BECA / IB Math 01-Linear functions Name:
24 September 2021

1.9 Test: Functions

1. Given the linear function $f(x) = -3x + 9$. [6]

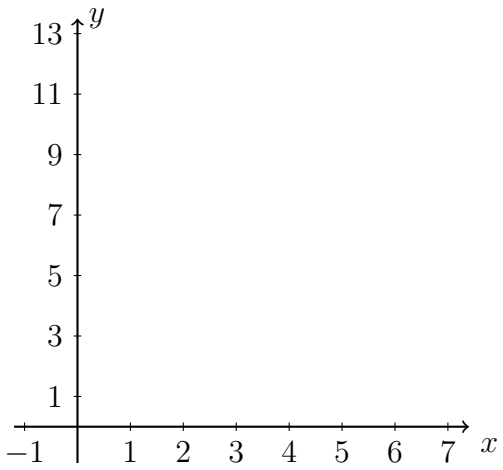
   (a) $f(x) = 0$. Find x.

   (b) Find $f(0)$

   (c) Plot the answers to the first two parts, (a) and (b), as points on the grid and label them as ordered pairs.

   (d) Draw a straight line through the points to represent the function.

   (e) Which answer, (a) or (b), is the x-intercept. Which is the y-intercept?



2. A relation composed of four points is plotted on the graph below, and represented as a set of ordered pairs as $\{(-1, 5), (j, 1), (4, 3), (5, k)\}$. [5]

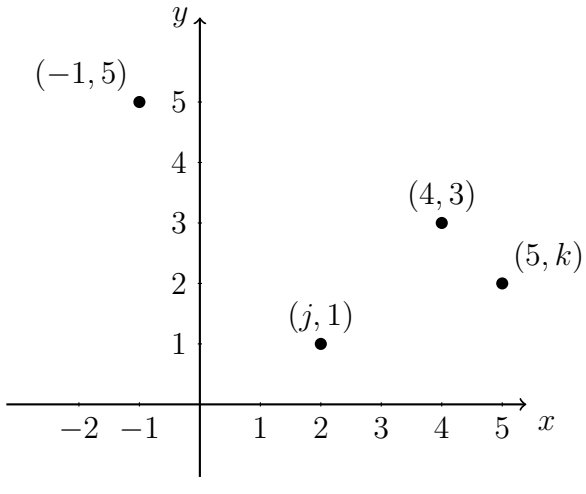
   (a) Write down j

   (b) Write down k

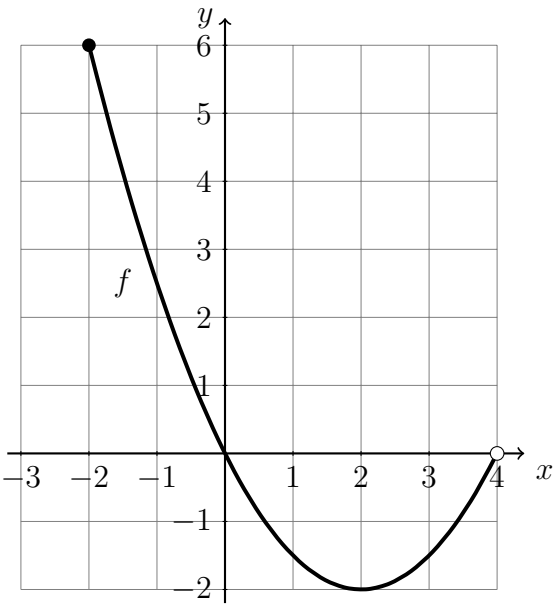
   (c) Write down the domain.

   (d) Is the relation a function? Why or why not.

   (e) Add an ordered pair to the relation so that it would *not* be a function.



3. The graph of a function f is shown on the grid below. [6]



(a) Write down $f(2)$

(b) Find x for $f(x) = 6$.

(c) Write down the domain.

(d) Write down the range.

4. The cost to rent a car is the function of the distance driven in miles plus a fixed charge. The cost in dollars is shown in the table. [4]

Miles driven	0	20	40	60	80	100
Rental cost	50	54	58	62	66	70

(a) What is the initial fixed charge?

(b) What would be the cost if the car is driven 80 miles?

(c) If the amount charged was \$70, how many miles must have been driven?

(d) Is the incremental cost per mile driven constant? (Is the function linear?) Explain why or why not in the context of the situation.

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5. A trainer writes a five-week workout plan for a client. For the leg workout two sets of lunges are required, with the number of reps in each set increasing each week. Let x be the week and the number of reps the function of x shown in the table. [4]

Legs workout - lunges (each side, two sets, twice a week)
Week 1: 8 reps
Week 2: 10 reps
Week 3: 12 reps
Week 4: 14 reps
Week 5: 16 reps

(a) How many reps are planned for the third week, when $x = 3$?

(b) Which week has the most reps?
(express your answer in the form $x =$ a number)

(c) Explain what the ordered pair $(2, 10)$ would refer to in this context.

(d) Do the reps increase by a constant amount with each week? Explain.
(If so, what is the slope, or rate of change?)

6. Consider the function $f(x) = 14 - 2x$. [5]

(a) Write down the independent variable.

(b) Calculate $f(4)$

(c) Show that $f(3) = 8$

(d) There is an x for which $f(x) = -6$.
Find this value of x.

7. Challenge: A group of friends rent a professional grill for a party. The rental charge is given by the formula $C(t) = 150 + 35(t)$ where C is the cost in dollars and t is the amount of time the grill is rented in hours. [8]

   (a) Find the cost of renting the grill for two hours.

   (b) Find $C(4)$.

   (c) The friends have a budget of \$325 for the grill rental. Determine the number of hours they can afford.

Early finishers **[4]**

8. Simplify each expression. (Leave it in radical form, not a decimal.)

   (a) $\sqrt{18}$ (b) $\sqrt{48}$

9. Simplify these fractions problems without a calculator. Show the steps you took.

   (a) $\frac{1}{2} - \frac{1}{3} =$ (b) $\frac{2}{5}x + \frac{1}{10}x + \frac{1}{5} =$