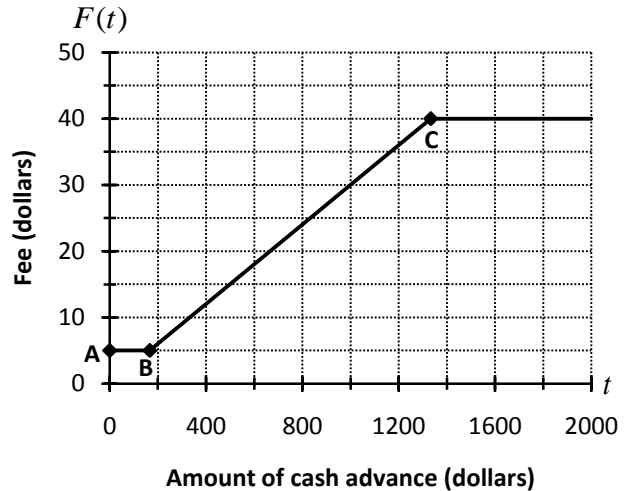


1. The function $F(t)$ given by the graph below describes the fees on cash advances for a Professional Association of Diving Instructors (PADI) credit card in 2202. $F(t)$ represents the fee on a cash advance of t dollars.

- (a) What is the independent variable (input) and the dependent variable (output)?

Independent variable:

Dependent variable:



- (b) Find $F(600)$ and explain what it means in the context of this situation? Write your answer in a complete sentence.
- (c) Explain why the graph is level between points A and B.
- (d) Find the value for t for which $F(t) = 30$ and interpret the meaning of the point $(t, 30)$ in the context of this model.
- (e) Between points B and C for every additional dollar you take out in a cash advance how much do you pay in fees? Show or explain what you did to get your answer.

2. (a) A large company has offices in two locations, one in New Jersey and one in Utah. The salary of the office assistants in the New Jersey office is \$28,500, while the salary of the office assistants in the Utah office is \$22,500. The New Jersey office has 128 office assistants and the Utah office has only 32 office assistants. What is the mean salary paid to the office assistants in this company?

(b) Suppose Juanita has taken five exams having scored 78, 94, 94, 84 and 83. She takes one more exam.

i. What score would he need on the 6th exam so that the median is 87?

ii. What score would he need on the 6th exam so that the mean score is 87?

3. Evaluate the expression $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$ for $a = \frac{3}{4}$, $b = 14$, $c = -320$. Write a **key sequence** to compute this expression on your graphing calculator using only one **ENTER** at the very end. What result do you get? Express answer as a decimal and as a fraction.

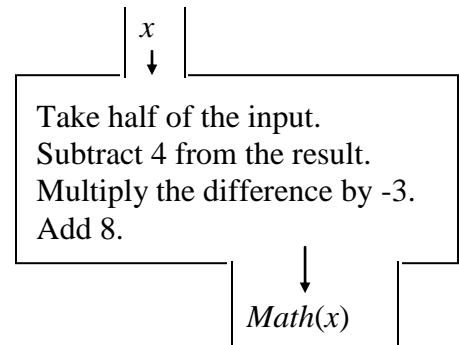
Decimal

Fraction

4. Consider the function machine for the function $Math$.

(a) Write the algebraic representation (equation).

(b) Find the output when the input is 2.6. Show or briefly explain what or did to get your answer.



(c) Find the input when the output is -3 . Show or briefly explain what or did to get your answer.

(d) What are the inputs if the outputs are greater than 32?

(e) Are $Math(-k)$ and $-Math(k)$ equivalent? Explain why or why not.

5. Consider the functions $f(x) = 5 + 4x - x^2$ and $g(x) = 3x - (9 - x)$. Find

(a) $2 \cdot f(-6)$

(b) $f(g(4))$

(c) $f(t - 3)$

(d) $f(2w) - g(2w)$

6. (a) List the set of integers.

(b) Define the set of rational numbers.

(c) Using your definition for rational numbers explain why the integers are considered rational.

(d) Give five examples of real numbers that are not rational.

(e) Give two examples of numbers that are not real numbers.

7. The number of wolves in a certain population is predicted by the formula $N(t) = 0.1(-t^2 + 50t + 700)$, where n is the number of wolves t years after the year 1998.

(a) Find and interpret $N(0)$. Write your conclusion in a complete sentence.

(b) Find and interpret $N(8)$. Write your conclusion in a complete sentence.

(c) Calculate $\frac{N(8) - N(0)}{8 - 0}$. Explain what your answer represents in terms of wolf population. Write your answer in a complete sentence.

8. Write a mathematical expression for each of the following. Then find the value of each expression.

(a) The opposite of the square of 6.

(b) The square of the opposite of 6.

(c) The reciprocal of the cube of -4.

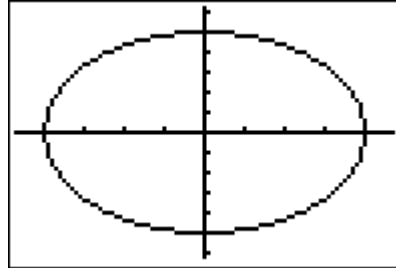
(d) The cube of the reciprocal of -4.

(e) The product of a non-zero number and its reciprocal.

9. The following windows were obtained from a graphing calculator.

(a) Using the information given by the view window, label the tick marks on the coordinate axes.

```
WINDOW
Xmin=-10
Xmax=10
Xscl=2
Ymin=-6
Ymax=6
Yscl=1
Xres=■
```



(b) Find x if $y = 3$.

(c) What is the domain of this relation?

(d) What is the range of this relation?

(e) Is this relation a function? Explain.

10. (a) Simplify each expression.

i. $2x - 5(x - 8)$

ii. $(2x - 5)(x - 8)$

iii. $5 - 2x(x - 8)$

(b) Solve each equation below and verify your answer.

i. $\frac{2}{3}x - 6 = 3x$

ii. $5 - 2(x + 3) = 6x$