Future Algebra II Student,

The problems in this review packet will help prepare you for success in Algebra II Level 1 next year. These problems are a review of what you learned in Algebra I and Geometry. If you have forgotten how to do some of these problems, there are worked out examples and links that you should read/view to help refresh your memory. Read the examples, and then try the problems. You will be tested on the material from this packet within the first two weeks of school, so it is essential that you complete every problem, and we will collect the packets at that time. If you have difficulty with a lot of these problems, then you will need to get extra help during the first week of school, either with your Algebra II teacher or in the math lab.

The material in this packet is a mixture of topics that we expect you to have mastered, topics that we expect you are familiar with, and topics that we will develop more during the school year. Topics in the packet with 1 star (★) are topics that we expect you to have mastered prior to the Algebra II course. If you are not comfortable with these topics you will need to seek help outside of class. Topics in this packet with 2 stars (★★) are topics that we expect you to be familiar with. We will review them briefly during class but if you don’t remember them at all, you may struggle. Finally, topics with 3 stars (★★★) are ones that you have seen before, and it will be to your advantage if you know them well, but they are also part of the Algebra II curriculum and you will see them again in depth. You should prioritize having a full understanding of the 1 star topics (★) as those will not be reviewed during class time.

We will collect this packet within the first two weeks of school, so if your schedule does not allow you to complete it over the summer you will have some time at the beginning of the year, but we recommend completing it during the summer if possible. If you follow this schedule you will be done before the start of school without having to do too many problems each week in the summer.

Week of August 5-9: Problems 1-6
Week of August 12-16: Problems 7-12
Week of August 19-23: Problems 13-18
Week of August 26-30: Problems 19-23

We hope you enjoy your summer, and we look forward to meeting you in September!

-- Mr. Schwartz and Ms. Wikner
ORDER OF OPERATIONS https://tinyurl.com/WHSGEMDAS

P/G - Parenthesis, brackets, and other Grouping symbols

E - Exponents

M \{ Multiply or Divide (whichever comes first) from left to right

D \{ Add or Subtract (whichever comes first) from left to right

Example: Evaluate $5 - 4(4 + 1) + 10 + 3^2$

5 - 4(4 + 1) + 10 + 3² Add inside the parenthesis
5 - 4(5) + 10 + 3² Evaluate the exponent
5 - 4(5) + 10 + 9 Multiply because it is to the left of the division
5 - 20 + 10 + 9 Divide
5 - 2 + 9 Subtract because it is to the left of the addition
3 + 9 Add
12

★ 1) Simplify each of the following using PEMDAS. (★ = need to know without review)

a. $3(10 - 2) - 8 + 3^2$ b. $15 + 5(6 - 2)^2$

EVALUATING ALGEBRAIC EXPRESSIONS https://tinyurl.com/WHSevalexp

To evaluate an algebraic expression, substitute numerical values for the variables and simplify using PEMDAS. Whenever you are replacing a variable with a negative number, you need to use parentheses.

Example: Evaluate $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$ when $a = 1$, $b = -8$ and $c = 12$

Solution: Replace $a$ with 1, $b$ with -8, and $c$ with 12. When you replace $b$ with -8, use parentheses.

$$\frac{-(8) + \sqrt{(-8)^2 - 4 \cdot 1 \cdot 12}}{2 \cdot 1} = \frac{8 + \sqrt{64 - 48}}{2} = \frac{8 + \sqrt{16}}{2} = \frac{8 + 4}{2} = \frac{12}{2} = 6$$
2) Evaluate each expression.

a. \(2x^2 + 3y + 6\) if \(x = -3\) and \(y = -4\).

b. \(\frac{-b + \sqrt{b^2 - 4ac}}{2a}\) when \(a = 2\), \(b = 2\) and \(c = -4\)

DIVIDING FRACTIONS https://tinyurl.com/WHSdividingfractions

To divide fractions, multiply the top fraction by the reciprocal of the bottom fraction.

Example 1: Divide \(\frac{4}{6}\)

Solution: \(\frac{3}{4} \cdot \frac{1}{6} = \frac{3}{4} \cdot \frac{1}{6} = \frac{18}{4} = \frac{9}{2}\)

Example 2: Divide \(\frac{3}{8}\)

Solution: Think of the 8 in the denominator as \(\frac{8}{1}\) in order to find its reciprocal.

\[\frac{1}{\frac{3}{8}} = \frac{1}{3} \cdot \frac{8}{1} = \frac{8}{3} = \frac{24}{1}\]

3) Divide the following fractions. Reduce your final answer as much as possible.

(a) \(\frac{2}{5}\)

(b) \(\frac{4}{12}\)
CALCULATING THE SLOPE OF A LINE https://tinyurl.com/WHSslopefrompoints

To calculate the slope of a line, use the slope formula. If one point has coordinates \((x_1, y_1)\) and another point has coordinates \((x_2, y_2)\), then the slope of the line is \(m = \frac{y_2 - y_1}{x_2 - x_1}\) (you may have seen this written \(\frac{\Delta y}{\Delta x}\)).

**Example:** Find the slope between \((-5, 2)\) and \((4, -1)\).

**Solution:** Think of \((-5, 2)\) as \((x_1, y_1)\) and think of \((4, -1)\) as \((x_2, y_2)\). Then use the formula for slope.

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 2}{4 - (-5)} = \frac{-3}{9} = -\frac{1}{3}
\]

**★ 4) Find the slope of the line through each pair of points.**

a. \((-4, 7)\) and \((-6, -4)\)  
b. \((19, -2)\) and \((-11, 10)\)

SOLVING EQUATIONS WITH VARIABLE EXPONENTS (you can guess and check)

**Example:** Solve \(3^x = 27\).

**Solution:** Check powers of 3 until you find the answer: \(3^1 = 3\)  
\(3^2 = 9\)  
\(3^3 = 27\), so \(x = 3\).

★★★ 5) Find \(x\) in each equation  
(★★★ = good to know, but will be covered in class)

a. \(4^x = 64\)  
b. \(3^x = 2187\)  
c. \(6^x = 7776\)
Example 1: Graph the equation \( y = 5x - 3 \)

Solution: For a line in the form \( y = mx + b \), the slope is \( m \) and the y-intercept is \( b \). In this case, \( m = 5 \) and \( b = -3 \). To plot the y-intercept, plot \((0, -3)\). To find another point on the line, use the fact that \( m = \frac{\text{rise}}{\text{run}} \). From the y-intercept, count up 5 and to the right 1. Then connect the two points and extend the line in both directions to fill the grid.

Example 2: Graph \( y = -\frac{1}{2}x + 5 \)

Solution: This time, \( b = 5 \), so the y-intercept is \((0, 5)\). To graph a line with negative slope, go DOWN and to the right to get a second point on the graph. Since the slope is \( -\frac{1}{2} \), we’ll go down 1 and right 2 to get our second point \((2, 4)\). Then extend the line in both directions to fill the grid.

★ 6) Graph each line.

a. \( y = \frac{1}{3}x - 2 \)

b. \( y = x - 2 \)

c. \( y = -3x + 7 \)

d. \( x = 3 \)
Example: Find the equation of the line.

Solution: This line goes up 2 and over 1, meaning that its slope is $\frac{2}{1}$ or 2.

This line has a y-intercept (crosses the y-axis) at -1.

The equation for a line is $y = mx + b$ where m is the slope, and b is the y-intercept.

So the equation for this line is $y = 2x - 1$

★★ 7) Write equations (in slope-intercept form) for the following lines:

a. 

b. 

c.
INTERCEPTS ON A GRAPH https://tinyurl.com/WHSxandyints

The y-intercept of a graph is the point where the graph crosses the y-axis.

The x-intercept of a graph is the point where the graph crosses the x-axis.

As you can see in the diagram, the value of y at an x-intercept is 0 and the value of x at a y-intercept is 0.

Example: Find the x-intercept for the line $2x - 6y = 30$.

Solution: Since we're finding an x-intercept, the value of y must be 0. Substitute 0 for y in the equation and solve for x.

\[
2x - 6(0) = 30 \\
2x = 30 \\
x = 15. \text{ So the x-intercept is (15, 0)}
\]

Example: Find the y-intercept for the line $2x - 6y = 30$.

Solution: Since we're finding a y-intercept, the value of x must be 0. Substitute 0 for x in the equation and solve for y.

\[
2(0) - 6y = 30 \\
-6y = 30 \\
y = -5. \text{ So the y-intercept is (0, -5)}
\]

★ 8) Find the x and y intercepts for each equation.

a. $3x + 5y = -15$ 

b. $\frac{1}{2}x - 4y = 10$
SOLVING LINEAR EQUATIONS https://tinyurl.com/WHSsolvelineareqs

When you solve a linear equation, the goal is to get the variable by itself on one side of the equation. Remember that if you do something to one side of the equation, you must do it to the other side of the equation also.

Example: Solve \( y + 5(y + 3) = 33 \)

\[
\begin{align*}
y + 5y + 15 &= 33 & \text{Use distributive property, } 5(y + 3) &= 5y + 15 \\
6y + 15 &= 33 & \text{Combine like terms, } y + 5y &= 6y \\
6y + 15 - 15 &= 33 - 15 & \text{Subtract 15 from each side} \\
6y &= 18 & \text{Simplify.} \\
\frac{6y}{6} &= \frac{18}{6} & \text{Divide each side by 6.} \\
y &= 3 & \text{Simplify.}
\end{align*}
\]

★ 9) Solve each equation.

a. \( 4x + 7 = 27 \)  
b. \( 12y - 4 = 7y + 56 \)  
c. \( 4 - 5(n - 1) = 12n - 8 \)

SOLVE A QUADRATIC EQUATION https://tinyurl.com/WHSfactoringbox
https://tinyurl.com/WHSquadraticformula
★★★ 10) Solve the equation below. You may use factoring or the quadratic formula.

\[
x^2 + 4x - 12 = 0
\]

\[
x=______
\]

\[
x=______
\]
SOLVING A FRACTIONAL EQUATION https://tinyurl.com/WHSxindenumerator

Example 1: To solve this equation, you would multiply both sides by 3

\[ 15 = \frac{x}{3} \]

\[ 3 \cdot 15 = \frac{x}{3} \cdot 3 \]

\[ 3 \cdot 15 = x \]

\[ x = 45 \]

Example 2: To solve this equation, you will need to get x out of the denominator of the fraction by multiplying both sides by x.

\[ 15 = \frac{3}{x} \]

\[ x \cdot 15 = \frac{3}{x} \cdot x \]

\[ x \cdot 15 = 3 \]

Then we will need to divide both sides by 15 to solve for x.

\[ x \cdot 15 = \frac{3}{15} \]

\[ x = \frac{3}{15} \]

Simplifying the fraction, we get:

\[ x = \frac{1}{5} \]

★★ 11) Solve for x. Show all your work.

a. \[ 6 = \frac{x}{12} \]

b. \[ 18 = \frac{12}{x} \]

c. \[ 10 = \frac{85}{x} \]

d. \[ 13 = \frac{x}{5} \]

COMBINING LIKE TERMS https://tinyurl.com/WHScombineliketerms

In algebraic expressions, **like terms** are terms that have the same variable raised to the same exponent. The table on the next page shows examples of like terms and unlike terms.
You can combine like terms by adding their coefficients.

**Example:** Simplify $4x - 3y^2 - 7x + 5y^2 + x^3$

**Solution:** Rearrange the expression so that the like terms are next to each other.

$$4x - 7x - 3y^2 + 5y^2 + x^3$$

Then combine like terms:

$$-3x + 2y^2 + x^3$$

**★ 12) Simplify each expression by combining like terms.**

a. $7x^2 + 12x - x^2 - 40x$

b. $5(n^2 + n) - 3(n^2 - 2n)$

**SIMPLIFYING SQUARE ROOTS** [https://tinyurl.com/WHSsimplifyradicals](https://tinyurl.com/WHSsimplifyradicals)

To understand square roots, it helps to know the numbers that are perfect squares. The table below shows the first ten perfect squares.

To simplify the square root of a number, find the **largest** perfect square that is also a factor of the number. If there is no perfect square factor, then the square root is already simplified.

**Example:** Simplify $\sqrt{72}$.

**Solution:** Check the list of perfect squares. Find the biggest one that is a factor of 72. In this case, that number is 36. (9 and 4 are also factors of 72, but 36 is the biggest one.) To simplify $\sqrt{72}$, factor out $\sqrt{36}$:

$$\sqrt{72} = \sqrt{36 \cdot 2} = 6 \cdot \sqrt{2},$$

which is usually just written $6\sqrt{2}$. So $\sqrt{72} = 6\sqrt{2}$.
13) Simplify each square root. Show all of your steps.

a. $\sqrt{20}$

b. $\sqrt{48}$

c. $\sqrt{63}$

RATIONALIZING DENOMINATORS https://tinyurl.com/WHSrationalizedenom

Part of simplifying a fraction is that we do not leave a square root in the bottom of a fraction. If you are solving a problem and you find that you have a square root in the denominator of your fraction, you will have to rationalize your denominator to fix it.

Example: $\frac{8}{3\sqrt{2}}$

To fix the $\sqrt{2}$ in the denominator, we will multiply by $\frac{\sqrt{2}}{\sqrt{2}}$ (a fancy form of 1).

$$\frac{8}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{3 \cdot 2} = \frac{8\sqrt{2}}{6}$$

We still have to simplify the fraction, since the top and bottom are divisible by 2, so our final answer is:

$$\frac{4\sqrt{2}}{3}$$

14) Rationalize the denominators for the following fractions:

a. $\frac{3}{\sqrt{5}}$

b. $\frac{5}{2\sqrt{3}}$

c. $\frac{6}{5\sqrt{3}}$
MULTIPLYING BINOMIALS https://tinyurl.com/WHSmultiplybinomials

A binomial is an algebraic expression with two terms. To multiply binomials, use the Distributive Property.

Example: Expand \((2x - 5)^2\)

Solution: \((2x - 5)^2\) means to multiply \((2x - 5)(2x - 5)\). Set up a 2 x 2 table. Across the top, write the terms from the first set of parentheses. Down the left side, write the terms from the second set of parentheses. In each square of the table, multiply the term above by the term on the left.

<table>
<thead>
<tr>
<th>2x</th>
<th>-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x</td>
<td>4x^2</td>
</tr>
<tr>
<td>-5</td>
<td>-10x</td>
</tr>
</tbody>
</table>

Next, add the four terms on the inside of the box together and combine like terms to get your answer:

\[4x^2 - 10x - 10x + 25 = 4x^2 - 20x + 25\]

Note: If you prefer to use the FOIL method of multiply binomials, that is fine too.

★★ 15) Expand each expression and simplify as much as possible.

a. \((x + 3)(3x - 5)\) 

b. \((x + 6)^2\) 

c. \((2x - 3)^2\)
**IS IT A FUNCTION?** https://tinyurl.com/WHSfunction

When something is a function there is only one possible output for each input. When you input a number you can predict what you will get out- there is only one option.

**Example 1:**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

This is a function, because you know what you will get for each input. When you input 1, you will get 4. When you input 2, you will get 5. When you input 3, you will get 4.

**Example 2:**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

This is NOT a function, because you do not know what you will get for each input. When you input 1, you might get 4 or you might get 5. Because you can’t predict the output, this is not a function.

★★★ 16) Decide if the following tables could represent functions:

a.  

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>-7</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

b.  

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

d.  

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-11</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

d.  

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>2</td>
<td>3.7</td>
</tr>
</tbody>
</table>
EVAULATING FUNCTIONS https://tinyurl.com/WHSevaluatingfunctions

A function is a rule that pairs an input with exactly one output. To indicate that a rule is a function, mathematicians use the notation \( f(x), g(x), h(x) \), etc. For example, \( f(x) = x + 2 \) is a function that adds 2 to an input to get an output. To evaluate a function, replace \( x \) with a number. Remember that if you are replacing \( x \) with a negative number, you must use parentheses.

Example: Suppose \( f(x) = 4 - x \). Find \( f(-2) \).

Solution: We are replacing \( x \) with the number -2. We will use parentheses when we replace \( x \) because of the negative. \( f(-2) = 4 - (-2) = 4 + 2 = 6 \). Note that \( f(-2) \) does NOT mean \( f \cdot -2 \), it means replace \( x \) with -2.

★★ 17) Evaluate the functions.

a. \( f(x) = x - 5 \). Find \( f(8) \)

b. \( g(x) = 2x^2 + 6x - 5 \). Find \( g(-2) \)

PYTHAGOREAN THEOREM http://tinyurl.com/WHS-Pythagorean-Theorem

In a right triangle, \( a^2 + b^2 = c^2 \) (a and b are the lengths of the legs, and c is the length of the hypotenuse). We can use this formula to find a missing side length in a right triangle.

Example 1: Find the missing length

In this example, we do not know the length of the hypotenuse (c). So our equation will look like: \( 2^2 + 4^2 = c^2 \)
So \( 4 + 16 = c^2 \)
So \( 20 = c^2 \)
So \( c = \sqrt{20} \), which simplifies to \( 2\sqrt{5} \)

Example 2: Find the missing length

In this example, we do not know the length of one of our legs (we can call that leg a or b - it does not matter) So our equation will look like: \( 1^2 + b^2 = 3^2 \)
So \( 1 + b^2 = 9 \)
So \( b^2 = 8 \)
So \( b = \sqrt{8} \), which simplifies to \( 2\sqrt{2} \)
★ 18) Solve for the missing length in each triangle:

a. 

b. 

c. 

d. 

RIGHT TRIANGLE TRIGONOMETRY https://tinyurl.com/WHStrigonometry

In your geometry class, you learned about the sine, cosine, and tangent of an angle. You may have used SOH CAH TOA to help remember which ratio is which. The box summarizes SOH CAH TOA.

| sin \( \theta \) = \frac{\text{opposite leg}}{\text{hypotenuse}} | cos \( \theta \) = \frac{\text{adjacent leg}}{\text{hypotenuse}} | tan \( \theta \) = \frac{\text{opposite leg}}{\text{adjacent leg}} |

Example 1: Solve the triangle

Solving for AC: \( \cos 67 = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{12}{AC} \)

\[
AC \cdot \cos 67 = \frac{12}{AC} \cdot AC \\
AC \cdot \cos 67 = \frac{12}{12} \\
AC = \frac{12}{\cos 67} \approx 30.71
\]

Solving for AB: \( \tan 67 = \frac{\text{opposite}}{\text{adjacent}} = \frac{AB}{12} \)

\[
12 \cdot \tan 67 = \frac{AB}{12} \cdot 12 \\
AB = 12 \cdot \tan 67 \approx 28.27
\]

Solving for \( m \angle A \): \( m \angle A = 90 - 67 = 23^\circ \)

If you don't have access to a calculator that can compute trig functions, show all the steps up to the point where you would plug in to compute the decimal.
Example 2: Solve the triangle

Any inverse trig function will work to solve for the angles - in this example we are using $\tan^{-1}$.

\[
m \angle D = \tan^{-1} \frac{3}{4} \approx 36.87^\circ \\
m \angle F = \tan^{-1} \frac{4}{3} \approx 53.13^\circ
\]

Solve the following triangles:

**19a.**

\[
\begin{align*}
XY &= \\
XZ &= \\
m \angle Z &=
\end{align*}
\]

**b.**

\[
\begin{align*}
PR &= \\
QR &= \\
m \angle P &=
\end{align*}
\]

**c.**

\[
\begin{align*}
m \angle L &= \\
m \angle K &=
\end{align*}
\]
SPECIAL RIGHT TRIANGLES
https://tinyurl.com/WHS454590
https://tinyurl.com/WHS306090

★★ 20) Find the missing side lengths for these two triangles. Try to do this **without** a calculator.

![30° 60° 1 triangle](image)

![45° 45° 1 triangle](image)

MATCH EQUATIONS TO TABLES

★ 21) Each equation below matches one of the tables. Draw a line from the equation to the matching table. Try to do these **without** using your calculator.

i. \( f(x) = 2x \)   
ii. \( f(x) = x + 2 \)   
iii. \( f(x) = x^2 \)   
iv. \( f(x) = 2^x \)

<table>
<thead>
<tr>
<th>x</th>
<th>f(x)</th>
<th>x</th>
<th>f(x)</th>
<th>x</th>
<th>f(x)</th>
<th>x</th>
<th>f(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>1/2</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
GRAPHING FUNCTIONS USING TABLES

If you want to graph a function, one good strategy is to create a table, and then plot the points from your table.

Example 1: Graph \( f(x) = 2x^2 - 8 \)  
First you make a table by plugging in points:

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>-1</td>
<td>-6</td>
</tr>
<tr>
<td>0</td>
<td>-8</td>
</tr>
<tr>
<td>1</td>
<td>-6</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Work:
\[
2(-2)^2 - 8 = 2(4) - 8 = 8 - 8 = 0
\]
\[
2(-1)^2 - 8 = 2(1) - 8 = 2 - 8 = -6
\]
\[
2(0)^2 - 8 = 2(0) - 8 = 0 - 8 = -8
\]
\[
2(1)^2 - 8 = 2(1) - 8 = 2 - 8 = -6
\]
\[
2(2)^2 - 8 = 2(4) - 8 = 8 - 8 = 0
\]

Then you plot your points, and connect them to make your graph.
Graph the following functions by first completing the table, and then plotting your points to make a graph.

★ 22a. Graph \( f(x) = (x - 1)^2 \)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

b. Graph \( f(x) = |x| + 2 \)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
EXPONENT PROPERTIES
https://tinyurl.com/WHSpropertiesofexponents

The box shows five exponent properties you learned in Algebra I.

An example of each property using numbers is shown below:

Property 1: \(3^2 \cdot 3^7 = 3^{2+7} = 3^9\)

Property 2: \(\frac{5^6}{5^2} = 5^{6-2} = 5^4\)

Property 3: \((2^3)^5 = 2^{3\cdot5} = 2^{15}\)

Property 4: \(6^0 = 1\)

Property 5: \(4^{-8} = \frac{1}{4^8}\)

Example: Find \(a\) in the equation \(5^2 \cdot 5^a = 5^{11}\).

Solution: Property 1 says that \(5^2 \cdot 5^a = 5^{2+a}\). If \(5^{2+a} = 5^{11}\), then \(2 + a = 11\) and \(a = 9\).

★★★ 23) Use the exponent properties to find \(b\) in each equation.

a. \(2^3 \cdot 2^b = 2^{10}\)

b. \(\frac{2^{13}}{2^b} = 2^5\)

c. \((2^4)^b = 2^{12}\)

d. \(2^{-9} = \frac{1}{2^b}\)

e. \(\frac{(2^3)^0}{2^{10}} = 2^b\)