Essential Standards Chart: What is it we expect students to learn?

Grade:	8th	Subject:	Math	Semester		Team Members:	Heather Scott Curtis Dial

Standard Description	Example Rigor	Prerequisite Skills	Common Assessment	When Taught?	Extension Standards
What is the essential standard to be learned? Describe in student-friendly vocabulary.	**What does proficient student work look like? Provide an example and/or description.**	**What prior knowledge, skills, and/or vocabulary is/are needed for a student to master this standard?**	**What assessment(s) will be used to measure student mastery?**	**When will this standard be taught?**	**What will we do when students have learned the essential standard(s)?**
• Students will know and apply the properties of integer exponents to generate equivalent numerical expressions. (8.EE.1)	1) $8^{-3} = \frac{1}{8^3}$ 2) $3^2 \cdot 3^{12} = 3^{14}$ 3) $(x^6)(x^3)^2(x^5) = x^{17}$	1) Perform operations with rational numbers 2) including negative rational numbers. (7.NS) 3) Rewrite expressions in different forms. (7.EE.2)	Exponent Properties Common Assessment	September	· Identify real and complex numbers through the introduction of) = √-1. • Reduce irrational numbers to simplest radical form. (√24 = 2√6). • Rationalizing fractions with a square root in the denominator. • Multiply and divide monomials.
• Simplify linear expressions utilizing the distributive property and collecting like terms. (8.EE.7) • Create a multi-step linear equation to represent a real-life situation. (8.EE.7) • Solve equations with linear expressions on either or both sides	1) $7x - 2(x+6) =- 2$ 2) $5x - 3(x-3) = 2(x+3)$ 3) $4x - 6 =- 2(-2x+3)$	1) Add, subtract, factor and expand linear expressions. (7.EE.1) 2) Rewrite expressions in different forms. (7.EE.2) 3) Create and solve multi-step equations to represent real-life situations. (7.EE.3,4)	Solving Equations Common Assessment	November/December	• Create and solve equation representations of more complex real-life situations. • Create and solve inequality representations of real-life situations. (i.e. The school band sells

including equations with one solution, infinitely many solutions, and no solutions. (8.EE.7) • Give examples of and identify equations as having one solution, infinitely many solutions, or no solutions. (8.EE.7)	Answers on table 1.A				shirts for $10 each. It costs them $3 per shirt to buy each shirt and $2 per shirt to have the logo printed. There was also a $1000 printer set-up fee. If they want to have a profit of at least $4 per shirt sold, how many shirts do they need to sell?) • Solve simple quadratic equations of the form ax2-c = p. • Solve simple radical equations of the form a√x+b=c
• Verify that a relationship is a function or not. (8.F.1) • Reason from a context, graph, or table after knowing which quantity is the input and which is the output. (8.F.1)	Table 2.A	• Use independent and dependent variables. (6.EE.9) • Use characteristics of proportional relationship and have an informal understanding of slope. (7.RP.1-3)		January	• Explain when an equation is not a function for all real values of given certain equations. • Restrict the domain of those same equations so that each equation becomes a function. • Use function notation.
• Represent and compare functions numerically, graphically, verbally and algebraically. (8.F.2)	Table 3.A	Use independent and dependent variables. (6.EE.9)		January	• Explain when an equation is not a function for all real values of given certain equations.

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>• Restrict the domain of those same equations so that each equation becomes a function.
• Use function notation.</td></tr>
<tr><td>• Interpret equations in y=mx + b form as a linear function. (8.F.3)</td><td>4.A</td><td>Use characteristics of proportional relationship and have an informal understanding of slope. (7.RP.1-3)</td><td></td><td>February</td><td>• Explain when an equation is not a function for all real values of given certain equations.
• Restrict the domain of those same equations so that each equation becomes a function.
• Use function notation.</td></tr>
<tr><td>• Identify and contextualize the rate of change and the initial value from tables, graphs, equations, or verbal descriptions. (8.F.4)</td><td>Y=5x+9

m=5, b= 9
<table><tr><td>x</td><td>y</td><td>m=2/1</td></tr><tr><td>0</td><td>3</td><td>b=3</td></tr><tr><td>2</td><td>7</td><td></td></tr><tr><td>4</td><td>11</td><td></td></tr><tr><td>6</td><td>15</td><td></td></tr></table></td><td>• Use characteristics of proportional relationship and have an informal understanding of slope. (7.RP.1-3)
• Use the coordinate plane.</td><td></td><td>February</td><td>• Explain when an equation is not a function for all real values of given certain equations.
• Restrict the domain of those same equations so that each equation becomes a function.
• Use function notation.
• Discuss max/min and local max/min of a function.</td></tr>
<tr><td>• Compare graphs, tables, and equations of</td><td></td><td>• Determine unit rate.</td><td></td><td>February/March</td><td></td></tr>
</table>

proportional relationships. (8.EE.5) • Graph proportional relationships and interpret the unit rate as the slope. (8.EE.5)	5.A.1 & 5.A.2	• Apply proportional relationships. • Solve equations with numeric and graphical representations of solutions. • Calculate slope/rate of change.			
• The solution to a system of two linear equations in two variables is an ordered pair that satisfies both equations. (8.EE.8)	1) $\begin{cases} y = -2x \\ y = -\frac{1}{2}x - 3 \end{cases}$ (2,-4)	• Determine unit rate. • Apply proportional relationships. • Solve equations with numeric and graphical representations of solutions. • Calculate slope/rate of change.		March	• Solve systems of linear inequalities.
Apply the Pythagorean Theorem to solve problems in real-world contexts. (8.G.7)	1) A 40 foot flagpole casts a shadow of 30 feet, what is the distance from the top of the pole to the point of the shadow? a= 50 ft.	• Use the properties of similarity, congruence, and right triangles. • Calculate square roots and squares. Solve equations of the form = using the square root as the inverse operations of squaring.		(Math Skills)	Derive (and use) the distance formula from the Pythagorean Theorem using the hypotenuse of a triangle. • Explore trigonometric ratios.

EE.7 1.A

① $7x - 2(x+6) = -2$

$7x - 2x - 12 = -2$

$5x - 12 = -2$

$5x = 10$

$x = 2$ - One solution

② $5x - 3(x-3) = 2(x+3)$

$5x - 3x + 9 = 2x + 6$

$\cancel{2x} + 9 = \cancel{2x} + 6$

$-\cancel{2x} \qquad -\cancel{2x}$

$9 \neq 6$ Not true - No solution $(\emptyset)$

③ $4x - 6 = -2(-2x+3)$

$\cancel{4x} - 6 = \cancel{4x} - 6$

$-\cancel{4x} \qquad -\cancel{4x}$

$-6 = -6$ - true - Many solutions (∞)

8.F.1 2.A

Table : x (input) can have only one y (output).

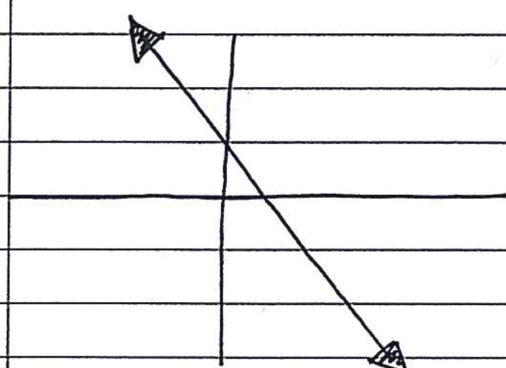
X	Y
0	8
1	23
2	94
3	86
4	-3

- yes, function

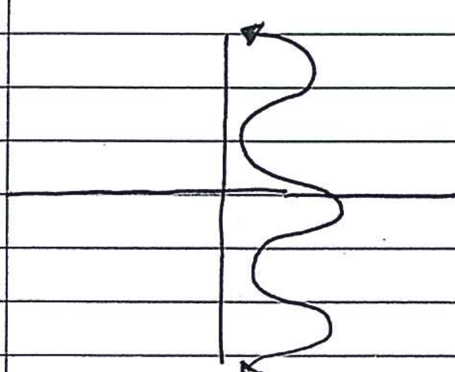
X	Y	
0	8	
1	4	
2	23	*
3	5	
2	18	*

- Not a function, because the input of 2 has 23 & 18 as outputs.

Graph: Must pass vertical line test.
- a graphed line cannot intersect with a vertical line at more than one point.



- yes, function



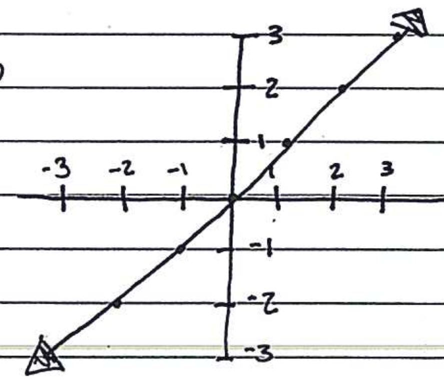
- Not function

8.F.2 3.A

Ex1: Which linear function has a greater value at $x = 0$

A) $f(x) = \frac{1}{3}x + \frac{1}{2}$

B



- A has a greater value when $x=0$.

Ex 2: Chad wants to buy towels online. There are two stores that sell the kind of towels Chad wants.

The first store charges \$20 per towel, and a \$25 delivery charge.

Store 2 offers the equation $y = 35 + 18n$ to determine final price.

A Which store charges more per towel?

B Chad needs to buy 15 towels, which store will be cheaper?

A → The first store \$20 per towel > \$18 per towel

B → First store = \$325 $\boxed{\text{Store 2} = \$305}$

8.F.3 4.A

Table:

x	0	2	4	6
y	3	7	11	15

+2 +2 +2

+4 +4 +4

→ linear because $m = \frac{\Delta y}{\Delta x} = \frac{4}{2} = 2$

$b = (y \text{ when } x=0) = 3$

$y = mx + b \Rightarrow y = 2x + 3$

x	0	2	4	6
y	3	7	19	39

+2 +2 +2

+4 +12 +20

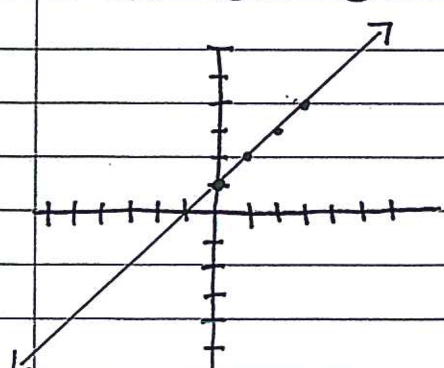
→ Non-linear because there is no constant M. and we can not write an equation in $y = mx + b$ form.

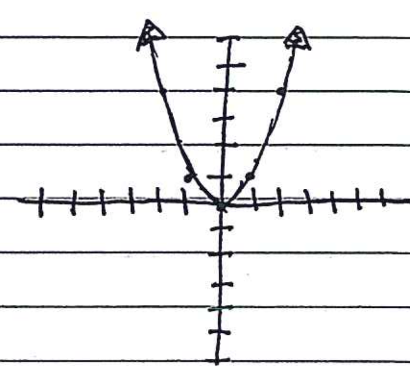
Equation: ✱MUST BE IN $Y = MX + b$ FORM✱

$y = 3x + 4$ $\quad m=3 \quad b=4 \quad$ → linear

$y = 4x^2 + 1$ $\quad$ → not linear, because (x^2)

Graph: Must be straight line.





$b=1 \quad m=\frac{1}{1}$ → $\boxed{y = 1x + 1}$ → linear

-Not straight line → Non linear $\boxed{Y = x^2}$

8.EE.5 5.A.1

Ex1: The American antelope and the wildebeest are among the fastest mammals on the planet, particulary at running long distances. The maximum recorded speed for the antelope is 88.5 km/h which it can sustain for nearly one kilometer.

On the other hand, the distance in kilometers that the wildebeest can run in t hours is given by the equation $d = 80.5t$.

Assuming both animals are running at constant speeds, which animal can run faster.

- The American antelope ; $88.5 > 80.5$

Ex2: Robert is having his house painted. The job takes three days, and he pays the painter the same hourly rate every day. The cost of the job is in the table below.

	Day 1	Day 2	Day 3
Hours worked	5	4	6
Amount paid	300	240	360

- What is the painters unit rate of change of dollars with respect to time, how much is the painter paid for 1 hour worked.

- Graph the relationship.

5.A.2

- the painter is paid : $300 for 5 hours, $240 for 4 hours, and $360 for 6 hours:

$$\frac{300}{5} = \frac{240}{4} = \frac{360}{6} = \$60/\text{hour}.$$

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