# 1.3

READY, SET, GO! Name Period Date

## READY

Topic: Multiplying two binomials

In the previous RSG, you were asked to use the distributive property on two different terms in the same problem. Example: *Multiply and simplify* $3x(4x+1)+2(4x+1)$.

You may have noticed that the binomial $(4x+1)$ occurred twice in the problem.

Here is a simpler way to write the same problem: $(3x+2)(4x+1)$.

You will use the distributive property twice. First multiply $3x(4x+1)$; then multiply $+2(4x+1)$. Add the like terms. Write the $x^2$ term first, the x-term second, and the constant term last.

$\mathbf{3x(4x+1)+2(4x+1)} \rightarrow \mathbf{(12x^2+3x)+(8x+2)} \rightarrow \mathbf{12x^2+[3x+8x]+2} \rightarrow \underbrace{\mathbf{12x^2+11x+2}}_{\text{Simplified form}}$

like terms

**Multiply the two binomials.** (Your answer should have 3 terms and be in this form $ax^2+bx+c$.)

1. $(x+5)(x-7)$
2. $(x+8)(x+3)$
3. $(x-9)(x-4)$
4. $(x+1)(x-4)$
5. $(3x-5)(x-1)$
6. $(5x-7)(3x+1)$
7. $(4x-2)(8x+10)$
8. $(x+6)(-2x+5)$
9. $(8x-3)(2x-1)$

Warm-Up

## SET

Topic: Distinguishing between linear and quadratic patterns

**Use first and second differences to identify the pattern in the tables as *linear, quadratic*, or *neither*. Write the recursive equation for the patterns that are linear or quadratic.**

10.

| $x$ | $y$ | 1st | 2nd |
|---|---|---|---|
| -3 | -23 | | |
| -2 | -17 | +6 | |
| -1 | -11 | +6 | 0 |
| 0 | -5 | +6 | 0 |
| 1 | 1 | +6 | 0 |
| 2 | 7 | +6 | 0 |
| 3 | 13 | +6 | |

a. Pattern: Linear
b. Recursive equation:
Explicit: $y=6x-5$
$18-5=13$

11.

| $x$ | $y$ | 1st | 2nd |
|---|---|---|---|
| -3 | 4 | | |
| -2 | 0 | -4 | |
| -1 | -2 | -2 | +2 |
| 0 | -2 | 0 | +2 |
| 1 | 0 | +2 | +2 |
| 2 | 4 | +4 | +2 |
| 3 | 10 | +6 | |

a. Pattern: Quadratic
b. Recursive equation: $y=x^2+x-2$

12.

| $x$ | $y$ | 1st |
|---|---|---|
| -3 | -15 | |
| -2 | -10 | +5 |
| -1 | -5 | +5 |
| 0 | 0 | +5 |
| 1 | 5 | +5 |
| 2 | 10 | +5 |
| 3 | 15 | |

a. Pattern: Linear
b. Recursive equation: $y=5x$

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# 1.3

13.

| $x$ | $y$ |
|---|---|
| -3 | 24 |
| -2 | 22 |
| -1 | 20 |
| 0 | 18 |
| 1 | 16 |
| 2 | 14 |
| 3 | 12 |

a. Pattern: Linear
b. Recursive equation: $y = -2x + 18$

14.

| $x$ | $y$ |
|---|---|
| -3 | 48 |
| -2 | 22 |
| -1 | 6 |
| 0 | 0 |
| 1 | 4 |
| 2 | 18 |
| 3 | 42 |

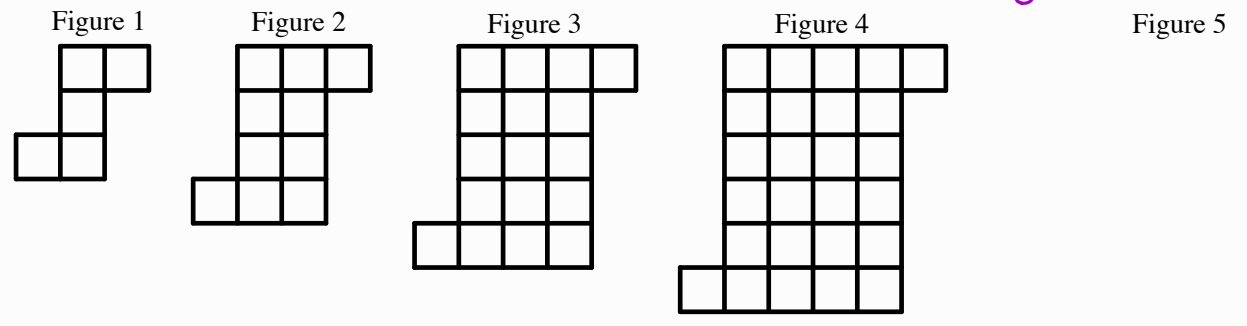
a. Pattern: Quadratic
b. Recursive equation: $y = 5x^2 - x$

15.

| $x$ | $y$ |
|---|---|
| -3 | 4 |
| -2 | 1 |
| -1 | 0 |
| 0 | 1 |
| 1 | 4 |
| 2 | 9 |
| 3 | 16 |

a. Pattern: Quadratic
b. Recursive equation: $y = x^2 + 2x + 1$

16.




a. Draw figure 5.
b. Predict the number of squares in figure 30. Show what you did to get your prediction.

## GO

Topic: Interpreting recursive equations to write a sequence

**Write the first five terms of the sequence.**

17. $f(0) = -5; f(n) = f(n-1) + 8$

18. $f(0) = 24; f(n) = f(n-1) - 5$

19. $f(0) = 25; f(n) = 3f(n-1)$

20. $f(0) = 6; f(n) = 2f(n-1)$

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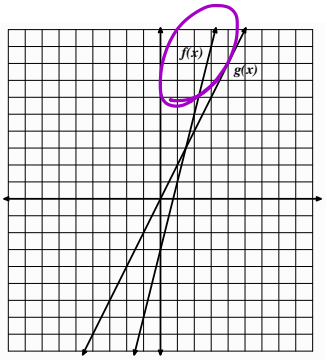
## GO

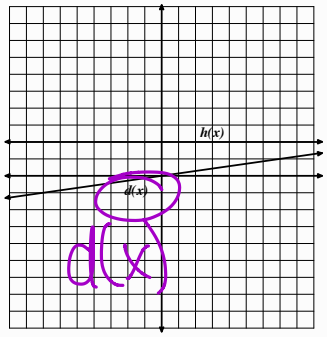
Topic: Comparing linear and exponential rates of change

**Indicate which function is changing faster.** Slope

10.




11.

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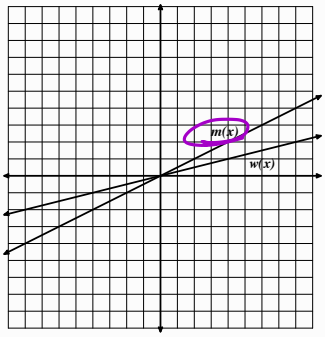
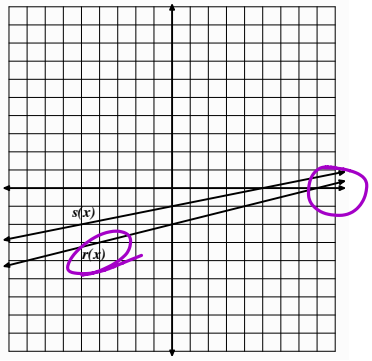
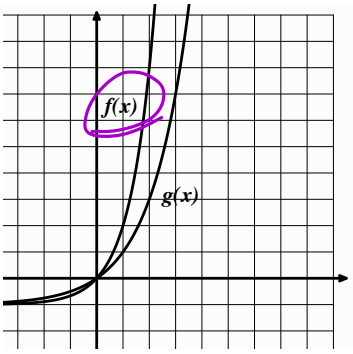


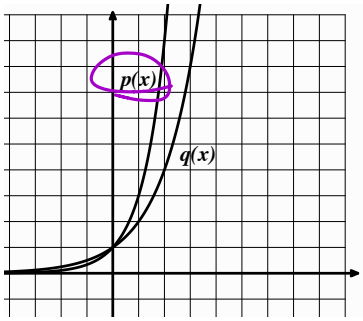

13.

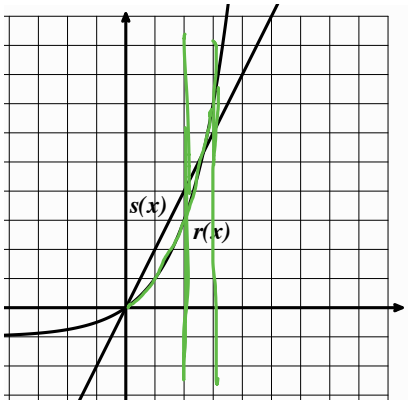



14.




15.




16 a. Examine the graph at the left from 0 to 1.

Which graph do you think is growing faster?

S(x)

b. Now look at the graph from 2 to 3.

Which graph is growing faster in this interval?

r(x)

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# 1.5 The Tortoise and The Hare

## *A Solidify Understanding Task*

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In the children's story of the tortoise and the hare, the hare mocks the tortoise for being slow. The tortoise replies, "Slow and steady wins the race." The hare says, "We'll just see about that," and challenges the tortoise to a race. The distance from the starting line of the hare is given by the function:

$d = t^2$ ($d$ in meters and $t$ in seconds) $y = x^2$

Because the hare is so confident that he can beat the tortoise, he gives the tortoise a 1 meter head start. The distance from the starting line of the tortoise including the head start is given by the function:

$d = 2^t$ ($d$ in meters and $t$ in seconds) $y = 2^x$

1. At what time does the hare catch up to the tortoise?

At 2 seconds

2. If the racecourse is very long, who wins: the tortoise or the hare? Why?

Turtle

3. At what time(s) are they tied?

At 2 and 4 seconds

4. If the racecourse were 15 meters long who wins, the tortoise or the hare? Why?

Rabbit


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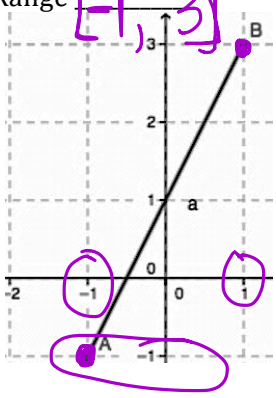
## GO

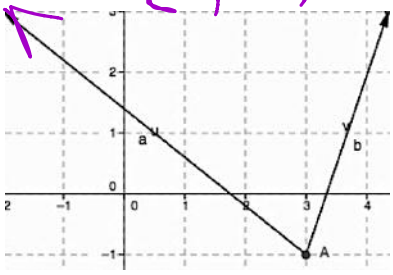
Topic: Identifying domain and range from a graph

**State the domain and range of each graph. Use interval notation where appropriate.**

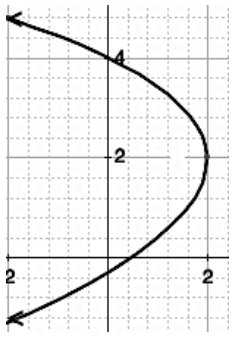
13a. Domain $[-1, 1]$
b. Range $[-1, 3]$



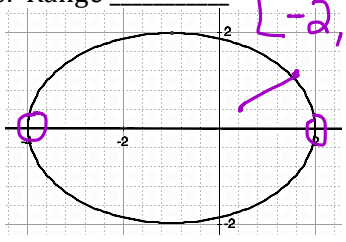

14a. Domain $(-\infty, +\infty)$
b. Range $(-1, \infty)$



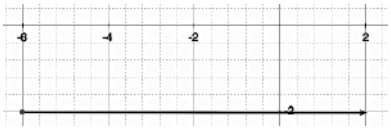

15a. Domain _____
b. Range _____



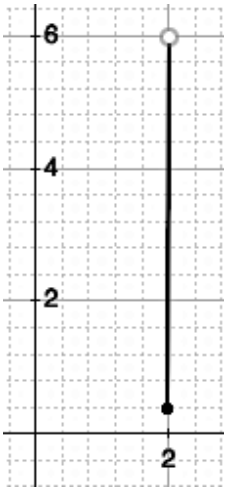
16a. Domain $[-4, 2]$
b. Range $[-2, 2]$



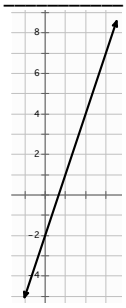
17a. Domain _____
b. Range _____



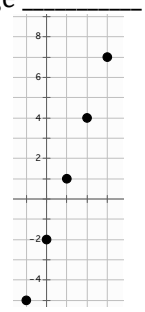
18a. Domain _____
b. Range _____



19a. Domain _____
b. Range _____



20a. Domain _____
b. Range _____



21. Are the domains of #19 and #20 the same? Explain.

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