

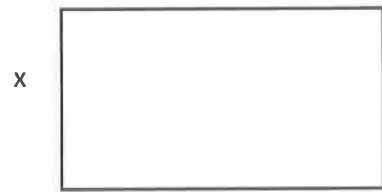
Leaving Cert - Revision Sheet 4

Arithmetic/Numbers

1. The length of a rectangle is 3 cm longer than the width. The width is x cm.

Write an expression for

(a) The length of the rectangle



(b) The area of the rectangle

(c) The area of the rectangle is 70 cm^2 . Form an equation in terms of x and solve it.

2. If $x = 3$ and $x = -2$ are the roots of a quadratic equation, form the equation.

3. Solve the equations:

(a) $3^x = 27$

(b) $3^{2x+1} = 243$

(c) $9^x = \frac{81}{\sqrt{3}}$

Co-ordinate Geometry

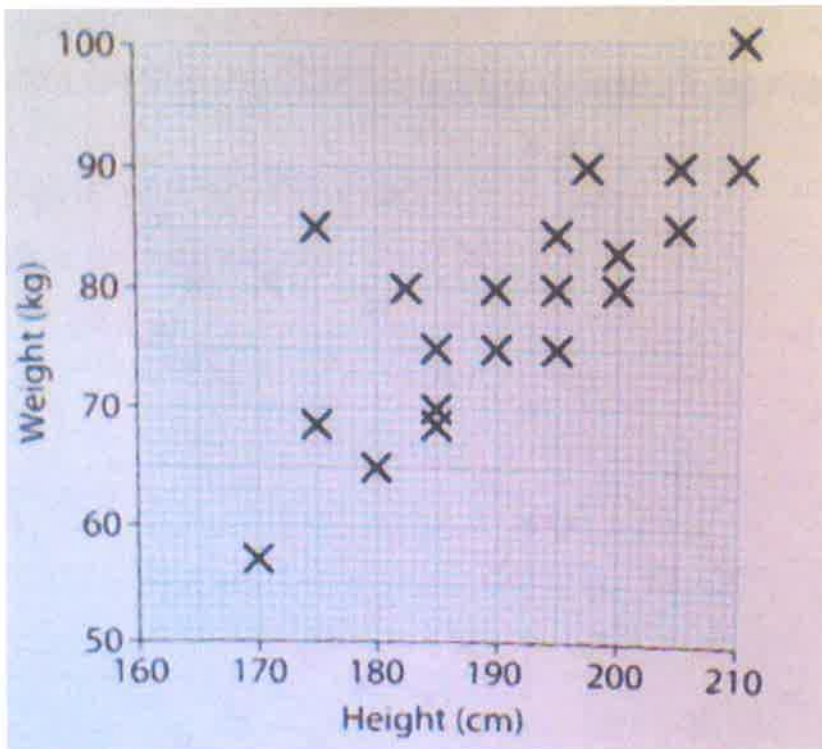
4. Calculate the points of intersection of the following line and circle:

$$x - y = 5$$

$$x^2 + y^2 = 53$$

Statistics

5. This scatter diagram shows the weights, in kg, and the heights, in cm, of 20 male members of a basketball club.



- (a) Write down the weight of the heaviest member.
- (b) Write down the height of the shortest member.
- (c) One member is particularly heavy for his height.
Write down the height and weight of this member
- (d) Describe the correlation in words
- (e) Estimate a value of r , the correlation co-efficient.

Functions

6. If $f(x) = 2x + 1$ and $g(x) = x^2$, find:

(a) $f \circ g(3)$

(b) $g \circ f(-3)$

Complex Numbers

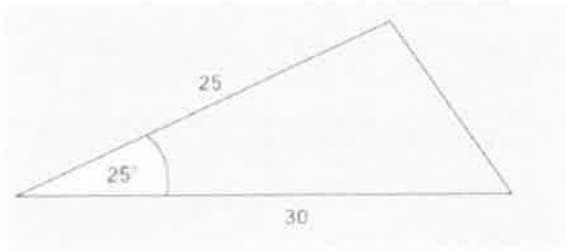
7. Express $\frac{2+3i}{1-2i}$ in the form $a + bi$

8. Solve the quadratic equation, giving your answer in the form $a + bi$

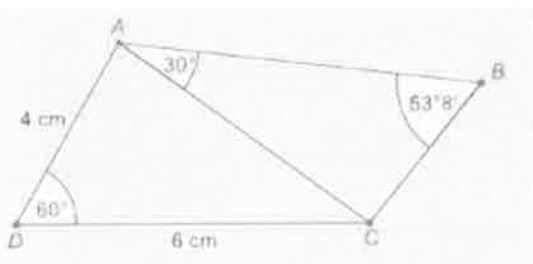
$$z^2 - 6z + 34 = 0$$

Trigonometry

9. Calculate the area of the triangle:



10. ABCD is a quadrilateral as shown in the diagram



(a) Find $|AC|$

(b) Find $|BC|$

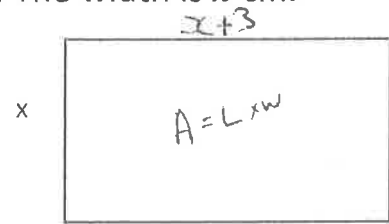
Leaving Cert - Revision Sheet 4

Arithmetic/Numbers / ALGEBRA

1. The length of a rectangle is 3 cm longer than the width. The width is x cm.

Write an expression for

(a) The length of the rectangle
 $x+3$



(b) The area of the rectangle

$$A = x(x+3)$$

$$A = x^2 + 3x$$

(c) The area of the rectangle is 70 cm^2 . Form an equation in terms of x and solve it.

$$x^2 + 3x = 70$$

$$\begin{array}{r} x^2 + 3x - 70 = 0 \\ -70 \quad -70 \end{array}$$

$$x^2 + 3x - 70 = 0$$

$$(x+10)(x-7) = 0$$

$$\boxed{x = -10} \quad \boxed{x = 7}$$

$$\boxed{x = 7}$$

ANSWERS

2. If $x = 3$ and $x = -2$ are the roots of a quadratic equation, form the equation.

$$(x-3)(x+2) = 0$$

$$\boxed{x = 3} \quad \boxed{x = -2}$$

$$(x-3)(x+2) = 0 \quad \text{FOIL}$$

$$x^2 + 2x - 3x - 6 = 0$$

$$\boxed{x^2 - x - 6 = 0}$$

3. Solve the equations:

(a) $3^x = 27$

$$3^x = 3^3$$

$$\boxed{x = 3}$$

(b) $3^{2x+1} = 243$

$$3^{2x+1} = 3^5$$

$$2x + 1 = 5$$

$$\begin{array}{r} 2x + 1 = 5 \\ -1 \quad -1 \\ \hline 2x = 4 \end{array}$$

$$\boxed{x = 2}$$

(c) $9^x = \frac{81}{\sqrt{3}}$

$$(3^2)^x = \frac{3^4}{3^{1/2}}$$

$$3^{2x} = 3^{3.5}$$

$$2x = 3.5$$

$$\boxed{x = 1.75}$$

Co-ordinate Geometry

(A) (B)

4. Calculate the points of intersection of the following line and circle:

(A) $x - y = 5$

(B) $x^2 + y^2 = 53$

(A)
$$\begin{array}{r} x - y = 5 \\ + y \quad + y \\ \hline \end{array}$$

(C) $x = y + 5$

(B) $x^2 + y^2 = 53$

$(y+5)^2 + y^2 = 53$

$y^2 + 10y + 25 + y^2 = 53$
 $\quad \quad \quad -53$

$2y^2 + 10y - 28 = 0$

$\div 2 \rightarrow y^2 + 5y - 14 = 0$

$(y+7)(y-2) = 0$

$y = -7$

$y = 2$

(C) $x = y + 5$

$x = -7 + 5$

$x = -2$

$x = 2 + 5$

$x = 7$

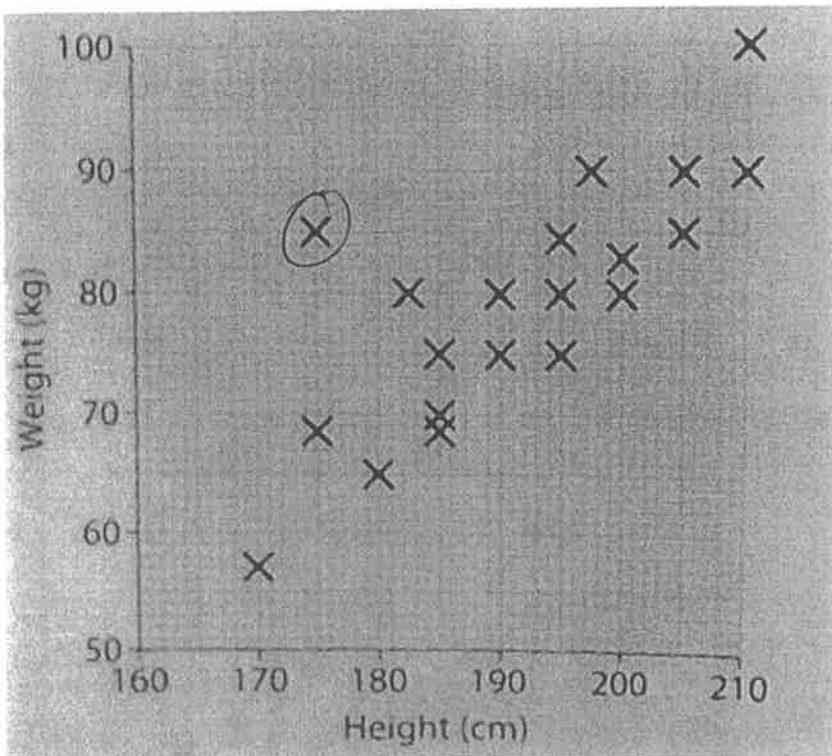
$(-2, -7)$

$(7, 2)$

$(y+5)(y+5)$
 $y^2 + 5y + 5y + 25$
 $y^2 + 10y + 25$

Statistics

5. This scatter diagram shows the weights, in kg, and the heights, in cm, of 20 male members of a basketball club.



- (a) Write down the weight of the heaviest member.

100 kg

- (b) Write down the height of the shortest member.

170 cm

- (c) One member is particularly heavy for his height.

Write down the height and weight of this member

H: 175 cm

W: 85 kg

- (d) Describe the correlation in words

STRONG POSITIVE CORRELATION BETWEEN HEIGHT AND WEIGHT.

- (e) Estimate a value of r , the correlation co-efficient.

$$r = 0.8$$

COMPOSITE: 2 FUNCTIONS

RIGHT TO LEFT
←

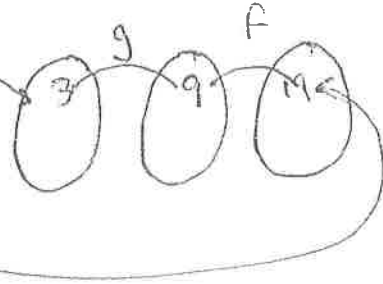
Functions

6. If $f(x) = 2x + 1$ and $g(x) = x^2$, find:

(a) $f \circ g(3)$

$$g(3) = 3^2 = 9$$

$$f(9) = 2(9) + 1 = \boxed{19}$$



(b) $g \circ f(-3)$

$$f(-3) = 2(-3) + 1 = -5$$

$$g(-5) = (-5)^2 = \boxed{25}$$

Complex Numbers

7. Express $\frac{2+3i}{1-2i}$ in the form $a + bi$

$(-2i)(2i)$
 $-4i^2$
 $-4(-1)$
 4

BOT: $(1-2i)(1+2i)$

$$1 + 2i - 2i + 4$$

$$\boxed{5}$$

$$\frac{(2+3i)(1+2i)}{(1-2i)(1+2i)}$$

TOPS $(2+3i)(1+2i)$

$$2 + 4i + 3i - 6$$

$$\boxed{-4 + 7i}$$

TOP = $\frac{-4+7i}{5}$

$$= \boxed{-\frac{4}{5} + \frac{7}{5}i}$$

8. Solve the quadratic equation, giving your answers in the form $a + bi$ complex

$$|z^2 - 6z + 34 = 0$$

$$\begin{cases} a = 1 \\ b = -6 \\ c = 34 \end{cases}$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{6 \pm \sqrt{(-6)^2 - 4(1)(34)}}{2(1)}$$

$$\sqrt{(-6)^2 - 4(1)(34)}$$

$$\sqrt{-100}$$

$$\sqrt{100} \sqrt{-1}$$

$$\boxed{10i}$$

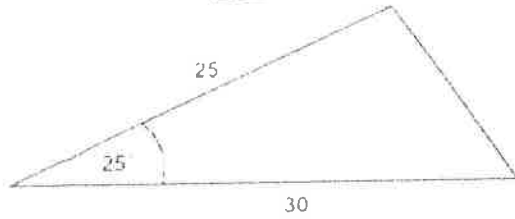
$$\frac{6 \pm (10i)}{2}$$

$$z = \boxed{3 + 5i} \quad z = \boxed{3 - 5i}$$

Trigonometry

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9. Calculate the area of the triangle

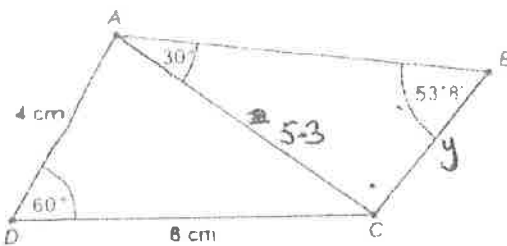


~~$A = \frac{1}{2}bh$~~ $A = \frac{1}{2}ab \sin C$

$$A = \frac{1}{2}(30)(25)\sin 25$$

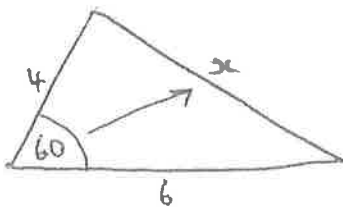
$$= \boxed{158.48}$$

10. ABCD is a quadrilateral as shown in the diagram



(a) Find |AC|

COSINE RULE



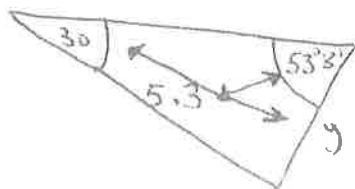
$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$x^2 = (6)^2 + (4)^2 - 2(4)(6) \cos 60$$

$$x^2 = 28$$

$$x = \boxed{5.3}$$

(b) Find |BC|



SINE RULE

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{y}{\sin 30} = \frac{5.3}{\sin 53^\circ 8'}$$

$$\frac{y}{0.5} = 6.6247$$

$$y = (6.6247)(0.5)$$

$$y = \boxed{3.31235}$$