AGrader LEARNING CENTRE

Discover the Ace in You

Care Package

SECONDARY 3

Curriculum Information

Welcome to A Grader Learning Centre!

Dear Parents,

Thank you for your interest in the AGrader Programme. This **Care Package** is specially compiled to showcase to you the AGrader curriculum for Secondary 3.

There are **2 Parts** to this Care Package:

PART I: Curriculum Information	**i. Subject Structure SMART Sheets** Every subject's curriculum is carefully structured to allow AGrader's students to fully grasp school concepts. Have a close look at our Subject Structure SMART Sheets to fully understand how your child will benefit and improve with a structured learning plan! 😊 **ii. What's So Special About AGrader's Worksheets?** The Unique Learning Points of the AGrader Curriculum section will explain to you what sets the AGrader Curriculum apart from other tuition providers. 😊
PART II: Worksheets & Annotated Solutions	i. Excerpts from AGrader's Worksheets (For Students) These are snippets of our ACTUAL worksheets, specially chosen from our worksheets to showcase the unique parts of our curriculum. *(Do let your child try them out! 😊)* ii. Annotated Solutions (For Parents) These are the EXACT annotated solutions that ALL our teachers use to prepare for their lessons. They are carefully planned and created by our in-house Curriculum Team to help our teachers prepare as well as to ensure that every child receives accurate information. *(You may use this to go through the answers with your child after he/she has tried the questions! 😊)*

Scan to Speak to Us Directly on WhatsApp!

+65 9720 2533

www.agrader.sg

Scan to Reserve Your 50% Off Deal NOW!

WHAT IS SO SPECIAL
About the AGrader Curriculum?

The AGrader Curriculum is specially written and crafted by our in-house Curriculum Team of subject experts, each with years of experience and deep understanding of the MOE syllabus.

At AGrader, we strive to continually improve and innovate our curriculum materials and methodologies to help our students improve their grades.

Below is a summary of some of the **Unique Learning Points** that put AGrader's curriculum materials ahead of others.

English

Deep Focus on Development of Students' **Comprehension** & **Writing** Abilities

The AGrader English Programme primarily focuses on developing our students' comprehension & writing abilities via bite-sized practices & a "Step-By-Step", "Model-Essay-Broken-Down" approach.

- ✓ Improve general knowledge and awareness of current affairs
- ✓ Critical thinking skills are honed as students make use of comparisons of related articles for their own writing
- ✓ Enhanced comprehension & writing abilities

Mathematics

Well Structured & Well Thought-Out Notes & Exercises in Increasing Difficulty to Help Students Learn in a "Step-by-Step" Approach

A carefully structured and well thought-out curriculum helps students gain confidence through a scaffolded learning approach & consistent practice.

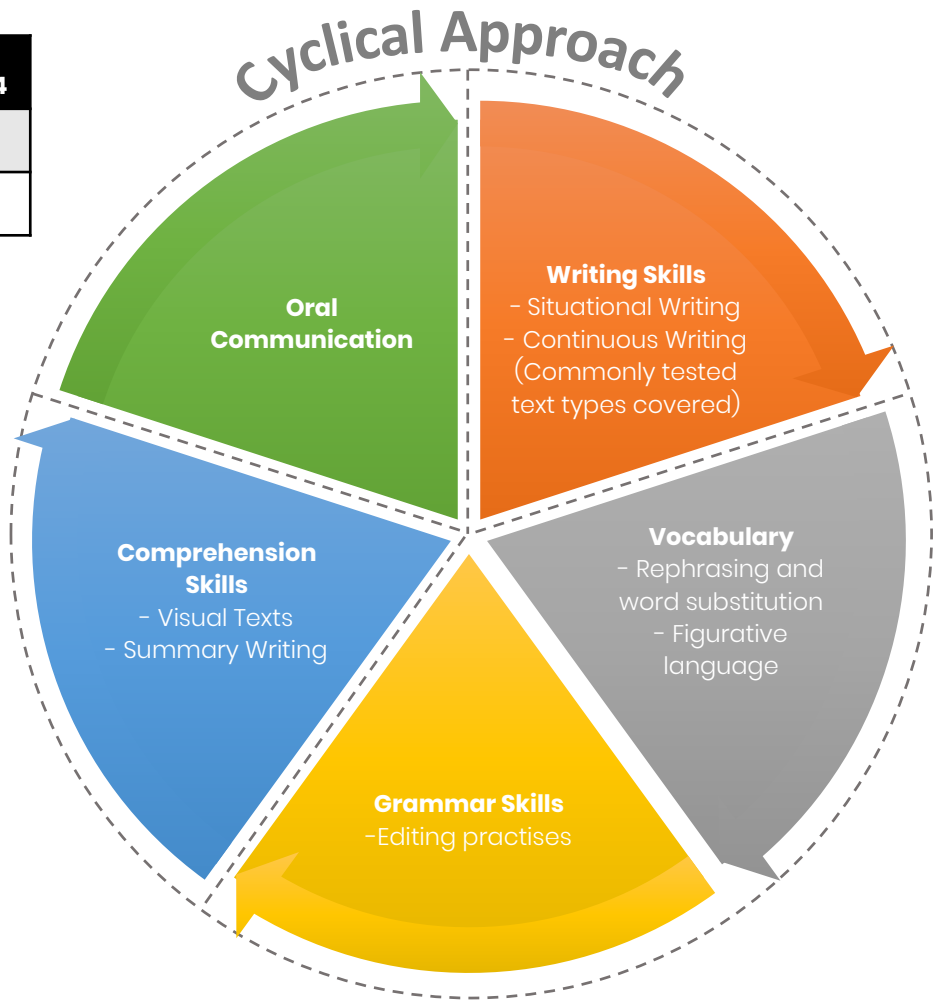
- ✓ Improve abilities to identify similar types of questions and applying the correct methods in solving them
- ✓ Reduce careless mistakes
- ✓ Improve speed of tackling questions

AGrader LEARNING CENTRE
Discover the Ace in You

Secondary English

Worksheets Specially Designed According to Exam Format in Paper 4
Reading Aloud
Spoken Interaction

Worksheets Specially Designed According to Exam Format in Paper 2
Visual Text Comprehension
Narrative Comprehension
Non-Narrative Comprehension



AGrader's Secondary English curriculum is delivered in a cyclical approach., which gives our students a holistic exposure to the different components and papers, **according to the latest MOE syllabus..**

Worksheets Specially Designed According to Exam Format in Paper 1
Editing
Situational Writing
Continuous Writing

Current Affairs

Recent news articles are injected into the curriculum to widen student's general knowledge.

Suggested Answers

Students will be provided with suggested answers crafted by our Curriculum Writer to reference to.

AGrader LEARNING CENTRE
Discover the Ace in You

Secondary Mathematics

AGrader's Secondary Mathematics curriculum is specially designed using a "Step-By-Step", learner-directed system **according to the latest MOE syllabus.**

Worksheets Specially Designed According to Exam Format
Paper 1 – 25 Short Answer Questions
Paper 2 – 10 to 11 Varying Questions

- **Notes** — Summary of key points at the start of the topic
- **Example (With Solutions)** — Scaffold students' learning with worked solutions
- **Exercise (With final answers)** — Allow students to apply what they have learnt
- **Review Exercises** — Mixture of questions from different concepts to round up the topic

✓ **Organised**

Examples and exercises are organised in terms of **concepts** to allow students to identify the different techniques to tackle different types of questions.

✓ **Scaffolded**

Concepts are arranged neatly from easiest to hardest in a "building-block" format, building upon the previous concept to enhance a learner's understanding.

AGrader LEARNING CENTRE

Discover the Ace in You

Care Package

SECONDARY 3

Worksheets & Annotated Solutions

(For Students) (For Parents)

Welcome to AGrader Learning Centre!

Dear Parents,

Thank you for your interest in the AGrader Programme. This **Care Package** is specially compiled to showcase to you the AGrader curriculum for Secondary 3.

There are **2 Parts** to this Care Package:

PART I: Curriculum Information	**i. Subject Structure SMART Sheets** Every subject's curriculum is carefully structured to allow AGrader's students to fully grasp school concepts. Have a close look at our Subject Structure SMART Sheets to fully understand how your child will benefit and improve with a structured learning plan! 😊 **ii. What's So Special About AGrader's Worksheets?** The Unique Learning Points of the AGrader Curriculum section will explain to you what sets the AGrader Curriculum apart from other tuition providers. 😊
PART II: Worksheets & Annotated Solutions	i. Excerpts from AGrader's Worksheets (For Students) These are snippets of our ACTUAL worksheets, specially chosen from our worksheets to showcase the unique parts of our curriculum. *(Do let your child try them out! 😊)* ii. Annotated Solutions (For Parents) These are the EXACT annotated solutions that ALL our teachers use to prepare for their lessons. They are carefully planned and created by our in-house Curriculum Team to help our teachers prepare as well as to ensure that every child receives accurate information. *(You may use this to go through the answers with your child after he/she has tried the questions! 😊)*

Scan to Speak to Us Directly on WhatsApp!

+65 9720 2533

www.agrader.sg

Scan to Reserve Your 50% Off Deal NOW!

AY2020 PROMOTION

NO Upfront Deposits

NO Upfront Registration Fees

50% OFF

Your First 4 Trial Lessons!

SAMPLE WORKSHEET
(TRY THEM OUT!)

Secondary 3 English

Name: _____

Date: _____

Homework:	**Corrections:**
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

Focus on Global Issues: California Shooting

California Shooting Kills 12 at Country Music Bar, a Year After Las Vegas

THOUSAND OAKS, Calif. — Country music was blaring and beer was flowing. The Lakers game was on the television, and if revelers weren't line dancing they were playing pool. Then all of a sudden, into "College Country Night!" at the Borderline Bar & Grill stepped a man with a gun.

Wearing dark clothing and a dark baseball cap, he set off smoke bombs to create confusion. He shot a security guard at the entrance and then opened fire into the crowd. Patrons dropped to the ground, dashed under tables, hid in the bathroom and ran for exits, stepping over bodies sprawled across the floor.

And as they raced for safety, many of them thought: not again.

Just last year, they had fled the same chaos — gunshots, bodies falling — in Las Vegas, at a country music festival where 58 people were killed in the worst mass shooting in modern American history. The Borderline, a popular hangout for country music fans, had become a place of solace for dozens of survivors of the Vegas massacre to come together for music, for healing and for remembering — "to celebrate life," in the words of one.

And now, at least some of them belong to a group that seems uniquely American: survivors of two mass shootings.

"This is the second time in about a year and a month that this has happened," Nicholas Champion, a fitness trainer from Southern California who posted a group photo on Facebook of Vegas survivors gathering at the Borderline in April, said in a television interview. "I was at the Las Vegas Route 91 mass shooting as well as probably 50 or 60 others who were in the building at the same time as me tonight."

When a gunman opened fire at the Route 91 Festival in Las Vegas last year, Telemachus Orfanos somehow survived.

On Wednesday night, though, he didn't.

"He was killed last night at Borderline," his mother, Susan Orfanos, said, speaking rapidly into the telephone. "He made it through Las Vegas, he came home. And he didn't come home last night, and the two words I want you to write are: Gun control. Right now — so that no one else goes through this. Can you do that? Can you do that for me? Gun control."

Ms. Orfanos then hung up the telephone.

The authorities said the gunman, Ian D. Long, 28, of Newbury Park, Calif., was found dead at the scene after killing 12 people, including a sheriff's deputy, and being confronted by officers who had stormed the bar. Mr. Long's .45-caliber handgun had been purchased legally and had been outfitted with an extended magazine.

Investigators said there was no clear motive. Mr. Long, a Marine Corps veteran who had served in Afghanistan, had apparently been wrestling with his own demons: officers responded to a disturbance at his home in April, and mental health specialists spoke to him about his military service after suspecting that he might be suffering from post-traumatic stress disorder. But they decided he was not a danger to himself or others, and determined they could not force him to seek treatment.

The attack is only the latest in a wave of mass shootings that have plagued the country this year. A man opened fire at a Pittsburgh synagogue late last month, killing 11 people in an attack that officials said was motivated by anti-Semitism and anti-immigrant rage.

With mass shootings a fixture of life in this nation, Americans in large gatherings — at churches, concerts, public squares — have become accustomed to thinking through the possibilities, eyeing exit routes and weighing escape options, should the horrific happen.

Extracted from The New York Times, 8 Nov 2018

Study the poster carefully and discuss the following questions.

General Context

1. **What is effective about the photograph presented?**

2. **What is the purpose of asking the reader to "guess which one" has been banned?**

Visual Text Skills

Visual texts (Paper 2 Section A) test specific reading skills. You need to consider both the visual and linguistic aspects in order to answer the questions. These visual texts may include anything from advertisements, brochures, posters and even recipes.

Visuals

Images in a visual text may contain

- People, animals or objects participating in an action,
- Flow charts, maps or labelled images that demonstrate concepts or ideas,
- Symbols or icons.

How these images are placed in the visual texts usually convey some relation between them. Where they are placed is also important. For instance, the most eye-catching places tend to be the top and bottom. Top lines are generally headers or headlines meant to attract readers' initial attention whereas bottom lines generally contain additional information, elaboration and even terms and conditions. Bear in mind that these are not established rules and they do change according to text types and design. Read visual texts carefully and explore the many variations.

Question types for visual text

Skills	Question's intent	What you should do	Sample question
Literal/Factual	— Understanding content of the visual text, — Extracting relevant examples	— Find your answers from the text directly	— Name two attractions that are available for booking in advance.
Inference	— Making connections between content of visual text and the intended message or purpose underlying	— Infer purpose from the text, especially when it is meant to encourage action or participation, — Explain effects of visuals or text on readers	— What is the purpose of this advertisement? — Explain why the large image on the left will appeal to its target audience.
Evaluation	— Evaluate effectiveness of rhetorical or literary device or textual cues, — Evaluate readers' response to the visual text	— Explain how the visuals or text elicit emotions and responses.	— How do the visuals convey the message of the poster? — What effect does the headline have on readers?

In general, this 5m Visual Text section will include one of each question type.

SAMPLE WORKSHEET
(TRY THEM OUT!)

Secondary 3 E-Math

Topic: Coordinate Geometry

Name: _____

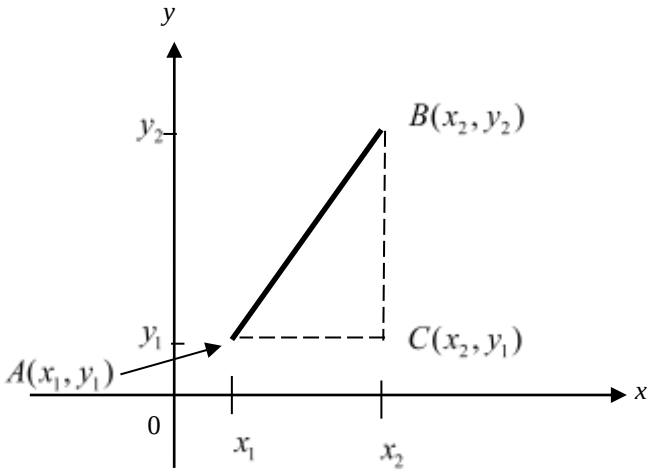
Date: _____

Homework:	**Corrections:**
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

Summary

Key Points

1. Length of a line segment



Length of the line segment AB is measured by using ***Pythagoras' theorem***

$AB^2 = AC^2 + BC^2 = 3^2 + 4^2 = 5^2$

$AB = \sqrt{5^2} = 5$

Hence, to find the ***length of line segment AB***

$$\text{Length of } AB = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

2. Gradient of a line segment

To find the ***gradient of any line segment AB*** where the coordinates of A and B are (x_1, y_1) and (x_2, y_2) respectively

$$Gradient = \frac{y_1 - y_2}{x_1 - x_2}$$

3. Equation of a line segment

$$y = mx + c$$

where *m* ***is the gradient of line segment*** and ***c*** **is the y-intercept**.

Example (Finding Length, Gradient, Equation of straight lines)

A straight line passes through the points *A* (0, 2), *B* (6, 7).

(a) Find the length of AB

(b) Find the gradient of *AB*.

(c) Find the equation of the line *AB*.

(d) Find the equation of horizontal line that passes through the point A

(e) Find the equation of vertical line that passes through the point B

Solution

(a) $Length \text{ of } AB = \sqrt{(0-6)^2 + (2-7)^2}$

$= 7.81 units \text{ (3.s.f)}$

(b) $\text{Gradient of } AB = \frac{2-7}{0-6}$

$= \frac{5}{6}$

(c) Given that the line AB has a gradient of $\frac{5}{6}$ and passes through points (0,2) and (6,7)

we shall use the gradient and one of the points to find the y-intercept of the line

$y = mx + c$

$\text{Sub } x = 0, y = 2 \text{ and } m = \frac{5}{6}$

$2 = \frac{5}{6}(0) + c$

$c = 2$

$\therefore \text{Eqn of line } AB: \quad y = \frac{5}{6}x + 2$

(d) If the horizontal line passes through A (0,2), then it will cut the y-axis at $y = 2$

Hence equation of horizontal line through A is $y = 2$

(e) If the vertical line passes through B (6,7), then it will cut the x-axis at $x = 6$

Hence equation of vertical line through B is $x = 6$

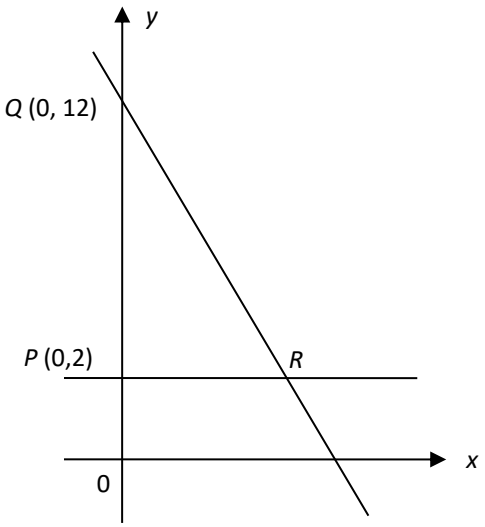
Exercise

A straight line passes through the points *C* (2, -3), *D* (6, 5).

a) Find the length of CD
b) Find the gradient of *CD*.
c) Find the equation of the line *CD*.
d) Find the equation of line that is parallel to x-axis passes through the point D
e) Find the equation of line that is parallel to y-axis through the point C

Review Exercise

In the diagram [*not drawn to scale*], *QR* and *PR* are straight lines. PR is a straight line that is parallel to the x-axis



.

Given that the equation of the line *QR* is parallel to the line $y = -2x + 5$,

a) write down the equation of the line *QR*.

b) Calculate the coordinate of R.

c) the length of QR

d) Find the value of t if the line joining the points (4, 6) and $(3t-1, 1-t)$ is parallel to the line QR

SAMPLE WORKSHEET
(TRY THEM OUT!)

Secondary A-Math

Topic: Solving Trigonometric Equation

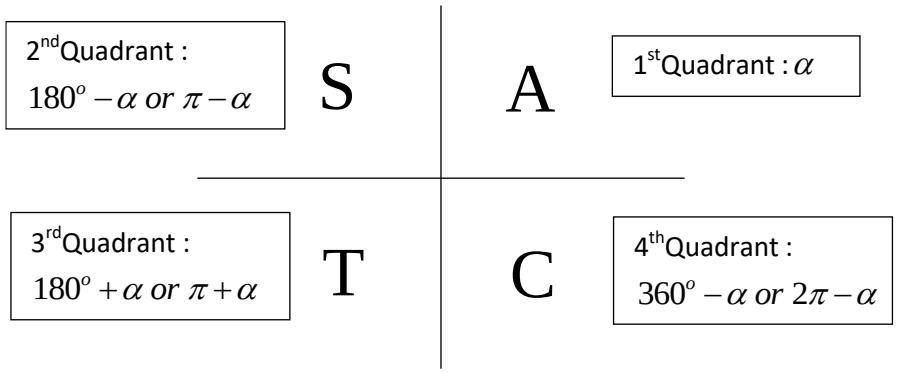
Name: _____

Date: _____

Homework:	**Corrections:**
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

Summary

CAST diagram



When we solve a trigonometric equation, we always solve for a particular range because trigonometric functions are periodic. We solve for the basic angle first then calculate the necessary solutions that satisfy the trigonometric function within the given range

Principal Value

In Simple Term, it refers to the 'calculator value' when you press an inverse trigonometric function.

Function	Principal Value of x	
$y = \cos(x)$	$0^o \le \cos^{-1}(y) \le 180^o$	$0 \le \cos^{-1}(y) \le \pi$
$y = \sin(x)$	$-90^o \le \sin^{-1}(y) \le 90^o$	$-\frac{\pi}{2} \le \sin^{-1}(y) \le \frac{\pi}{2}$
$y = \tan(x)$	$-90^o < \tan^{-1}(y) < 90^o$	$-\frac{\pi}{2} < \tan^{-1}(y) < \frac{\pi}{2}$

Trigonometric Identities (Provided in formula sheet)

$$\sin^2 A + \cos^2 A = 1$$

$$\sec^2 A = 1 + \tan^2 A$$

$$\operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$$

Example

Solve the equation $2\cos 2x + 3\cos x + 1 = 0$ for the range of $0 \le x \le 2\pi$

Solution

$2\cos 2x + 3\cos x + 1 = 0$

$2(2\cos^2 x - 1) + 3\cos x + 1 = 0$

$4\cos^2 x - 2 + 3\cos x + 1 = 0$

$4\cos^2 x + 3\cos x - 1 = 0$

$(4\cos x - 1)(\cos x + 1) = 0$

$\cos x = \frac{1}{4}$ or $\cos x = -1$

Basic Angle = $\cos^{-1}\left(\frac{1}{4}\right) = 1.32$ $x = \frac{\pi}{2}, \frac{3\pi}{2}$

Since $\cos x$ is positive,

x is in 1*st* and 4*th* quadrant

$x = 1.32,\ 2\pi - 1.32$

$x = 1.32,\ 4.96\ (3sf)$

Hence $x = 1.32, \frac{\pi}{2}, \frac{3\pi}{2}, 4.96$

EXERCISE

Solve the equation $3\cos 2x + 16\cos x - 3 = 0$ for the range of $0 \le x \le \pi$

(*Ans*: a) $x = 1.23$)

Review Exercise

(a) Solve the equation $6\sin x \cos x - 1 = 0$ for $0 \le x \le 2\pi$

(b) ***Hence***, find the number of solutions for the equation $6\sin 2x \cos 2x - 1 = 0$ for $0 \le x \le 4\pi$

ANNOTATED SOLUTIONS

Secondary 3 English

Name: _____

Date: _____

Homework:	Corrections:
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

Focus on Global Issues: California Shooting

California Shooting Kills 12 at Country Music Bar, a Year After Las Vegas

THOUSAND OAKS, Calif. — Country music was blaring and beer was flowing. The Lakers game was on the television, and if revelers weren't line dancing they were playing pool. Then all of a sudden, into "College Country Night!" at the Borderline Bar & Grill stepped a man with a gun.

Wearing dark clothing and a dark baseball cap, he set off smoke bombs to create confusion. He shot a security guard at the entrance and then opened fire into the crowd. Patrons dropped to the ground, dashed under tables, hid in the bathroom and ran for exits, stepping over bodies sprawled across the floor.

And as they raced for safety, many of them thought: not again.

Just last year, they had fled the same chaos — gunshots, bodies falling — in Las Vegas, at a country music festival where 58 people were killed in the worst mass shooting in modern American history. The Borderline, a popular hangout for country music fans, had become a place of solace for dozens of survivors of the Vegas massacre to come together for music, for healing and for remembering — "to celebrate life," in the words of one.

And now, at least some of them belong to a group that seems uniquely American: survivors of two mass shootings.

"This is the second time in about a year and a month that this has happened," Nicholas Champion, a fitness trainer from Southern California who posted a group photo on Facebook of Vegas survivors gathering at the Borderline in April, said in a television interview. "I was at the Las Vegas Route 91 mass shooting as well as probably 50 or 60 others who were in the building at the same time as me tonight."

When a gunman opened fire at the Route 91 Festival in Las Vegas last year, Telemachus Orfanos somehow survived.

On Wednesday night, though, he didn't.

"He was killed last night at Borderline," his mother, Susan Orfanos, said, speaking rapidly into the telephone. "He made it through Las Vegas, he came home. And he didn't come home last night, and the two words I want you to write are: Gun control. Right now — so that no one else goes through this. Can you do that? Can you do that for me? Gun control."

Ms. Orfanos then hung up the telephone.

The authorities said the gunman, Ian D. Long, 28, of Newbury Park, Calif., was found dead at the scene after killing 12 people, including a sheriff's deputy, and being confronted by officers who had stormed the bar. Mr. Long's .45-caliber handgun had been purchased legally and had been outfitted with an extended magazine.

Investigators said there was no clear motive. Mr. Long, a Marine Corps veteran who had served in Afghanistan, had apparently been wrestling with his own demons: officers responded to a disturbance at his home in April, and mental health specialists spoke to him about his military service after suspecting that he might be suffering from post-traumatic stress disorder. But they decided he was not a danger to himself or others, and determined they could not force him to seek treatment.

The attack is only the latest in a wave of mass shootings that have plagued the country this year. A man opened fire at a Pittsburgh synagogue late last month, killing 11 people in an attack that officials said was motivated by anti-Semitism and anti-immigrant rage.

With mass shootings a fixture of life in this nation, Americans in large gatherings — at churches, concerts, public squares — have become accustomed to thinking through the possibilities, eyeing exit routes and weighing escape options, should the horrific happen.

Extracted from The New York Times, 8 Nov 2018

Study the poster carefully and discuss the following questions.

General Context

- May discuss in context of the article → Mass shootings in America
- Purpose: To convince the public that there should be tighter control over gun ownership

1. **What is effective about the photograph presented?**

- Contrast between the Kinder egg and the gun (something intended for children to enjoy versus something that can be used to harm others)
- Classroom setting → the gun, in particular, stands out as something that does not belong
- Rather shocking to see a child holding a gun – shock factor captures the audience's attention

2. **What is the purpose of asking the reader to "guess which one" has been banned?**

Think: How else could the same message have been conveyed without asking the reader to guess? Why not just write "Kinder chocolate eggs have been banned but guns haven't"?

- Forces the reader to confront/acknowledge the absurdity of the fact that chocolate is banned while guns are not
- Directly addresses the reader

AGrader Learning Centre
Discover the Ace in You

Visual Text Skills

Visual texts (Paper 2 Section A) test specific reading skills. You need to consider both the visual and linguistic aspects in order to answer the questions. These visual texts may include anything from advertisements, brochures, posters and even recipes.

Visuals

Images in a visual text may contain

- People, animals or objects participating in an action,
- Flow charts, maps or labelled images that demonstrate concepts or ideas,
- Symbols or icons.

How these images are placed in the visual texts usually convey some relation between them. Where they are placed is also important. For instance, the most eye-catching places tend to be the top and bottom. Top lines are generally headers or headlines meant to attract readers' initial attention whereas bottom lines generally contain additional information, elaboration and even terms and conditions. Bear in mind that these are not established rules and they do change according to text types and design. Read visual texts carefully and explore the many variations.

Question types for visual text

Skills	Question's intent	What you should do	Sample question
Literal/Factual	— Understanding content of the visual text, — Extracting relevant examples	— Find your answers from the text directly	— Name two attractions that are available for booking in advance.
Inference	— Making connections between content of visual text and the intended message or purpose underlying	— Infer purpose from the text, especially when it is meant to encourage action or participation, — Explain effects of visuals or text on readers	— What is the purpose of this advertisement? — Explain why the large image on the left will appeal to its target audience.
Evaluation	— Evaluate effectiveness of rhetorical or literary device or textual cues, — Evaluate readers' response to the visual text	— Explain how the visuals or text elicit emotions and responses.	— How do the visuals convey the message of the poster? — What effect does the headline have on readers?

In general, this 5m Visual Text section will include one of each question type.

SOLUTIONS

AGrader LEARNING CENTRE
Discover the Ace in You

Secondary 3 E-Math

Topic: Coordinate Geometry

Name: _____

Date: _____

Homework:	Corrections:
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

AGrader Learning Centre
Discover the Ace in You

Exercise

A straight line passes through the points *C* (2, -3), *D* (6, 5).

a) Find the length of CD
b) Find the gradient of *CD*.
c) Find the equation of the line *CD*.
d) Find the equation of line that is parallel to x-axis passes through the point D
e) Find the equation of line that is parallel to y-axis through the point C

$\left(Ans: \text{a) } 8.94 \text{ units} \quad \text{b) } 2 \quad \text{c) } y=2x-7 \quad \text{d) } y=5 \quad \text{e) } x=2\right)$

Solution

(a) $\text{Length of } AB = \sqrt{(2-6)^2+(-3-5)^2}$

$= 8.94 \text{units (3.s.f)}$

(b) $\text{Gradient of } AB = \dfrac{5-(-3)}{6-2}$

$= 2$

(c) Given that the line CD has a gradient of 2 and passes through the point *D* (6, 5),

$y = mx + c$

Sub $x=6, y=5$ and $m=2$

$5 = 2(6) + c$

$c = -7$

$\therefore$ Eqn of line AB: $y = 2x - 7$

(d) A line that is parallel to the x-axis is a horizontal line.

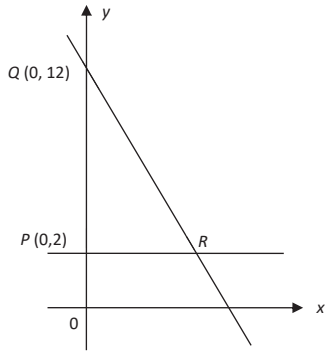
Hence, equation of the line through D is $y = 5$

(e) A line that is parallel to the x-axis is a horizontal line.

Hence equation of vertical line through C is $x = 2$

Review Exercise

In the diagram [*not drawn to scale*], *QR* and *PR* are straight lines. PR is a straight line that is parallel to the x-axis



.

Given that the equation of the line *QR* is parallel to the line $y = -2x + 5$,

a) write down the equation of the line *QR*.

b) Calculate the coordinate of R.

c) the length of QR

d) Find the value of t if the line joining the points (4, 6) and $(3t-1, 1-t)$ is parallel to the line QR

Solution

a) $\text{Gradient of } QR = -2$ (since parallel lines share the same gradient)

Since the line has a y-intercept of $Q(0,12)$,

Equation of *QR* is $y = -2x + 12$

b) The y coordinate of R is 2, since it is lying on horizontal line which passes through $P(0,2)$. Hence

Sub $y = 2$ into $y = -2x + 12$

$2 = -2x + 12$

$x = 5$

$R(5,2)$

c) Length of QR

$= \sqrt{(0-5)^2 + (12-2)^2}$

$= 11.2$ units $(3.s.f)$

d) $\dfrac{6-(1-t)}{4-(3t-1)} = -2$

$\dfrac{5+t}{5-3t} = -2$

$5+t = -2(5-3t)$

$5+t = -10+6t$

$-5t = -15$

$t = 3$

AGrader LEARNING CENTRE
Discover the Ace in You

Secondary 3 A-Math

Topic: Solving Trigonometric Equation

Name: _____

Date: _____

Homework:	**Corrections:**
Page Number(s)	Page Number(s) *Please correct and return*
Remarks:	

AGrader Learning Centre
Discover the Ace in You

EXERCISE

Solve the equation $3\cos 2x+16\cos x-3=0$ for the range of $0\le x\le \pi$

(*Ans*: a) $x=1.23$)

Solution

$3\cos 2x+16\cos x-3=0$

$3\left(2\cos^2 x-1\right)+16\cos x-3=0$

$6\cos^2 x-3+16\cos x-3=0$

$6\cos^2 x+16\cos x-6=0$

$3\cos^2 x+8\cos x-3=0$

$(3\cos x-1)(\cos x+3)=0$

$\cos x=\frac{1}{3}$ or $\cos x=-3$ (*reject*)

Basic Angle = $\cos^{-1}\left(\frac{1}{3}\right)=1.2310$

Since $\cos x$ is positive, and x lies only for $0\le x\le \pi$

then x must be in 1*st* quadrant

$\therefore x=1.23$ (3.s.f)

Review Exercise

(a) Solve the equation $6\sin x\cos x-1=0$ for $0\le x\le 2\pi$

(b) ***Hence***, find the number of solutions for the equation $6\sin 2x\cos 2x-1=0$ for $0\le x\le 4\pi$

Solution

(a) $6\sin x\cos x-1=0$

$6\sin x\cos x-1=0$

$6\left(\frac{\sin 2x}{2}\right)-1=0$

$3\sin 2x-1=0$

$\sin 2x=\frac{1}{3}$

Basic angle = 0.33984

$2x=0.33984,\ \pi-0.33984, 0.33984+2\pi, 3\pi-0.33984$

$x=0.170,\ 1.40,\ 3.31,\ 4.54$

(b) There is a total of 4 solutions for $6\sin x\cos x-1=0$

Solving $6\sin 2x\cos 2x-1=0$ for $0\le x\le 2\pi$ will double the number of solutions because the coefficient of x has been doubled, which leads to 8 solutions

However since we are now solving the equation $6\sin 2x\cos 2x-1=0$ for the new range of values between $0\le x\le 4\pi$, this will also double the number of solutions as well.

Hence, there will be a total of 16 solutions for solving $6\sin 2x\cos 2x-1=0$ for $0\le x\le 4\pi$

AGrader Learning Centre
Discover the Ace in You