation $3x - y + 1 = 0$.

 - Find the point of intersection between L_1 and L_2 .
- The height of a vertical cliff is 450 m. The angle of elevation from a ship to the top of the cliff is 31° . The ship is x metres from the bottom of the cliff.
 - Draw a diagram to show this information.
 - Calculate the value of x .



EXAM-STYLE QUESTIONS

- In the diagram, triangle ABC is isosceles.
 $AB = AC$, $CB = 20$ cm and angle ACB is 32° .
Find
 - the size of angle CAB
 - the length of AB
 - the area of triangle ABC .
- A gardener pegs out a rope, 20 metres long, to form a triangular flower bed as shown in this diagram.
 - Write down the length of AC .
 - Find the size of the angle BAC .
 - Find the area of the flower bed.
- The diagram shows a circle with diameter 10 cm and center O . Points A and B lie on the circumference and the length of AB is 7.5 cm. A triangle AOB is drawn inside the circle.
 - Find the size of angle AOB .
 - Find the area of triangle AOB .
 - Find the shaded area.

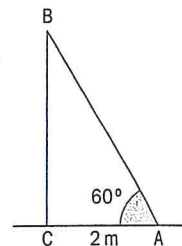


Paper 2 style questions

- $5x - 7y - 8 = 0$ and $3x + ky + 11 = 0$ are the equations of two lines. Find the value of k for which the lines are:
 - parallel
 - perpendicular.
- Consider $P(1, 5)$, $Q(5, 7)$, and $R(3, 1)$
 - Show that triangle PQR is isosceles.
 - Find the midpoint M of QR .
 - Use gradients to verify that PM is perpendicular to QR .
- Set up a system of equations and solve algebraically: A hairdresser has 12 small and 16 large cans of hairspray, giving a total of 9 L of hairspray. At this time last year she had 4 small and 12 large cans, totaling 6 L of hairspray. How much spray is in each size can?

4

The diagram shows a ladder AB . The ladder rests on the horizontal ground AC . The ladder is touching the top of a vertical telephone pole CB . The angle of elevation of the top of the pole from the foot of the ladder is 60° . The distance from the foot of the ladder to the foot of the pole is 2 m.



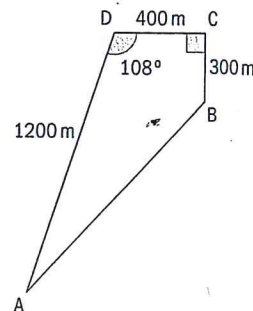
- Calculate the length of the ladder.
 - Calculate the height of the pole.
- The ladder is moved in the same vertical plane so that its foot remains on the ground and its top touches the pole at a point P which is 1.5 m below the top of the pole.
- Write down the length of CP .
 - Find the new distance from the foot of the ladder to the foot of the pole.
 - Find the size of the new angle of elevation of the top of the pole from the foot of the ladder.

EXAM-STYLE QUESTION

5

The diagram shows a cross-country running course. Runners start and finish at point A .

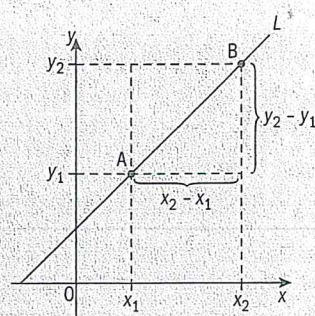
- Find the length of BD .
- Find the size of angle BDC , giving your answer correct to two decimal places.
- Write down the size of angle ADB .
- Find the length of AB .
- Find the perimeter of the course.
 - Rafael runs at a constant speed of 3.8 m s^{-1} . Find the time it takes Rafael to complete the course. Give your answer correct to the nearest minute.
- Find the area of the quadrilateral $ABCD$ enclosed by the course. Give your answer in km^2 .



CHAPTER 3 SUMMARY

Gradient of a line

- If $A(x_1, y_1)$ and $B(x_2, y_2)$ are two points that lie on line L , the gradient of L is $m = \frac{y_2 - y_1}{x_2 - x_1}$.
- **Parallel lines** have the **same gradient**. This means that
 - if two lines are parallel then they have the same gradient
 - if two lines have the same gradient then they are parallel.
- Two lines are **perpendicular** if, and only if, they make an angle of 90° . This means that
 - if two lines are perpendicular then they make an angle of 90°
 - if two lines make an angle of 90° then they are perpendicular.
- Two lines are **perpendicular** if the product of their gradients is -1 .



Equations of lines

- The equation of a straight line can be written in the form
 - i $y = mx + c$, where m is the **gradient** and c is the **y-intercept** (the y -coordinate of the point where the line crosses the y -axis).
 - ii $ax + by + d = 0$ where a , b and $d \in \mathbb{Z}$.
- The equation of any vertical line is of the form $x = k$ where k is a constant.
- The equation of any horizontal line is of the form $y = k$ where k is a constant.
- If two lines are parallel then they have the same gradient and do not intersect.
- If two lines L_1 and L_2 are not parallel then they intersect at just one point. To find the point of intersection write $m_1x_1 + c_1 = m_2x_2 + c_2$ and solve for x .

