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27 November 2018

Algebra 1 Regents Standards: learning trajectories

Rational & irrational numbers, closure

1. Calculate the given sum with a calculator, identifying and explaining rational numbers ("terminating or repeating") versus irrationals ("non-terminating, non-repeating")

2. State whether each value is "rational because it is terminating or repeating" or "irrational because it is non-terminating, non-repeating"

   (a) 7.1

   (b) $\sqrt{12}$

   (c) 5.25

   (d) $\sqrt{25}$

3. A teacher wrote the following set of numbers on the board:

   $$a = \sqrt{20} \qquad b = 2.5 \qquad c = \sqrt{225}$$

   Explain why $a + b$ is irrational, but $b + c$ is rational.

4. Is the product of $\sqrt{16}$ and $\frac{4}{7}$ rational or irrational? Explain your reasoning.

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Simplifying polynomials, standard form

5. Write the expression $5x + 4x^2(2x + 7) - 6x^2 - 9x$ as a polynomial in standard form.

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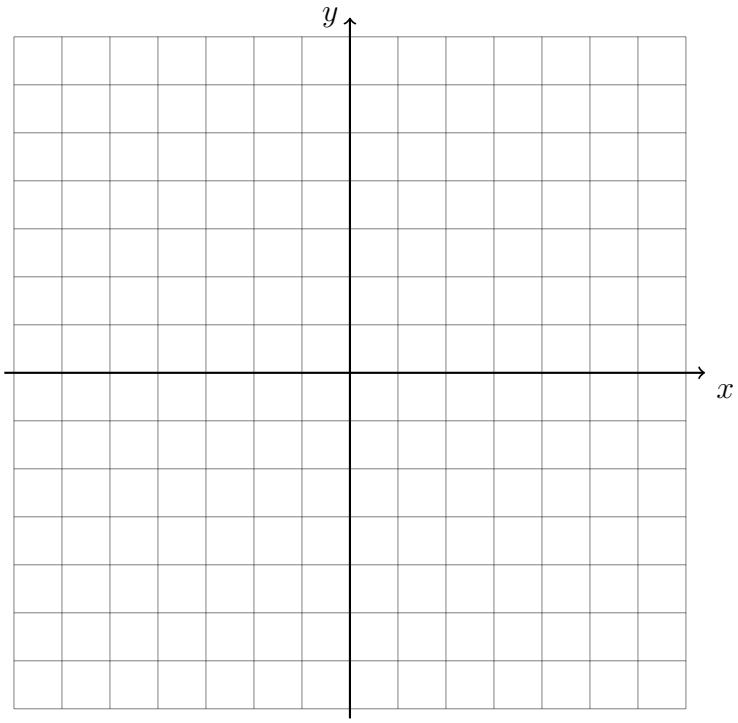
6. Graph the line $y = \frac{1}{3}x + 1$ after filling in the values in the blanks.

   y-intercept = _____

   Slope = _____



In the following two problems, solve for the value of x.

7. $7 = 2x - x$

8. $\frac{1}{2}(2 - 4x) = 6$

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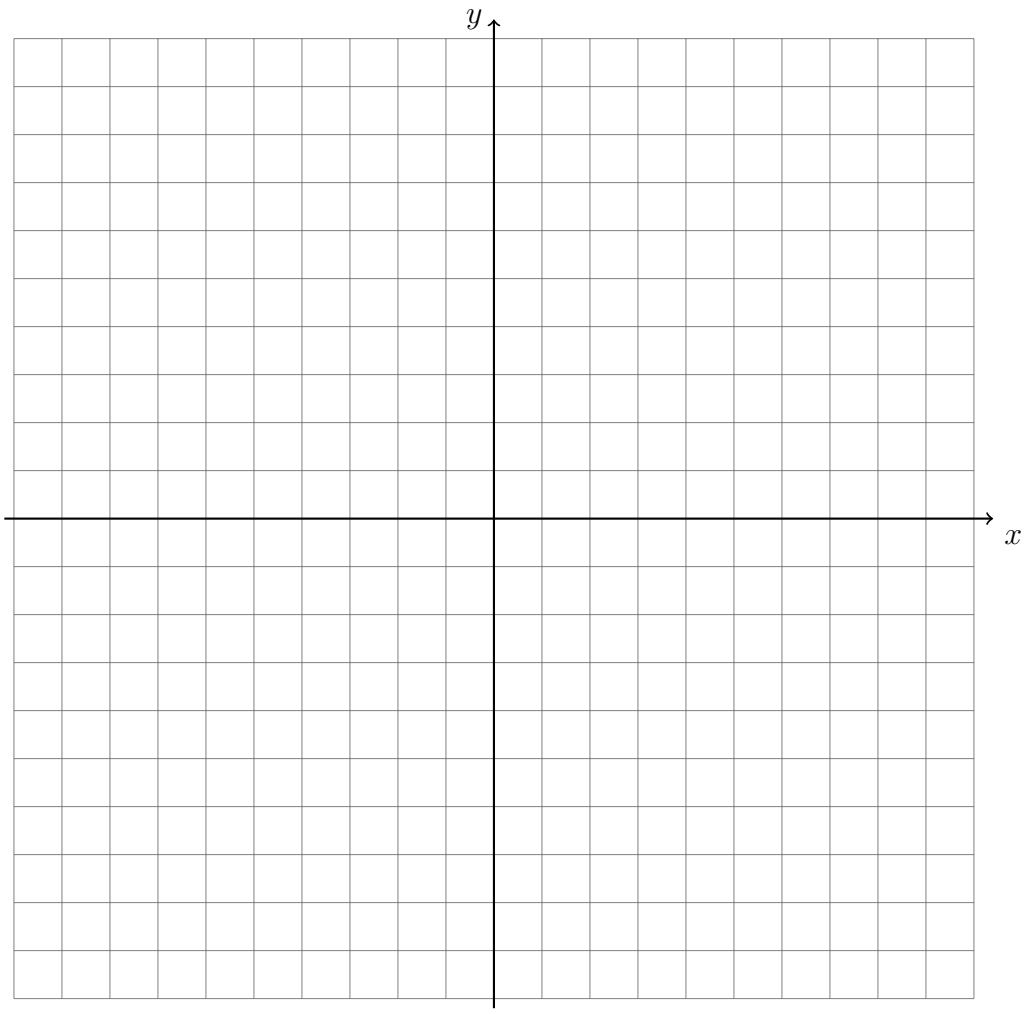
Graphing quadratic functions

9. Given the quadratic function $f(x) = x^2 + 1$, find the row differences.

x	$f(x)$
-3	10
-2	5
-1	2
0	1
1	2
2	5
3	10

Graph the function as a line over the domain $-3 \leq x \leq 3$.



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Rate of change

10. Find the slope of the function from the ratio of the line differences.

(a)

x	$f(x)$
-2	-1
-1	1
0	3
1	5
2	7

Change in $y =$ _____

Change in $x =$ _____

Slope = _____

(b)

x	$f(x)$
-4	7
-2	4
0	1
2	-2
4	-5

Change in $y =$ _____

Change in $x =$ _____

Slope = _____

11. Find the slope of the function. If the rate of change is not constant, write, "Non-linear. The rate of change is not constant."

(a)

x	$f(x)$
-3	0
-1	2
0	3
1	4
3	6

Slope = _____

(b)

x	$f(x)$
-4	-9
-2	-3
0	+1
2	-3
4	-9

Slope = _____

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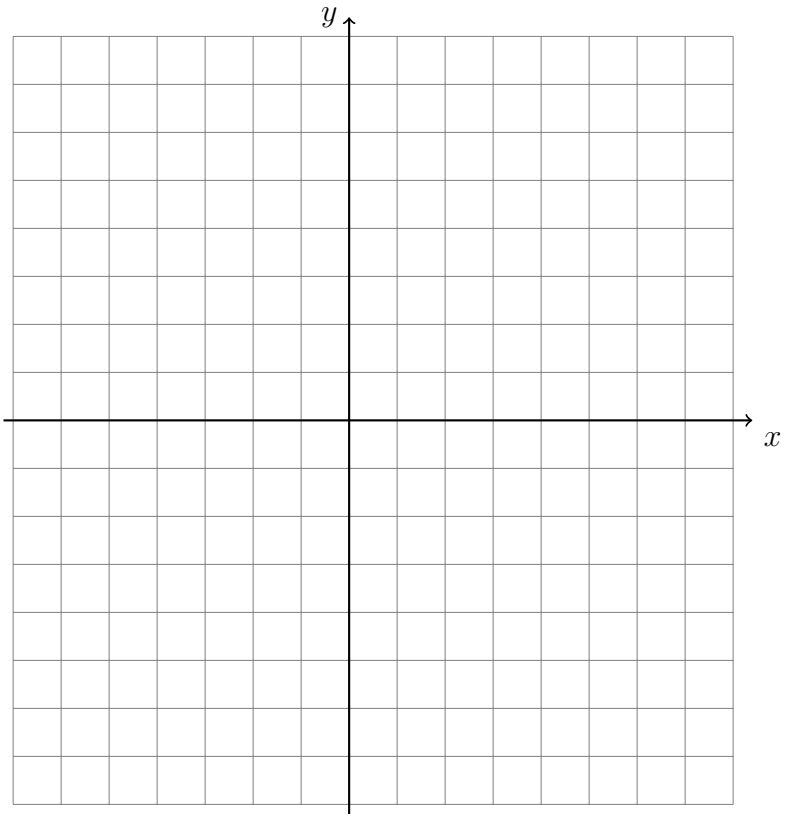
12. Fill in the T-chart, plot the points, and draw the line.

x	$y = \frac{2}{3}x - 4$



Write down the slope and y-intercept of the line.

$m =$

$b =$

Circle the row for the y-intercept.

Simplify each expression ("Collect like terms")

13. $x^2 - 3x - 4 + 2x^2 + 2x + 4$

14. $5(a^2 - 3a + 1) - 2(a^2 + 2a - 3)$