

# Test Topics

- Linear Data

- Slope
- Intercepts (X and Y)
- Functions ( $y=mx+b$ )
- Word Problems

- Polynomial Operations

- Addition  $f(x)+g(x)$
- Subtraction  $f(x)-g(x)$
- Multiplication  $f(x) \cdot g(x)$

- Function Notation Data

- $5f(x)+8$
- $f(5x)$
- $f(x-5)$
- etc...

- Transformations

- Translations
- Reflections
- Vertical Stretch/Shrink

| <b>x</b> | <b>f(x)</b> |
|----------|-------------|
| 6        | 9           |
| 8        | 14          |
| 14       | 29          |

- 1) What is the slope?
- 2) What is the function  $f(x)$  in standard form?
- 3) Where are the y-intercept(s)?
- 4) Where are the x-intercept(s)?

|   | x  | f(x) |    |
|---|----|------|----|
| 2 | 6  | 9    | 5  |
| 6 | 8  | 14   | 15 |
|   | 14 | 29   |    |

4) Where are the x-intercept(s)?

$$(0) = 2.5x - 6$$

$$6 = 2.5x$$

$$2.4 = x$$

$$(2.4, 0)$$

1) What is the slope?

$$5/2 = 2.5$$

$$15/6 = 2.5$$

$$2.5$$

2) What is the function f(x) in standard form?

$$y = mx + b$$

$$9 = 2.5(6) + b$$

$$9 = 15 + b$$

$$-6 = b$$

$$y = 2.5x - 6$$

3) Where are the y-intercept(s)?

$$y = 2.5(0) - 6$$

$$y = -6$$

$$(0, -6)$$

The function  $r(d)=2d+500$  represents the number of red markers on a given day  $d$ .

The function  $b(d)=10d+4$  represents the number of blue markers on a given day  $d$ .

5. When will there be 384 blue markers?
6. How many total markers will there be on day 50?
7. When will there be 1008 total markers?
8. When will the number of red markers be the same as the number of blue markers?

$$r(d)=2d+500 \quad b(d)=10d+4$$

5. When will there be 384 blue markers?

$$384=10d+4$$

$$380=10d$$

$$38=d$$

Day 38

6. How many total markers will there be on day 50?

$$t(d)=(2d+500)+(10d+4)$$

$$t(d)=12d+504$$

$$t(50)=12(50)+504$$

$$t(50)=1104$$

1104 Markers

7. When will there be 1008 total markers?

$$(1008)=12d+504$$

$$504=12d$$

$$42=d$$

Day 42

8. When will the number of red markers be the same as the number of blue markers?

$$2d+500=10d+4$$

$$2d+496=10d$$

$$496=8d$$

$$62=d$$

Day 62

Given  $f(x)=3x^2-4x+5$  and  $g(x)=6x-8$

**9.**  $g(x)-2f(x)$

**11.**  $6f(x)+100$

**10.**  $g(x-2)$

**12.**  $f(-3x)$

Given  $f(x)=3x^2-4x+5$  and  $g(x)=6x-8$

9.  $g(x)-2f(x)$

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

$$6x-8-6x^2+8x-10$$

$$-6x^2+14x-18$$

10.  $g(x-2)$

$$6(x-2)-8$$

$$6x-12-8$$

$$6x-20$$

11.  $6f(x)+100$

$$6(3x^2-4x+5)+100$$

$$18x^2-24x+30+100$$

$$18x^2-24x+130$$

12.  $f(-3x)$

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

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

$$27x^2+12x+5$$

Given  $g(x)=3x^2+3x+3$

**13.** Reflection over the x-axis  
and vertical stretch of 2

**14.** Reflection over the y-axis  
and translation down 9

**15.** Translation left 4 units



Given  $g(x)=3x^2+3x+3$

**13.** Reflection over the x-axis  
and vertical stretch of 2

$$\begin{aligned} &-(3x^2+3x+3) \\ &\quad -3x^2-3x-3 \\ &2(-3x^2-3x-3) \\ &\quad -6x^2-6x-6 \end{aligned}$$

**14.** Reflection over the y-axis  
and translation down 9

$$\begin{aligned} &3(-x)^2+3(-x)+3 \\ &3(-x)(-x)+3(-x)+3 \\ &\quad 3x^2-3x+3 \\ &(3x^2-3x+3)-9 \\ &\quad 3x^2-3x-6 \end{aligned}$$

**15.** Translation left 4 units

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

Given  $g(x)=3x^2+3x+3$

**15.** Translation left 4 units

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

$$3(x+4)(x+4)+3(x+4)+3$$

$$3(x^2+8x+16)+3(x+4)+3$$

$$3x^2+24x+48+3x+12+3$$

$$3x^2+27x+63$$

|      |        |       |
|------|--------|-------|
|      | $x$    | $+4$  |
| $x$  | $+x^2$ | $+4x$ |
| $+4$ | $+4x$  | $+16$ |

Given  $f(x)=2x^3-2x^2+2$

**16.** Reflection over the x-axis  
and a vertical shrink of  $\frac{1}{2}$

**18.** Horizontal shrink of  $\frac{1}{4}$

**17.** Reflection over the y-axis  
and translation up 10

Given  $f(x)=2x^3-2x^2+2$

**16.** Reflection over the x-axis and a vertical shrink of  $\frac{1}{2}$

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

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

$$\frac{1}{2}(-2x^3+2x^2-2)$$

$$-x^3+x^2-1$$

**17.** Reflection over the y-axis and translation up 10

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

$$2(-x)(-x)(-x)-2(-x)(-x)+2$$

$$-2x^3-2x^2+2+10$$

$$-2x^3-2x^2+12$$

**18.** Horizontal shrink of  $\frac{1}{4}$

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

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

$$128x^3-32x^2+2$$

Given  $f(x)=6x^2+3x+8$

**19.** Translation right 4

**20.** Horizontal stretch of 2  
and a vertical stretch of 4

Given  $f(x)=6x^2+3x+8$

19. Translation right 4

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

$$6(x-4)(x-4)+4(x-4)+8$$

|      |        |       |
|------|--------|-------|
|      | $x$    | $-4$  |
| $x$  | $+x^2$ | $-4x$ |
| $-4$ | $-4x$  | $+16$ |

$$6(x^2-8x+16)+4(x-4)+8$$

$$6x^2-54x+96+4x-16+8$$

$$6x^2-70x+88$$

20. Horizontal stretch of 2  
and a vertical stretch of 4

$$6\left(\frac{1}{2}x\right)^2+4\left(\frac{1}{2}x\right)+8$$

$$6\left(\frac{1}{2}x\right)\left(\frac{1}{2}x\right)+4\left(\frac{1}{2}x\right)+8$$

$$1.5x^2+2x+8$$

$$4(1.5x^2+2x+8)$$

$$6x^2+8x+16$$