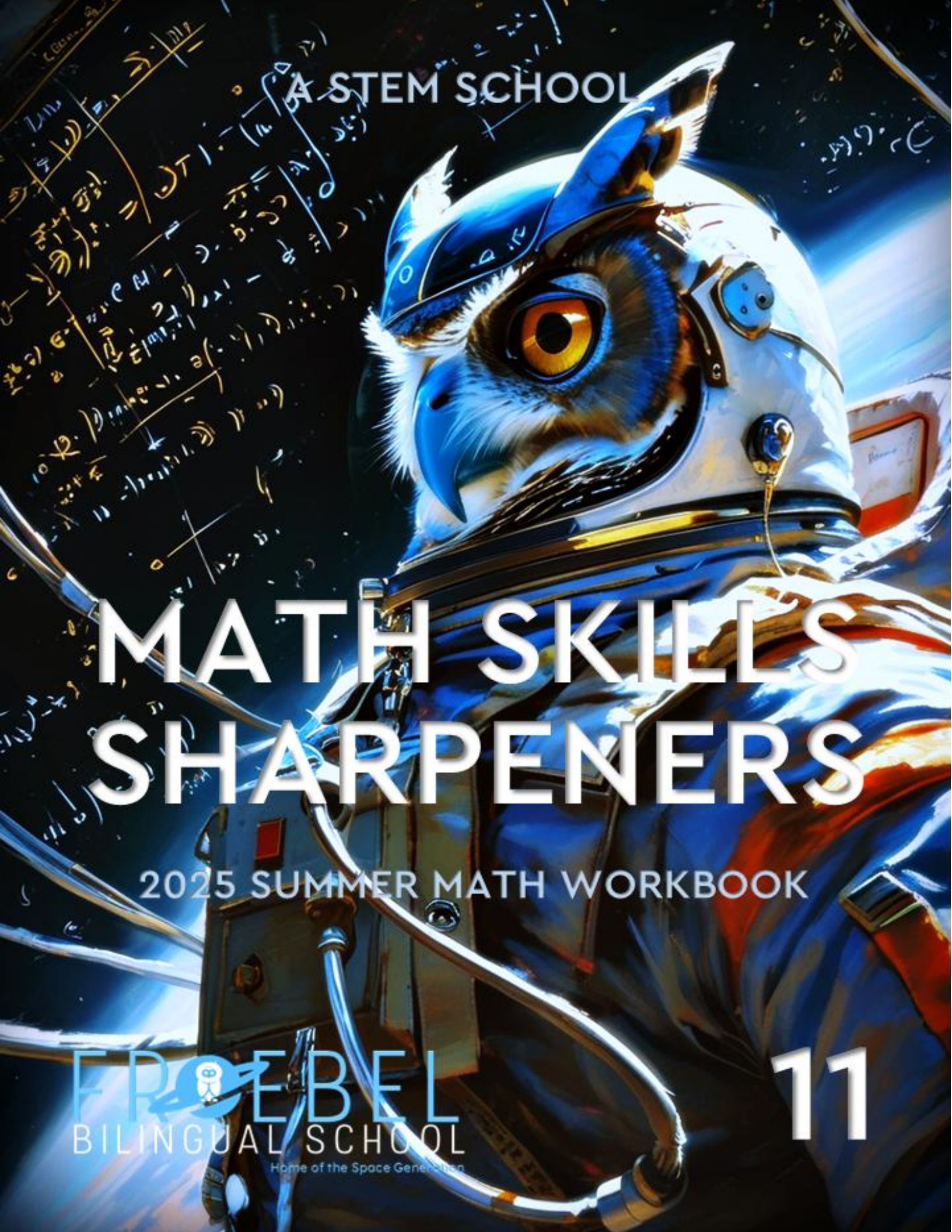


An owl wearing a white and blue space helmet with a visor, floating in space. The background is filled with various mathematical formulas and equations in white and yellow, such as $E=mc^2$, $a^2+b^2=c^2$, and $\frac{1}{x} = x^{-1}$.

A STEM SCHOOL

MATH SKILLS SHARPENERS

2025 SUMMER MATH WORKBOOK

FRÖEBEL
BILINGUAL SCHOOL
Home of the Space Generation

11

A STEM School



Home of the Space Generation

2025 SUMMER MATH SKILLS SHARPENER Going to Eleventh Grade

STUDENT'S NAME	DATE
TEACHER COMING FROM	SCORE
TEACHER GOING TO	
PARENT'S SIGNATURE	DATE RECEIVED

Week 1:

Day 1. Identify the property that the statement illustrates.

1) $17 \cdot \frac{1}{17} = 1$

2) $2(w + l) = 2w + 2l$

3) $6 + (2 + 4) = 6 + (4 + 2)$

4) $(6 \cdot 5) \cdot 7 = 6 \cdot (5 \cdot 7)$

5) $60 + 0 = 60$

6) $3a + 7a = a(3 + 7)$

7) $15 \cdot 1 = 15$

8) $5 + (-5) = 0$

Day 2. Simplify the expression

1) $25x + 14 - 17 - 6x$

2) $6(n - 2) - 8n + 40$

3) $3g + 9g^2 - 12g^2 + g$

4) $6y + 12x - 12y - 9x$

5) $5(2b + 3) + 8(b - 6)$

6) $7t^2 + 7t^2 - 2t^2 - 9t^4$

Day 3. Solve the equation. Check your solution.

1) $24x + 16 = 12$

2) $4(q - 5) = 16$

3) $48j + 25 = 12j - 11$

4) $-6y + 15 = -9$

5) $7m + 38 = -5m - 16$

6) $8(2n - 5) = 3(6n - 2)$

Day 4. Solve the inequality. Then graph the solution.

1) $2x - 3 < -1$

2) $7 - 3x \geq -11$

3) $15x + 8 > 9x - 22$

4) $13x + 24 \leq 16 - 3x$

5) $-5 < 10 - x < 5$

6) $-8 \leq 3x + 1 \leq 10$

Week 2:

Day 1. Solve the equation. Check for extraneous solutions.

1) $|3p + 2| = 7$

3) $|8r + 1| = 3r$

2) $|9q - 5| = 2q$

Day 2. Solve the inequality. Then graph the solution. (Presentation R.5)

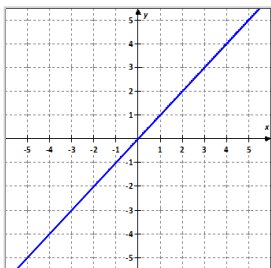
1) $|x - 5| \geq 1$

3) $|6z + 5| \leq 25$

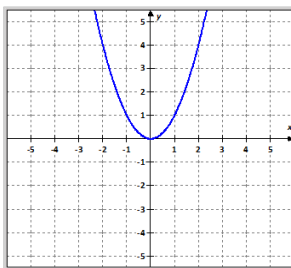
2) $|5 - 2y| > 7$

Day 3. Identify the type of function represented by the graph.

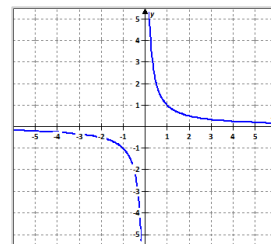
1.



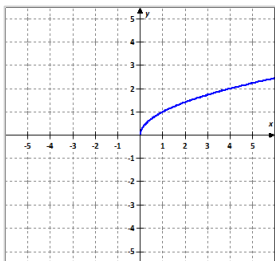
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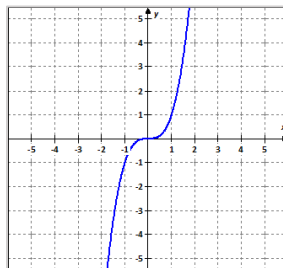
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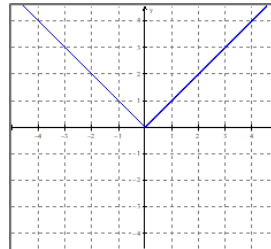
4.



5.



6.



Day 4. Given the parent function and description of the transformation, write the equation of the transformed function $f(x)$.

1. Linear: Translated 3 units up.
2. Cubic: Translated 5 units left.
3. Square: Reflected over the x-axis.
4. Quadratic: Translated 1 unit to the left and 3 units down.
5. Cubic: Translated 8 units down.
6. Linear: Reflected over the x-axis and translated 4 units up.
7. Quadratic: Reflected over the y-axis.
8. Reciprocal: Translated 7 units right.

Week 3:

Day 1. Solve each system by **Graphing. MUST show procedure.**

Show: Slope, Y-intercept, graph, and checked answers.

1.
$$\begin{cases} y = -2x + 5 \\ y = 4x - 1 \end{cases}$$

Step 1 - Find the slope and the y-intercept:

Slope:

Y-intercept:

Step 2 - Graph each equation.

Step 3 - Check the solution of each equation.

Day 2. Solve each system by Substitution. MUST show procedure.

1.
$$\begin{cases} -x + y = -4 \\ y = 2x - 11 \end{cases}$$

2.
$$\begin{cases} x - 3y = 3 \\ 2x = 3y \end{cases}$$

3.
$$\begin{cases} y = x + 3 \\ y = 2x + 12 \end{cases}$$

4.
$$\begin{cases} 2x + y = 4 \\ 3x + y = 3 \end{cases}$$

Day 3. Solve each system by Elimination. MUST show procedure.

1.
$$\begin{cases} x + 3y = 15 \\ 2x - 3y = -6 \end{cases}$$

2.
$$\begin{cases} 3x - y = 7 \\ 2x + y = 3 \end{cases}$$

3.
$$\begin{cases} x + y = 2 \\ 2x + y = -1 \end{cases}$$

4.
$$\begin{cases} 4x + y = 0 \\ x + y = -3 \end{cases}$$

5.
$$\begin{cases} -2x + 5y = -1 \\ 3x + 2y = 11 \end{cases}$$

Day 4. Solve the three-variable system using elimination and substitution.

$$1. \begin{cases} 4x + 2y + 3z = 12 \\ 2x - 3y + 5z = -7 \\ 6x - y + 4z = -3 \end{cases}$$

$$2. \begin{cases} x - 2y + z = -11 \\ 3x + 2y - z = 7 \\ -x + 2y + 4z = -9 \end{cases}$$

$$3. \begin{cases} 5x - 3y + 2z = 18 \\ -2x + 4y - z = -11 \\ -3x - 2y + 3z = 14 \end{cases}$$

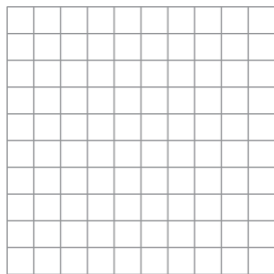
$$4. \begin{cases} -2x - 6y - 3z = 15 \\ 3x + 9y - 3z = 0 \\ 4x - 2y - 5z = 3 \end{cases}$$

$$5. \begin{cases} x + y + z = 8 \\ x - y + z = 8 \\ 2x + y + 2z = 16 \end{cases}$$

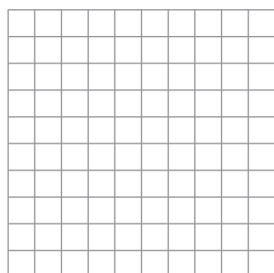
Week 4:

Day 1. Describe the transformation and graph the parent function $f(x) = x^2$ and the transformation.

1. Describe the transformation of $f(x) = x^2$ represented by $g(x) = (x - 2)^2 + 1$. Then graph each function.



2. Describe the transformation of $f(x) = x^2$ represented by $g(x) = (x - 5)^2 + 2$. Then graph each function.

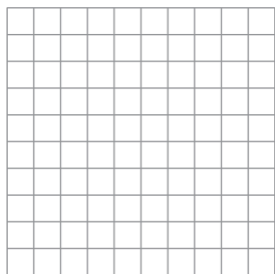


Day 2. Find the (a) Axis of Symmetry, (b) Vertex, (c) Y-Intercept, and (d) Graph.

1. Find the vertex and axis of symmetry of $f(x) = -3(x + 1)^2 + 9$.

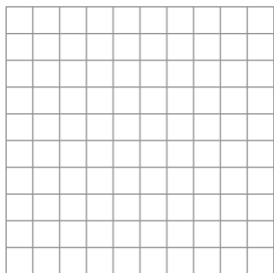


2. Find the vertex and axis of symmetry of $f(x) = 3(x + 7)^2 - 3$.

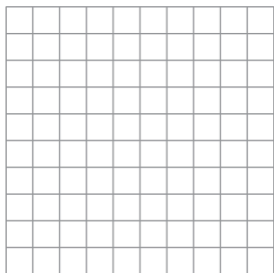


Day 3. Find the (a) Axis of Symmetry, (b) Vertex, (c) Y-Intercept, (d) X-Intercepts, (e) Domain and Range, (f) Maximum or Minimum, (g) Increasing and decreasing, and (h) Graph the equation.

1. $f(x) = 2x^2 + 12x + 19$

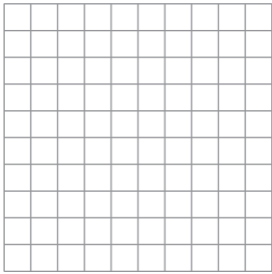


2. $f(x) = -2x^2 + 12x - 16$

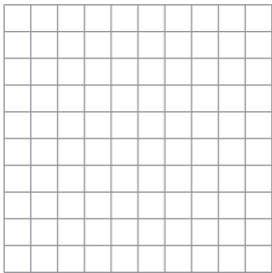


Day 4. Find the (a) Axis of Symmetry, (b) Vertex, (c) Y-Intercept, (d) X-Intercepts, (e) Domain and Range, (f) Maximum or Minimum, (g) Increasing and decreasing, and (h) Graph the equation.

1. $f(x) = (x + 1)(x + 3)$



2. $f(x) = (x - 1)(x + 3)$



Week 5:

Day 1. Factor the following polynomials in $x^2 + bx + c$ form.

1) $x^2 + 17x + 72$

2) $y^2 - 14y - 120$

3) $a^2 - a - 2$

4) $a^2 + 26a - 360$

5) $x^2 + 15x + 50$

6) $y^2 - 19y - 150$

Day 2. Factor the following polynomials in $ax^2 + bx + x$ form.

1) $4x^2 + 34x + 72$

2) $3y^2 - 2y - 120$

3) $2a^2 - 3a - 2$

4) $2a^2 + 16a - 360$

5) $10x^2 + 45x + 150$

6) $3y^2 - 7y - 150$

Day 3. Simplify the following square roots

1. $\sqrt{18}$

2. $\sqrt{8}$

3. $\sqrt{12}$

4. $\sqrt{20}$

5. $\sqrt{24}$

6. $\sqrt{75}$

Day 4. Find the square root of the negative number.

1. $\sqrt{-4}$

4. $-\sqrt{-36}$

2. $\sqrt{-12}$

5. $2\sqrt{-54}$

3. $-\frac{1}{3}\sqrt{-90}$

6. $\frac{1}{2}\sqrt{-16}$

Week 6:

Day 1. Adding and Subtracting Complex Numbers. Write the answer in standard form.

1. $(-2 + 3i) + (7 - 6i)$

2. $(9 + 3i) - (-2 - 7i)$

3. $(2 + 5i) + (-2 + 5i)$

4. $(6 + 17i) - (18 - 9i)$

5. $(4 - 8i) + (-13 + 23i)$

6. $2 + (10 + 3i) - (10 - 4i) + 3i$

Day 2. Multiplying Complex Numbers. Write the answer in standard form.

1. $2i(3 - 5i)$

2. $(6i)(6i)$

3. $(5i^2)(7i^2)$

4. $(5 + 6i)(-4 + 7i)$

5. $(7 + 2i)(-4 + 7i)$

6. $(-4 - 5i)(2 + 10i)$

Day 3. Multiply the complex number by its complex conjugate.

1. $8 + 2i$

2. $-7 + 4i$

3. $5 + 6i$

4. $3 - 5i$

5. $3 - 2i$

6. $2 + 9i$

Day 4. Solving Quadratic Equations Using Square Roots.

1. $4x^2 - 31 = 49$

2. $(x - 4)^2 = 49$

3. $2x^2 + 14 = 70$

4. $x^2 - 9 = 0$

5. $\frac{2}{3}x^2 + 14 = 20$

6. $\frac{1}{5}x^2 + 2 = \frac{3}{5}x^2$

7. $x^2 = 144$

8. $2x^2 - 8 = 0$

9. $x^2 = 81$

10. $2(x + 1)^2 + 3 = 21$

Week 7:

Day 1. Solving a Quadratic Equation by Factoring.

1. $x^2 - x - 6 = 0$

2. $-2x^2 - 2 = 4x$

3. $x^2 - 8x + 12 = 0$

4. $4x^2 - 12x = -9$

5. $x^2 + 3x - 10 = 0$

6. $x^2 + 2x = 48$

7. $2x^2 + 18 = 12x$

8. $x^2 - 4x = 45$

Day 2. Finding the Zeros of a Quadratic Function.

1. $f(x) = 4x^2 - 13x + 3$

2. $f(x) = x^2 + 6x + 9$

3. $f(x) = 2x^2 - 11x + 12$

4. $f(x) = x^2 - 8x + 16$

5. $f(x) = x^2 - 8x$

6. $f(x) = x^2 + 7x - 30$

Day 3. Solve the equation by completing the square.

1. $x^2 + 6x + 3 = 0$

2. $x^2 - 2s - 6 = 0$

3. $6x^2 + 6x + 12 = 0$

4. $4x^2 - 30x = 12 + 10x$

5. $5x(x + 6) = -50$

6. $x(x + 8) = -20$

Day 4. Solve the equation using the Quadratic Formula.

The Quadratic Formula:

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

1. $x^2 - 4x + 3 = 0$

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

3. $x^2 - 14x = -49$

4. $-10x = -25 - x^2$

5. $-5x^2 - 6 = -4x$

6. $-7x + 6 = -4x^2$

Week 8:

Day 1. Polynomials: Find the sum or difference. Must show procedure.

1) $(3x^2 + 4x + 5) + (2x^2 + 3x + 1)$

2) $(7x^3 - 2x + 4) - (x^3 + 5x - 3)$

3) $(x^2 + 2x) + (3x^2 + 4x)$

4) $(6x - 3) - (2x + 5)$

5) $(5x^4 + 3x^2) + (x^4 - 2x^2)$

6) $(8x^3 - 4x^2 + x) - (3x^3 + 2x - 5)$

7) $(2x^4 + x^2 - 7x) + (4x^3 - 5x^2 + 3x)$

8) $(x^5 - 2x^3 + x) - (3x^5 + x^3 - 4x)$

9) $(6x^4 - 3x^2 + x - 9) + (-2x^4 + 5x^2 - x + 4)$

10) $(x^6 - 4x^5 + 2x^4 - x + 7) - (x^6 - x^4 + 3x - 2)$

Day 2. Polynomials: Find the product. Must show procedure.

1) $(x + 3)(x + 2)$

2) $(x - 5)(x + 4)$

3) $(2x)(x + 1)$

4) $(x + 1)^2$

5) $(3x - 1)(x + 2)$

6) $(x^2 + 3x)(x - 4)$

7) $(2x + 5)(x^2 - x + 1)$

8) $(x - 2)^2(x + 3)$

9) $(x^3 - 2x)(x^2 + x + 1)$

10) $(2x^2 - x + 3)(x^2 + 4)$

Day 3. Divide using polynomial long division or synthetic division. Must show procedure.

1) $(x^2 + 3x + 2) \div (x + 1)$

2) $(x^2 - 9) \div (x - 3)$

3) $(2x^2 + 4x) \div (x)$

4) $(x^3 + 5x^2 + 6x) \div (x)$

5) $(3x^2 + 6x + 3) \div (x + 1)$

6) $(x^3 - 4x^2 + 5x - 2) \div (x - 2)$

7) $(2x^3 + 3x^2 - 5x - 6) \div (x + 1)$

8) $(x^3 + x^2 - 4x - 4) \div (x + 2)$

9) $(2x^4 + 3x^3 - x^2 - 7x - 6) \div (x^2 + x + 1)$

10) $(x^4 - x^3 + x^2 - x + 1) \div (x^2 + 1)$

Day 4. Find all the real solutions of the equation. Must show procedure.

1) $x^2 + 5x + 6 = 0$

2) $x^2 - 9 = 0$

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

4) $2x^2 - 8 = 0$

5) $(x - 1)^2 = 0$

6) $x^3 - 3x^2 - 4x + 12 = 0$

7) $x^3 + x^2 - 4x - 4 = 0$

8) $x^2 + x - 6 = 0$

9) $x^4 - 5x^2 + 4 = 0$

10) $x^3 - 6x^2 + 11x - 6 = 0$

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