GRADE 11 PRE-CALCULUS MATHEMATICS (30S)

Final Practice Exam

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Final Practice Exam

Name: _____

Student Number: _____

Attending ❑ Non-Attending ❑

Phone Number: _____

Address: _____

_____

_____

For Marker's Use Only

Date: _____

Final Mark: _____ /100 = _____ %

Comments:

Instructions

The final examination will be weighted as follows:

Modules 1–8	100%

The format of the examination will be as follows:

Module 1:	5 marks	Module 5:	19 marks
Module 2:	5 marks	Module 6:	19 marks
Module 3:	5 marks	Module 7:	23 marks
Module 4:	5 marks	Module 8:	19 marks

Time allowed: 2.5 hours

Note: You are allowed to bring the following to the exam: pencils (2 or 3 of each), blank paper, a ruler, a scientific or graphing calculator, and your Final Exam Resource Sheet. Your Final Exam Resource Sheet must be handed in with the exam.

Show all calculations and formulas used. Include units where appropriate. Clearly state your final answer. **Diagrams may not be drawn to scale.**

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Answer all questions to the best of your ability. Show all your work.

Module 1: Sequences and Series *(5 marks)*

1. Write the defining linear function of the following arithmetic sequence. *(2 marks)*

   99, 103, 107, . . .

2. Use a formula to find the value of $\sum_{k=2}^{8} 81\left(\frac{1}{3}\right)^{k-1}$. *(3 marks)*

Module 2: Factoring and Rational Expressions *(5 marks)*

1. Simplify. Identify all non-permissible values. *(5 marks)*

$$\frac{5x^2 + 14x - 19}{2x^2 + 5x + 3} \div \left(\frac{3x - 12}{x^2 - 2x - 8} + \frac{2x - 2}{x^2 + 4x - 5} \right)$$

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Module 3: Quadratic Functions *(5 marks)*

1. Given the following parabola in vertex form, complete the following questions. *(1 mark each, for a total of 5 marks)*

$$y = \frac{1}{2}(x-3)^2 + 2$$

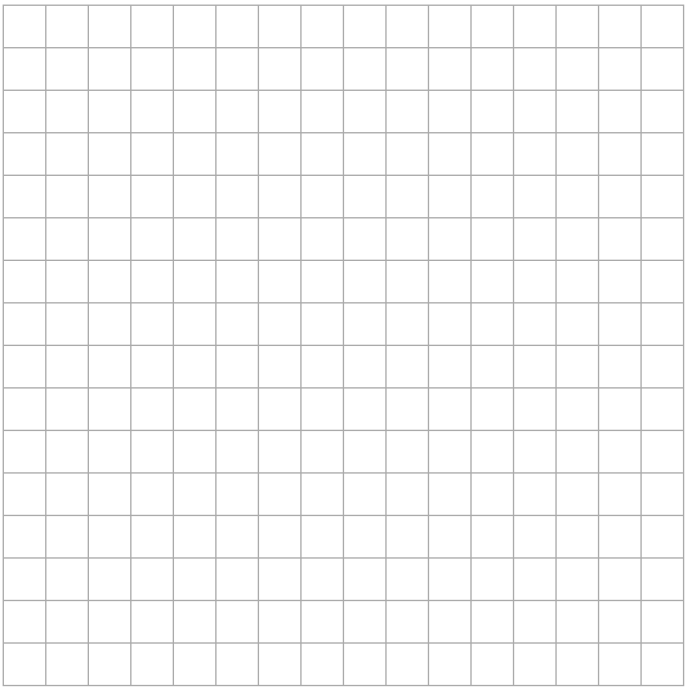
a) Identify the range.

b) Identify the direction of the opening.

c) Identify the axis of symmetry.

d) Identify the y-intercept.

e) Sketch the graph of the parabola.



Name: _____

Module 4: Solving Rational and Quadratic Equations *(5 marks)*

1. Solve the following quadratic equation using any method you wish. Explain why you chose the method you used. *(2 marks)*

   $2x^2 + 25 = 15x$

2. Solve the following rational equation. Identify any non-permissible values. *(3 marks)*

$$\frac{3x+1}{x} = -\frac{x}{x+1}$$

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Module 5: Radicals *(19 marks)*

1. Order the following radical expressions from least to greatest. Do not use a calculator. *(2 marks)*

   $6\sqrt{3}$, $11\sqrt{7}$, $9\sqrt{5}$, $2\sqrt{15}$

2. Simplify each of the following. All answers must have rationalized denominators. Assume all variables are non-negative.

   a) $3\sqrt{19} + 2\sqrt{76}$ *(1 mark)*

b) $\left(\sqrt{8xy}-\sqrt{x^3}\right)\left(\sqrt{4y^2}\right)$ *(2 marks)*

c) $\dfrac{5\sqrt{8}-2\sqrt{5}}{3-2\sqrt{3}}$ *(3 marks)*

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3. Identify the values for each of the variables for which each radical expression is defined. *(1 mark each, for a total of 2 marks)*

a) $\sqrt{6-3x}$

b) $\sqrt{32x^2}$

4. Find the solutions for each of the following equations. Check your solutions for extraneous roots. Determine any restrictions on the variable.

   a) $3 - x = \sqrt{2x - 3}$ *(4 marks)*

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b) $\sqrt{2x + 4} + 3 = 9$ *(3 marks)*

5. The period, P, measured in seconds, of a pendulum is the time it takes to complete one full swing. The period can be found using the formula $P = 2\pi\sqrt{\frac{L}{9.8}}$, where L measures the length of the pendulum in metres. How long should a pendulum be to complete one full swing in 4.3 seconds? Round your answer to four decimal places. Check your answer for extraneous solutions. *(2 marks)*

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Module 6: Systems of Equations and Inequalities *(19 marks)*

1. Solve the following system of equations algebraically and graphically. *(6 marks)*

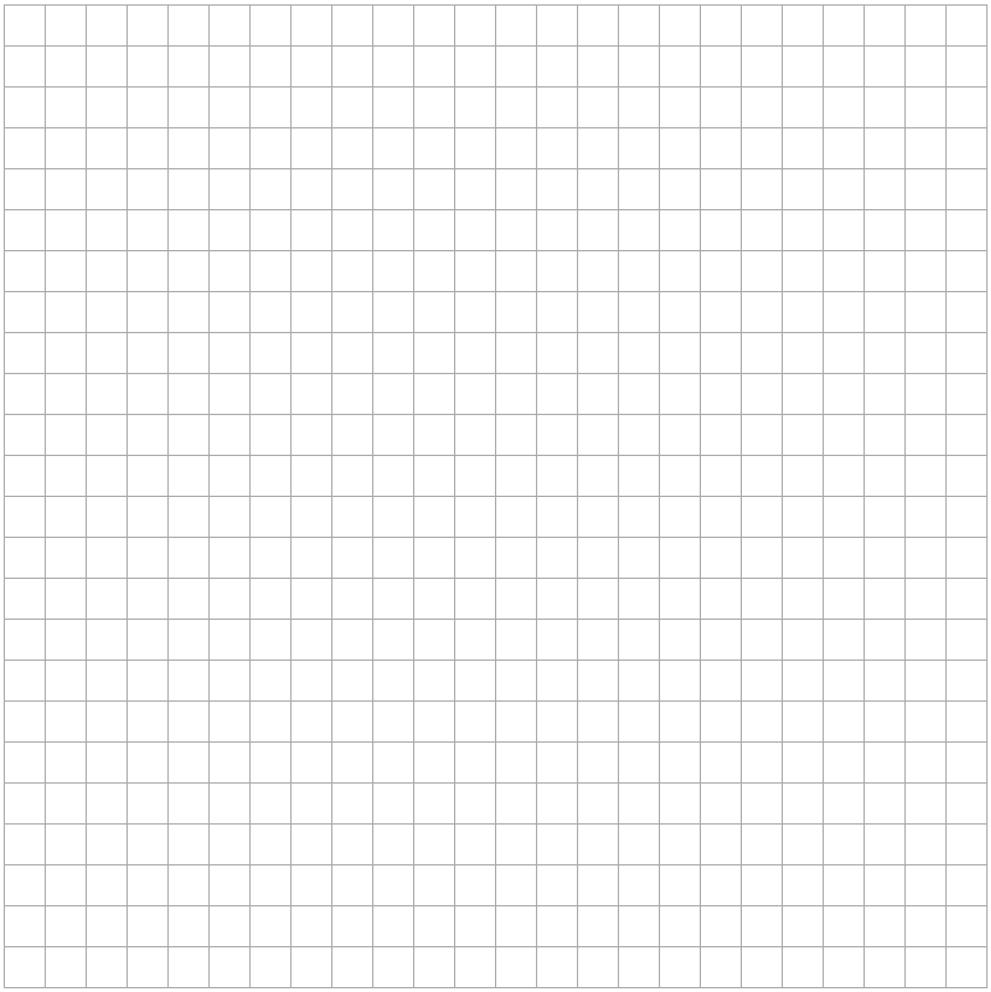
$$y = (x-3)^2$$

$$y = -3(x+1)^2 + 12$$

Answer:

Algebraic Solution

Graphing Solution



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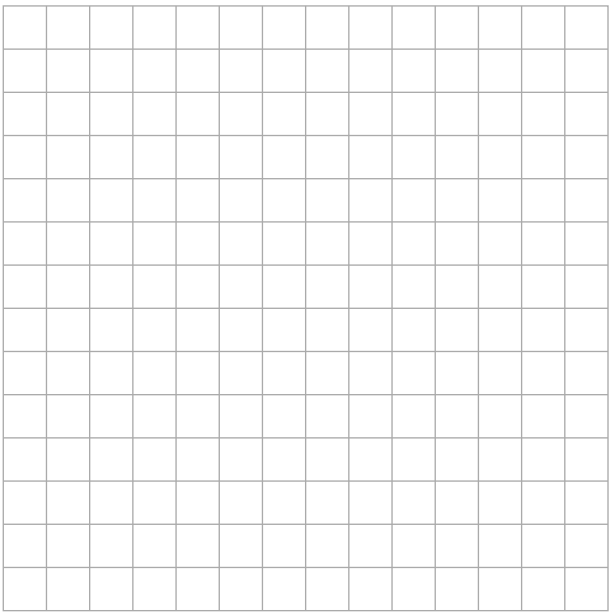
2. The sum of two numbers is 22. Their product is 117.
   a) Write a system of equations to represent this problem. *(1 mark)*

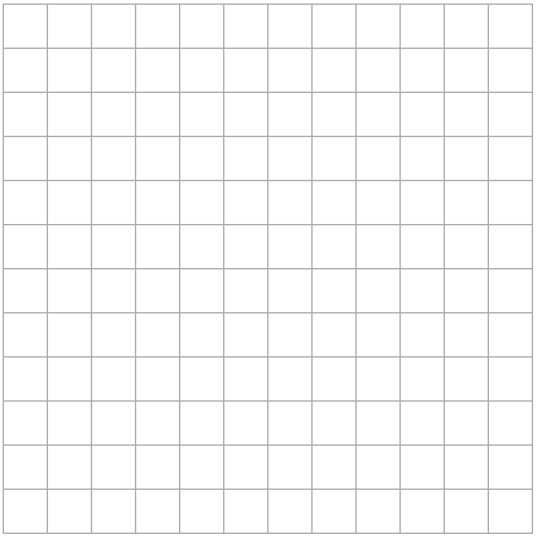
   b) Solve the system of equations to find the two numbers. *(3 marks)*

3. Solve the following inequalities by graphing. *(2 marks each, for a total of 6 marks)*

a) $y < 3x - 8$



b) $0 \leq x^2 - 4$



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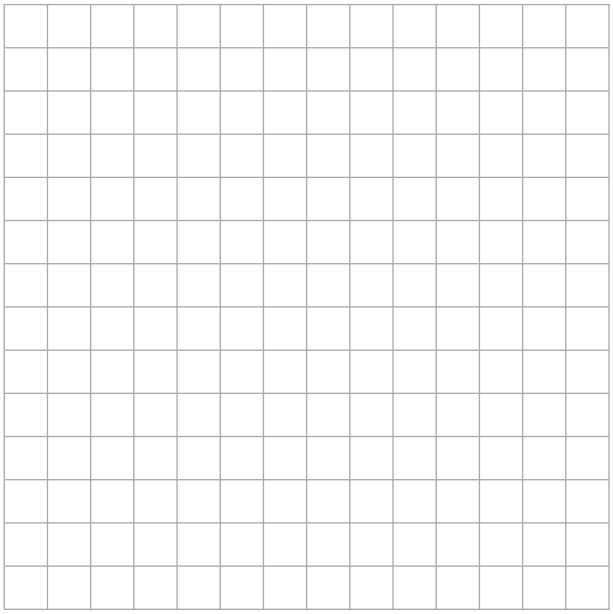
c) $y > (x + 1)^2 - 3$



4. Use the sign analysis method to solve the following quadratic inequality. *(3 marks)*

$0 \leq 2x^2 - 5x - 3$

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Module 7: Trigonometry *(23 marks)*

1. P(2, –3) is a point on the terminal side of angle θ in standard position. Determine $\sin\theta$, $\cos\theta$, and $\tan\theta$ for the following point. Also, determine the distance from the origin to the point P(2, –3). Rationalize any denominators. *(5 marks)*

2. Given the following angles in standard position, determine the exact values of the sine, cosine, and tangent ratios. Show how you determined the exact values. *(2 marks each, for a total of 4 marks)*

   a) 240°

   b) 45°

Name: _____

3. Sketch the angle 342° in standard position and find its reference angle. Determine the other angles that have the same reference angle as the given angle for θ in the interval [0°, 360°]. *(3 marks)*

4. Determine the solution set for each of the following trigonometric equations over the interval [0°, 360°]. Round to the nearest degree where necessary. *(2 marks each, for a total of 4 marks)*

   a) $\cos\theta = \frac{1}{5}$

   b) $\sin\theta - 1 = 0$

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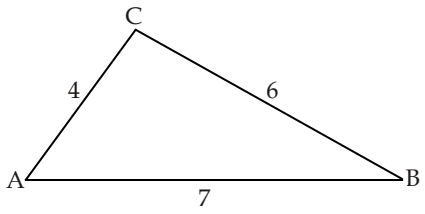
5. In ΔABC, $\angle C = 41°$, $c = 6$, and $a = 8$. Find all possible values for b and $\angle B$. Draw a diagram and round off answers to two decimal places. *(5 marks)*

6. Find the measure of $\angle A$ in ΔABC (to the nearest degree). *(2 marks)*



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Module 8: Absolute Value and Reciprocal Functions *(19 marks)*

1. Evaluate. *(1 mark each, for a total of 2 marks)*

   a) $4\,|\,3(-7) + 4\,|\,-3$

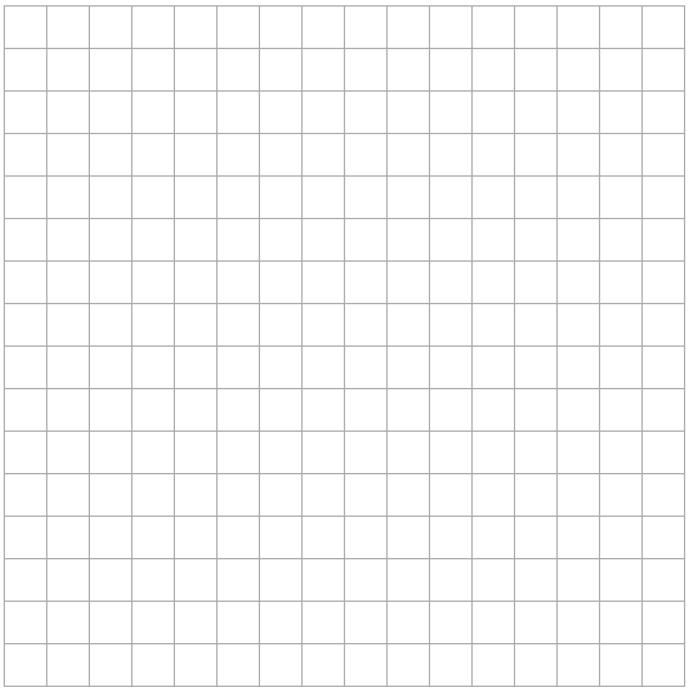
   b) $-2\,|\,-2(3) + 1\,|\,+5$

2. Solve the following absolute value equation algebraically. *(4 marks)*

   $|\,x^2 - x\,| = 6$

3. Solve the following absolute value equation graphically. *(4 marks)*

$|x + 4| = 5$



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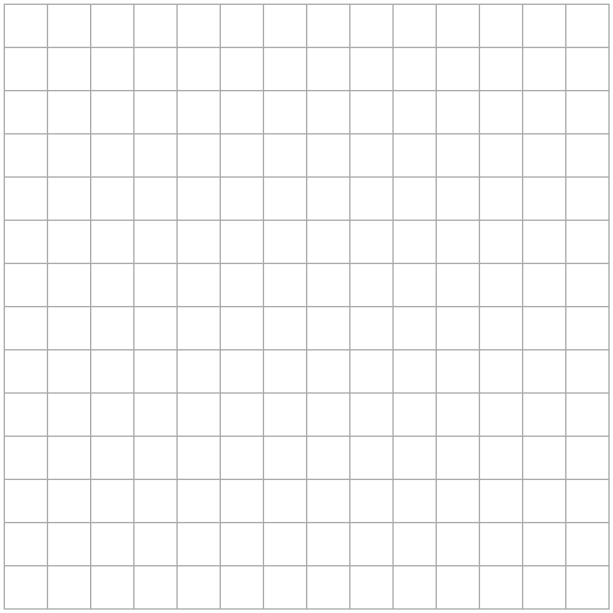
4. Sketch the graph of the reciprocal of the given function. State the equation(s) of the horizontal and vertical asymptote(s). *(4 marks)*

   $y = 2x - 6$



5. Given the graph of $y = \frac{1}{f(x)}$, sketch the graph of $y = f(x)$. *(5 marks)*