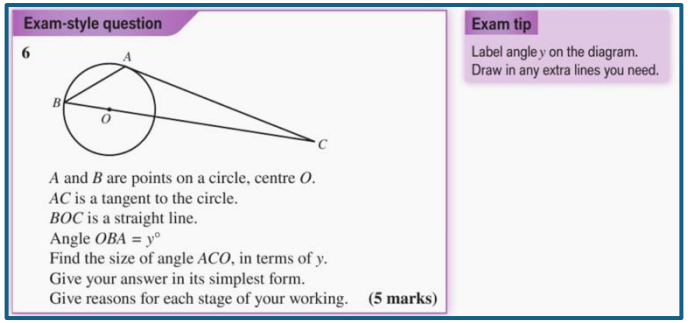
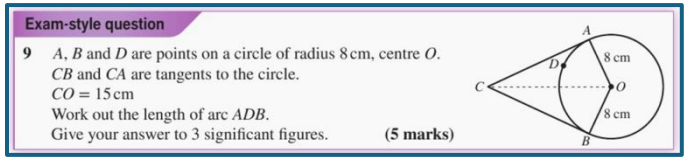
Holy Family Catholic School – Faculty of "Mathematics and Technology"

GCSE Mathematics Autumn Half-Term 2 Year 11 Higher

Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions	Red Zone
Lesson 1 Week 9 Can I recognise and use circle theorems involving radii and chords?	Isosceles Triangle Circle Theorem Congruence	GEOMETRY & MEASURES	Angle facts in a triangle. Pythagoras. Trigonometry	I will be able to: Understand and use facts about chords and their distance from the centre of a circle. Solve problems involving chords and radii.	A line from the centre of a circle meets a chord at right angles. What can you say about that chord? A. It's parallel to the radius. B. It's bisected by the radius. C. It passes through the centre. D. It's the diameter.	
Lesson 2 Week 9 Can I recognise and use circle theorems involving tangents?	Isosceles Triangle Circle Theorem Congruence Tangent	GEOMETRY & MEASURES	Language of Circles. Angle properties of isosceles triangles. Angle reasoning.	I will be able to: Understand and use facts about tangents at a point and from a point. Give reasons for angle and length calculations	A straight line touches a circle and makes a 90° angle with a radius drawn to the point of contact. What can we conclude?	

Holy Family Catholic School – Faculty of "Mathematics and Technology"

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					A. The line passes through the centre. B. The line is a tangent. C. The line is a chord. D. The line is a diameter.	
Lesson 3 Week 9 Pre-PAZ Revision Workshop 1						
Lesson 4 Week 9 Pre-PAZ Revision Workshop 2						
Week 10 PAZ Week 1						
Week 11 PAZ Week 2						

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GCSE Mathematics Autumn Half-Term 2 Year 11 Higher

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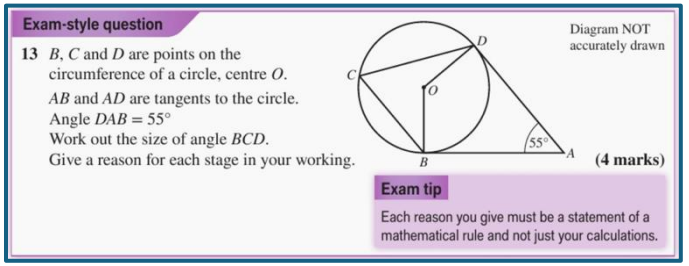
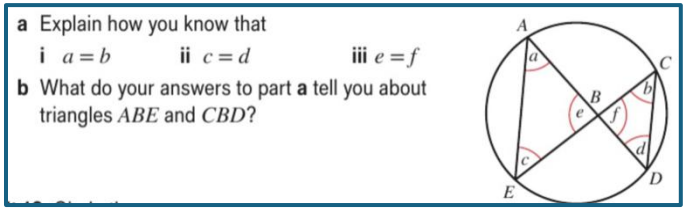
Lesson 1 Week 12 Can I recognise and use circle theorems involving angles in circles?	Isosceles Circle Theorem Congruence Tangent Centre Circumference Subtended	GEOMETRY & MEASURES	Angle reasoning. Radii & Chords. Tangents.	I will be able to: Understand, prove and use facts about angles subtended at the centre and the circumference of circles. Understand, prove and use facts about the angle in a semicircle being a right angle. Find missing angles using these theorems and give reasons for answers.	If $\angle ABC = 90°$, which of these must be true? A. AB is a diameter B. AC is a diameter C. BC is a diameter D. The circle passes through all three points	
Lesson 2 Week 12 Can I recognise and use circle theorems involving angles in circles?	Isosceles Triangle Circle Theorem Congruence Tangent Centre Circumference Subtended	GEOMETRY & MEASURES	Sum of angles in a quadrilateral.	I will be able to: Understand, prove and use facts about angles subtended at the centre and the circumference of circles.	In a circle, chord **AB** subtends angles at points **C** and **D** on the **same arc**. If ∠ACB = 30°, what is ∠ADB? A. 15° B. 30°	

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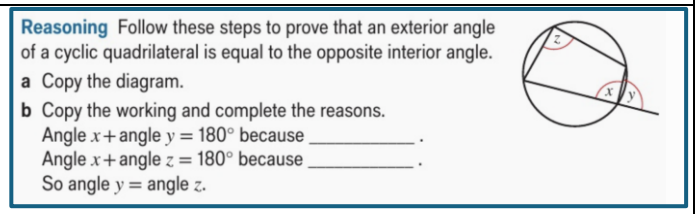
					C. 60° D. 150°	
Lesson 3 Week 12 Can I use a circle theorem to identify and use angles in cyclic quadrilaterals?	Isosceles Triangle Circle Theorem Congruence Tangent Centre Circumference Subtended	GEOMETRY & MEASURES	Segment. Angles in an isosceles triangle.	I will be able to: Understand, prove and use facts about cyclic quadrilaterals.	**Cyclic Quadrilateral** ABCD is a cyclic quadrilateral. If ∠A = 100°, find ∠C. A. 80° B. 100° C. 90° D. 50°	

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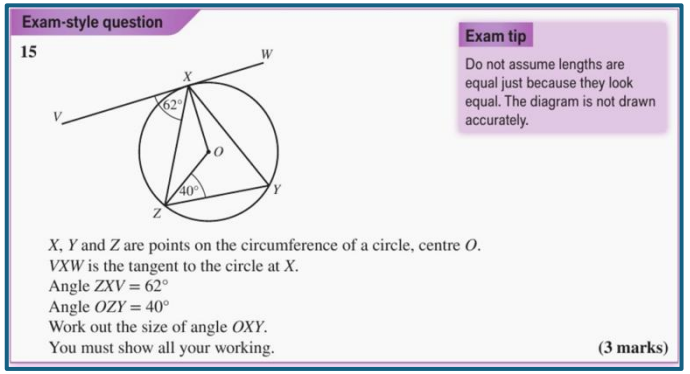
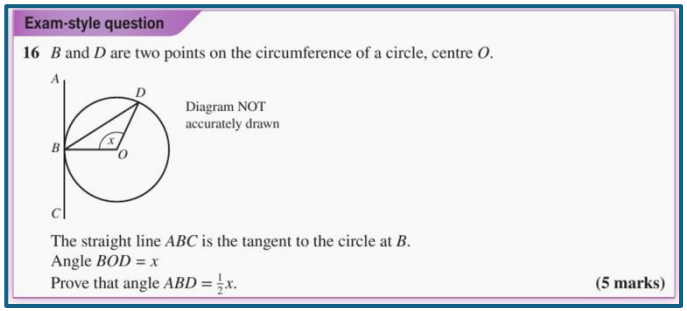
Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions	Red Zone
Lesson 4 Week 12 Can I create an algebraic proof for the alternate segment theorem?	Isosceles Triangle Circle Theorem Congruence Centre Circumference Subtended Proof Segment	GEOMETRY & MEASURES	Equation of parallel lines.	I will be able to: Prove the alternate segment theorem.	A tangent touches a circle at point A. Chord AB makes a 35° angle with the tangent. What is the size of the angle in the opposite segment subtended by AB? A. 35° B. 55° C. 145° D. 70°	 

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GCSE Mathematics Autumn Half-Term 2 Year 11 Higher

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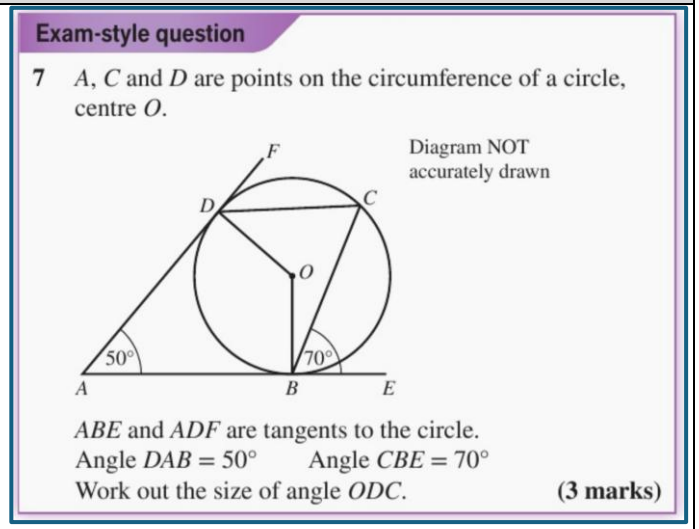
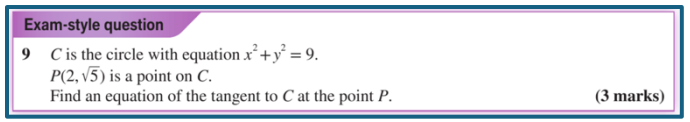
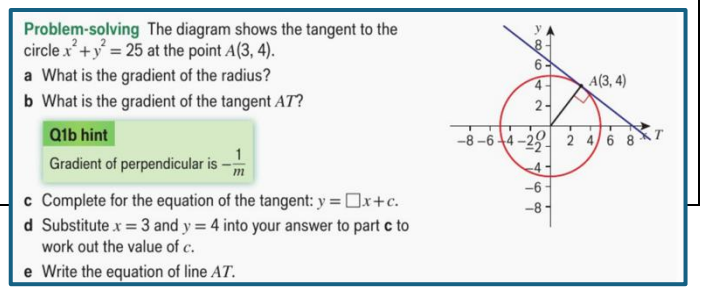
Lesson 1 Week 13 Can I solve a range of problems involving all circle theorems?	Isosceles Triangle Circle Theorem Congruence Centre Circumference Subtended Proof Segment	GEOMETRY & MEASURES	Equation of perpendicular lines.	I will be able to: Apply the correct circle theorem to solve problems involving angles around circles.	A tangent touches a circle at point P. Which statement is true? A. The tangent passes through the centre. B. The radius is parallel to the tangent. C. The radius is perpendicular to the tangent. D. The tangent bisects the radius.	
Lesson 2 Week 13 Can I find the equation of a tangent to a circle?	Equation Tangent Gradient Perpendicular Radius Substitute Reciprocal	GEOMETRY & MEASURES	Perpendicular gradient Find the equation of a line given gradient and a co-ordinate point.	I will be able to: Find the equation of a tangent to a circle at a given point.	If a circle has the equation $x^2 + y^2 = 49$, what is its radius? A. 7 B. 14 C. 49 D. 3.5	 

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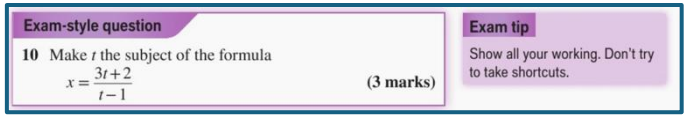
Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions	Red Zone
Lesson 3 Week 13	Algebra Review – exam question focus					
Lesson 4 Week 13 Can I re-arrange formulae?	Formula Subject Re-arrange Variable Denominator Fraction Operation	ALGEBRA ` Review / Recall	Re-arranging review. Linear factorising.	I will be able to: Change the subject of a formula (review) Change the subject with powers and roots involved.	**Make $r$the subject** $A = \pi r^2$ A. $r = \frac{A}{\pi}$ B. $r = \pi A^2$ C. $r = \sqrt{\frac{A}{\pi}}$ D. $r = \frac{A}{\pi^2}$	Make x the subject of each formula. **a** $M = 3\sqrt{\frac{x}{4}}$ **b** $y = \frac{x^2}{n}$
Lesson 1 Week 14 Can I re-arrange formulae?	Formula Subject Re-arrange Variable Denominator Fraction Operation	ALGEBRA	Re-arranging review. Linear factorising.	I will be able to: Change the subject where the subject appears twice.	Rearrange to make x the subject: $ax = cx + b$ A. $x = \frac{b}{c-a}$ B. $x = \frac{b}{a-c}$	

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					C. $x = \frac{a-c}{b}$ D. $x = b(a-c)$	
Lesson 2 Week 14 Can I add and subtract algebraic fractions?	Fractions Denominator Numerator Equivalent LCM Add/subtract	ALGEBRA	Four operations with fractions.	I will be able to: Add algebraic fractions using the LCM for the denominator. Subtract algebraic fractions using the LCM for the denominator.	**Different Denominators** $\frac{2}{x} + \frac{3}{2x}$ A. $\frac{5}{2x}$ B. $\frac{7}{2x}$ C. $\frac{2x+3}{2x}$ D. $\frac{7x}{2x}$	**Exam-style question** 13 Write $\frac{x+6}{2} + \frac{2x-3}{5}$ as a single fraction in its simplest form. **(3 marks)** Follow these steps to make x the subject of $\frac{1}{x} + \frac{1}{y} = 1$ **a** Add $\frac{1}{x} + \frac{1}{y}$ $\square \frac{}{xy} = 1$ **b** Multiply both sides by xy. **c** Collect all terms with x on one side. **d** Factorise. **e** Divide to get x on its own. The lens formula is $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$, where f = focal length, u = object distance and v = image distance. Make u the subject of the formula.
Lesson 3 Week 14 Can I factorise linear and quadratic expressions?	Factorise Expression HCF Term Bracket Linear Quadratic DOTS	ALGEBRA Review / Recall	Expand double & triple brackets	I will be able to: Factorise linear expressions into a single bracket. Factorise quadratic expressions into a double bracket.	Factorise: $x^2 - 7x + 10$ A. $(x-2)(x-5)$ B. $(x+2)(x-5)$	**Exam-style question** 19 Factorise fully $4x^2 - 16$ **(2 marks)**

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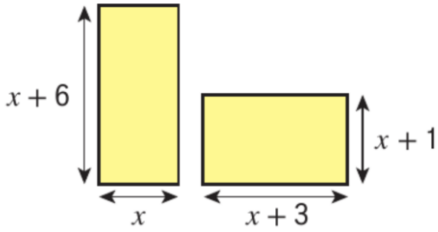
					C. $(x+2)(x+5)$ D. $(x-10)(x+1)$	**Problem-solving / Reasoning** The two rectangles shown have the same area. Find the value of x. 
Lesson 4 Week 14 Can I simplify algebraic fractions?	Factorise Expression HCF Term Bracket Linear Quadratic DOTS	ALGEBRA	Factorise linear expressions. Factorise quadratic expressions including a difference of two squares.	I will be able to: Simplify algebraic fractions by factorising linear expressions first. Simplify algebraic fractions by factorising both linear and quadratic expressions first.	**Factorise a Trinomial** $\frac{x^2+5x+6}{x+2}$ A. $x+3$ B. $\frac{(x+2)(x+3)}{x+2}$ C. x^2+3x+2 D. $\frac{x^2+5x+6}{x+3}$	**Exam-style question** **9** Simplify fully $\frac{2x^2+17x+21}{x^2-49}$ **(3 marks)** **Exam-style question** **10** Simplify fully $\frac{2x^2-9x+4}{3x^2-12x}$ **(3 marks)**

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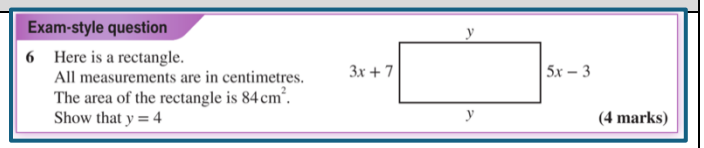
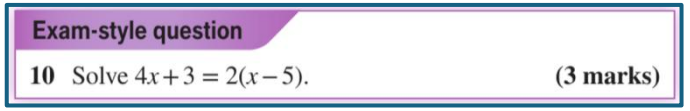
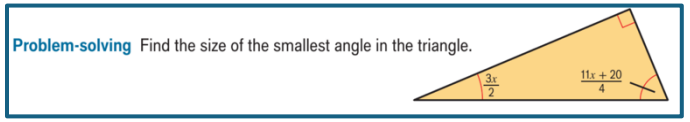
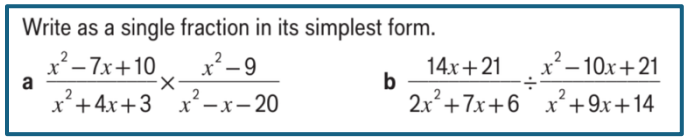
Lesson 1 Week 15 Can I solve equations and inequalities?	Equation Inequality Unknown Solution	ALGEBRA Review / recall	Solve simple equations and inequalities. Represent inequalities on a number line.	I will be able to: Solve equations / inequalities with unknowns on both sides. Solve equations / inequalities involving fractions.	**Solve** $3x + 2 \leq 2x + 5$ A. $x \leq 7$ B. $x \leq 3$ C. $x \geq 3$ D. $x \geq -3$	  
Lesson 2 Week 15 Can I multiply and divide more complex algebraic fractions?	Factorise Expression HCF LCM Term Bracket Linear Quadratic DOTS	ALGEBRA	All operations with simple algebraic fractions.	I will be able to: Multiply two algebraic fractions, by simplifying first. Divide algebraic fractions by simplifying first.	**Divide by an algebraic fraction** $\frac{x+2}{x} \div \frac{x+2}{x+3}$ A. $\frac{x+3}{x}$ B. $\frac{x}{x+3}$ C. $\frac{x+3}{x+2}$ D. 1	

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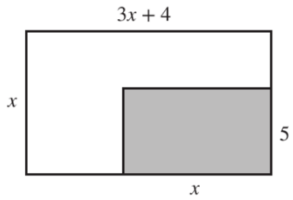
Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions	Red Zone
Lesson 3 Week 15 Can I add and subtract more complex algebraic fractions?	Factorise Expression HCF LCM Term Bracket Linear Quadratic DOTS	ALGEBRA	All operations with simple algebraic fractions.	I will be able to: Add and subtract two algebraic fractions, by simplifying first. Use multiple operations with algebraic fractions.	$\frac{1}{x}+\frac{1}{x+1}$ A. $\frac{2x+1}{x(x+1)}$ B. $\frac{2x+1}{x+1}$ C. $\frac{2x+1}{x}$ D. $\frac{x+1}{x(x+1)}$	**Exam-style question** 9 $2-\frac{x+1}{x+2}-\frac{x+3}{x-2}$ can be written as a single fraction in the form $\frac{ax+b}{x^2-4}$, where a and b are integers. Work out the value of a and the value of b. **(4 marks)** **Exam-style question** 13 Show that $3+\left[(x+4)\div\frac{x^2-x-20}{x+1}\right]$ simplifies to $\frac{ax-b}{cx-d}$, where a, b, c and d are integers. **(4 marks)**
Lesson 4 Week 15 Can I prove a result using algebra?	Even / Odd Prime Integer Prove Show Identity sign ≡ Identity Equation Expression Term	ALGEBRA	Generalise even & odd numbers eg 2n, 2n+1,... Identify equations and identities. Understand what integer values are?	I will be able to: Use algebraic reasoning to produce a given result in a "show that" question.	A rectangle has a **length of** $x+3$ and a **width of** $x+2$. **Show that the area of the rectangle can be written as the quadratic expression** x^2+5x+6**.**	**Exam-style question** 7  The diagram shows a large rectangle of length $(3x+4)$ cm and width x cm. A smaller rectangle of length x cm and width 5 cm is cut out and removed. The area of the shape that is left is 70 cm^2. Show that $3x^2-x-70=0$. **(3 marks)**

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					A. Area = length + width = $(x+3)+(x+2)$ $=2x+5$ **B.** Area = length × width = $(x+3)(x+2)$ $=x^2+5x+6$ **C.** Area = x^2+6x+5 **D.** Area = $(x^2+3x)+(2x+6)$ $=x^2+5x+6$	