**Transforming and Analyzing Linear Functions**

**For questions 1-8, describe the transformation of the linear parent function, f(x) = x, that will result in the graph of the linear function given.**

2. g(x) = -2(x) + 5

*ANSWER*:

a is negative, so the graph is reflected over the x-axis

|2| > 1, so the graph is vertically stretched by a factor of 2

d = 5, so the graph will translate 5 units up

4. g(x) = (- x + 3) + 7

*ANSWER*:

g(x) = (- x – (-3)) + 7

b is negative, so the graph is reflected over the y-axis

b = - , so the graph is horizontally stretched by a factor of = 2

c = -3, so the graph will translate || = 6 to the left

d = 7, so the graph will translate 7 units up

6. g(x) = (6x + 1) – 3

*ANSWER*:

g(x) = (6x – (-1)) – 3

a = ; 0 < < 1, so the graph is vertically compressed by a factor of

b = 6, so the graph is horizontally compressed by a factor of =

c = -1, so the graph will translate || = to the left

d = -3, so the graph will translate 3 units down

8. g(x) = -(-8x + 9) – 6

*ANSWER*:

g(x) -(-8x – (-9)) – 6

a is negative, so the graph is reflected over the x-axis

b is negative, so the graph is reflected over the y-axis

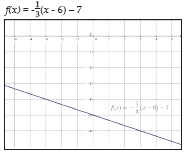
b = -8, so the graph is horizontally compressed by a factor of =

c = -9, so the graph will translate || = to the left

d = -6, so the graph will translate 6 units down

**For questions 9-12, identify the domain, range, x-intercept, and y-intercept of the linear function described by the equation and the graph. Write the domain and range as inequalities.**

10.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = -, b = 1, c = 6, and d = -7

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (-15, 0)

The y-intercept is (0, -ac + d); (0, -( )

= (0, 2 – 7) = (0, -5)

*ANSWER*:

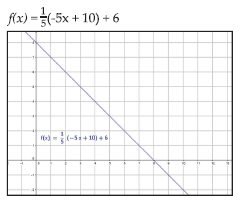
Domain: -∞ < x < ∞

Range: -∞ < y < ∞

x-intercept: (-15, 0)

y-intercept: (0, -5)

12.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = , b = -5, c = -10, and d = 6

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (8, 0)

The y-intercept is (0, -ac + d); (0, - )

= (0, 2 + 6) = (0, 8)

*ANSWER*:

Domain: -∞ < x < ∞

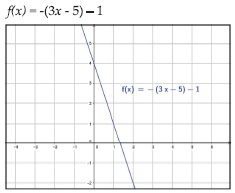
Range: -∞ < y < ∞

x-intercept: (8, 0)

y-intercept: (0, 8)

**For questions 13-16, identify the domain, range, x-intercept, and y-intercept of the linear function described by the equation and the graph. Write the domain and range in set builder notation.**

14.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = -1, b = 3, c = 5, and d = -1

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (, 0)

The y-intercept is (0, -ac + d); (0, -(-1)\*5 – 1)

= (0, 5 – 1) = (0, 4)

*ANSWER*:

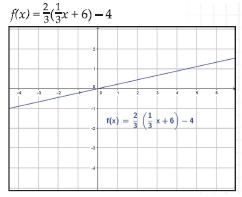
Domain: {x|x }

Range: {y|y }

x-intercept: (, 0)

y-intercept: (0, 4)

16.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = , b = , c = -6, and d = -4

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (0, 0)

The y-intercept is (0, -ac + d); (0, -\*-6 – 4)

= (0, 4 – 4) = (0, 0)

*ANSWER*:

Domain: {x|x }

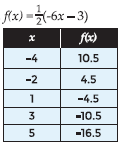
Range: {y|y }

x-intercept: (0, 0)

y-intercept: (0, 0)

**For questions 17-20, identify the domain, range, x-intercept, and y-intercept of the linear function described by the equation and the graph. Write the domain and range as intervals.**

18.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = , b = -6, c = 3, and d = 0

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (-0.5, 0)

The y-intercept is (0, -ac + d); (0, -\*3)

= (0, ) = (0, -1.5)

*ANSWER*:

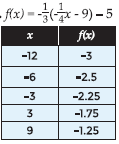
Domain: (-∞, ∞)

Range: (-∞, ∞)

x-intercept: (-.5, 0)

y-intercept: (0, -1.5)

20.



*SOLUTION:*

Since this is a linear function, the domain and range are both *all real numbers.*

a = -, b = -, c = 9, and d = -5

The x-intercept is (, 0); (, 0) = (, 0) = (, 0) = (24, 0)

The y-intercept is (0, -ac + d); (0, -()\*9 – 5)

= (0, 3 – 5) = (0, -2)

*ANSWER*:

Domain: (-∞, ∞)

Range: (-∞, ∞)

x-intercept: (24, 0)

y-intercept: (0, -2)