

## Leaving Cert - Revision Sheet 3

### Algebra

1. Solve the following quadratic equations

$$x^2 + 13x + 36 = 0$$

$$2x^2 + 15x + 7 = 0$$

$$6x^2 - 9x - 4 = 0$$

2. Solve the equation

$$x - 7 + \frac{12}{x} = 0$$

## Co-ordinate Geometry

3. Write down the centre and radius of each of the following circles:

(a) $x^2 + y^2 = 25$	(b) $x^2 + y^2 = 17$
(c) $(x - 2)^2 + (y + 3)^2 = 36$	(d) $x^2 + (y - 1)^2 = 49$

4. Investigate whether the point  $(-3,5)$  is on/inside/outside the circle  $x^2 + (y - 2)^2 = 25$

5. Write down the equation of the following circles:

(a) Centre $(0,0)$ and radius 4	(b) Centre $(-11,9)$ and radius 12
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## Statistics

6. Twenty people attended a party. Their ages are summarised in the following stem-and-leaf diagram.

Stem	Leaf
1	1, 3, 4, 5, 6, 9
2	1, 3, 5
3	3, 8
4	4, 5, 6, 7, 8
5	1, 6, 7
6	2

Key: 1|4 = 14

Calculate the Inter-Quartile Range

## Patterns / Sequences

7. For each of the sequences below, name the type of sequence, and write down the next two terms in the sequence:

(i) 5, 12, 19, 26, ...

(ii) 8, 15, 26, 41, 60

8. In an arithmetic sequence 18, 15, 12, ... how many terms of the sequence are positive?

### Numbers

9. John earns €965 per week. His standard rate cut-off point is €675; the standard rate of income tax is 22% and the higher rate is 42%. If he has tax credits of €80 per week, calculate his total tax bill.

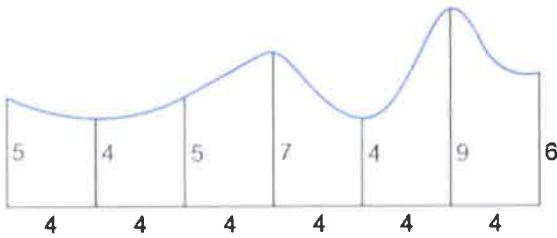
10. A businessman exchanged €4,500 for Swedish Krone. He received 39 510 Krone.

(a) What was the exchange rate?

(b) The next week, he converted the Krone back into euro at a rate of €1 = 8.44 Krone. How much did he receive in euro?

(c) What was the percentage profit on these transactions?

11. Use the Trapezoidal Rule to estimate the area of the following shape:



### Inferential Statistics

12. A dairy company which produces milk claims that 85% of people prefer their "Special" milk over their competitors' brands. The Department of Food carries out a survey to test their claim. They survey 500 people, and 402 of them say that they prefer "Special" milk.

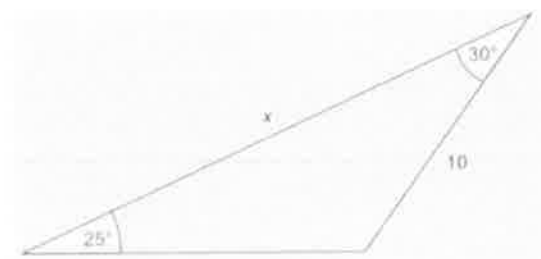
(a) What is the margin of error in the survey?

(b) Carry out a confidence interval

(c) Hence, examine the company's claim using the evidence from the survey.

## Geometry / Trigonometry

13. Calculate the length of the sides marked with a letter in the following diagrams:



# Leaving Cert - Revision Sheet 3

## Algebra

1. Solve the following quadratic equations

$x^2 + 13x + 36 = 0$ $(x + 4)(x + 9) = 0$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;"><math>x = -4</math></div> <div style="border: 1px solid black; padding: 2px;"><math>x = -9</math></div> </div> <div style="margin-top: 10px;"> <math display="block">\begin{array}{l} 36 \\ 1 \times 36 \\ 2 \times 18 \\ 3 \times 12 \\ 4 \times 9 \\ 6 \times 6 \end{array}</math> </div>	<p style="text-align: right; margin-right: 20px;">MAYBE -b METHOD.</p> $2x^2 + 15x + 7 = 0$ $(2x + 1)(x + 7) = 0$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;"><math>x = -7</math></div> <div style="border: 1px solid black; padding: 2px;"><math>2x = -1</math></div> </div> <div style="margin-top: 10px;"> <math display="block">x = -\frac{1}{2}</math> </div>
$ax^2 + bx + c = 0$ $6x^2 - 9x - 4 = 0$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 5px;"> <math>a = 6</math>  <math>b = -9</math>  <math>c = -4</math> </div> $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\frac{9 \pm \sqrt{(-9)^2 - 4(6)(-4)}}{2(6)}$ $\frac{9 \pm \sqrt{177}}{12}$	<div style="text-align: center; margin-top: 20px;"> <math>\frac{9 + \sqrt{177}}{12}</math>    or    <math>\frac{9 - \sqrt{177}}{12}</math> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px;"><math>1.86</math></div> <div style="border: 1px solid black; padding: 5px;"><math>-0.36</math></div> </div>

2. Solve the equation

$$x - 7 + \frac{12}{x} = 0$$

$$(x^2 - 7x + 12) = 0$$

$$(x - 3)(x - 4) = 0$$

$x = 3$

$x = 4$

## Co-ordinate Geometry

3. Write down the centre and radius of each of the following circles:

<p>(a) <math>x^2 + y^2 = 25</math>  <math>c(0,0)</math> <span style="border: 1px solid black; padding: 2px;"><math>r=5</math></span></p>	<p>(b) <math>x^2 + y^2 = 17</math>  <math>c(0,0)</math> <span style="border: 1px solid black; padding: 2px;"><math>r^2=17</math> <math>r=\sqrt{17}</math></span></p>
<p><math>(x-h)^2 + (y-k)^2 = r^2</math>            (c) <math>(x-2)^2 + (y+3)^2 = 36</math>  <math>c(2,-3)</math> <span style="border: 1px solid black; padding: 2px;"><math>r=6</math></span></p>	<p>(d) <math>x^2 + (y-1)^2 = 49</math>  <math>c(0,1)</math> <span style="border: 1px solid black; padding: 2px;"><math>r=7</math></span></p>

4. Investigate whether the point  $(-3,5)$  is on/inside/outside the circle  $x^2 + (y-2)^2 = 25$

$$\begin{aligned}
 & \overset{x=-3}{(-3)^2} + \overset{y=5}{(5-2)^2} \stackrel{?}{=} 25 \\
 & 9 + 9 \stackrel{?}{=} 25 \\
 & \underline{18} < 25 \\
 & \text{INSIDE}
 \end{aligned}$$

5. Write down the equation of the following circles:

<p>(a) Centre <math>(0,0)</math> and radius 4  <math>x^2 + y^2 = 16</math></p>	<p>(b) Centre <math>(-11,9)</math> and radius 12  <math>(x+11)^2 + (y-9)^2 = 144</math></p>
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**Statistics**

$$\frac{20+1}{2} = 10.5^{\text{th}}$$

6. Twenty people attended a party. Their ages are summarised in the following stem-and-leaf diagram.

Stem	Leaf
1	<del>2</del> , <del>3</del> , <del>4</del> , 5, <del>6</del>   9
2	7, 8, 9
3	<del>3</del>   8
4	4, 5, 6, 7   8
5	1, 6, 7
6	/

Key: 1|4 = 14

Handwritten annotations on the diagram:  
 $Q_1 = 17.5$  (pointing to the 6th leaf)  
 MEDIAN = 35.5 (pointing to the 10th leaf)  
 $Q_3 = 47.5$  (pointing to the 14th leaf)

Calculate the Inter-Quartile Range

$$IQR = Q_3 - Q_1 = 47.5 - 17.5 = 30$$

**Patterns / Sequences**

7. For each of the sequences below, name the type of sequence, and write down the next two terms in the sequence:

(i) 5, 12, 19, 26, ... 33, 40

7   7   7

LINEAR / ARITHMETIC

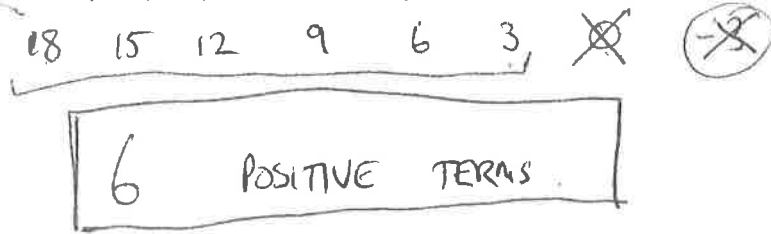
(ii) 8, 15, 26, 41, 60, 83, 110

7   11   15   19   23   27

4   4   4

QUADRATIC

8. In an arithmetic sequence 18, 15, 12, ... how many terms of the sequence are positive?



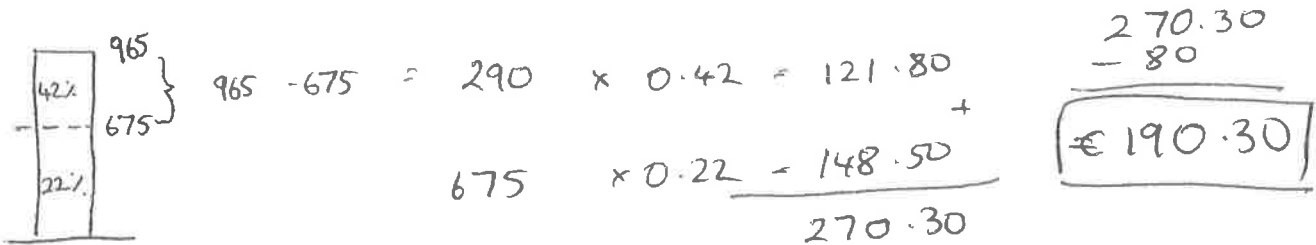
OR  $T_n = \frac{-3n + 21}{+3n} = 0$

$$21 = 3n$$

$$7 = n$$

**Numbers**

9. John earns €965 per week. His standard rate cut-off point is €675; the standard rate of income tax is 22% and the higher rate is 42%. If he has tax credits of €80 per week, calculate his total tax bill.



10. A businessman exchanged €4,500 for Swedish Krone. He received 39 510 Krone.

(a) What was the exchange rate?

$$39510 \div 4500 = 8.78$$

€1 = 8.78 KR

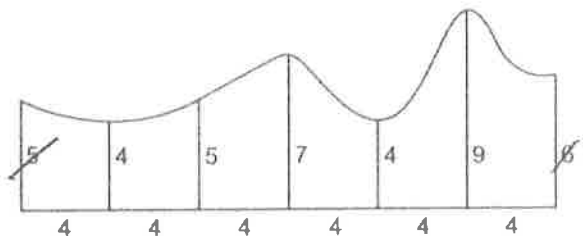
(b) The next week, he converted the Krone back into euro at a rate of €1 = 8.44 Krone. How much did he receive in euro?

$$39510 \div 8.44 = \boxed{\text{€} 4681.28}$$

(c) What was the percentage profit on these transactions?



11. Use the Trapezoidal Rule to estimate the area of the following shape:



$$A \approx \frac{h}{2} [\text{FIRST} + \text{LAST} + 2(\text{OTHERS})]$$

$$\approx \frac{4}{2} [5 + 9 + 2(4 + 5 + 7 + 4)]$$

$$= \boxed{138}$$

### Inferential Statistics

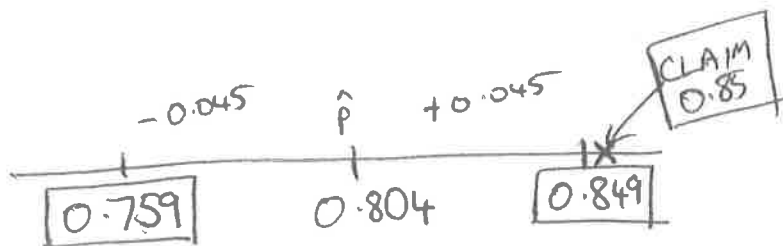
12. A dairy company which produces milk claims that 85% of people prefer their "Special" milk over their competitors' brands. The Department of Food carries out a survey to test their claim. They survey 500 people, and 402 of them say that they prefer "Special" milk.

(a) What is the margin of error in the survey?

$$\frac{1}{\sqrt{n}} = \frac{1}{\sqrt{500}} \approx 0.045 \quad 4.5\%$$

(b) Carry out a confidence interval

$$\hat{p} = \frac{402}{500} = 0.804$$

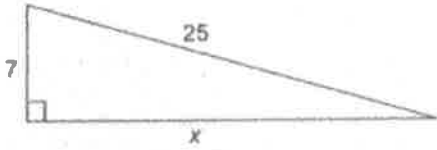


(c) Hence, examine the company's claim using the evidence from the survey.

REJECT THE COMPANY'S CLAIM  
AS 85% IS OUTSIDE OUR  
CONFIDENCE INTERVAL.

## Geometry / Trigonometry

13. Calculate the length of the sides marked with a letter in the following diagrams:



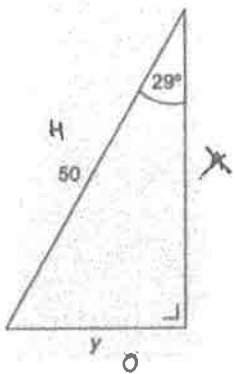
$$x^2 + 7^2 = 25^2$$

$$x^2 + \frac{49}{-49} = \frac{625}{-49}$$

$$x^2 = 576$$

$$x = 24$$

$$\sqrt{576}$$



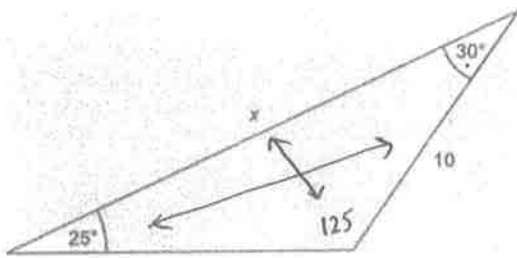
SOH ~~CAH~~ ~~TOA~~

$$\sin 29 = \frac{y}{50}$$

$$0.4848 = \frac{y}{50}$$

$$50(0.4848) = y$$

$$y = 24.24$$



$$30 + 25 = 55$$

$$180 - 55 = 125$$

$$\frac{x}{\sin 125} = \frac{10}{\sin 25}$$

$$\frac{x}{0.8192} = 23.6620$$

$$x = 23.6620(0.8192)$$

$$x = 19.38$$