

N MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

MISCELLANEOUS REPORTS ON WELLS

Submit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut-off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below:

| | |
|--|--|
| REPORT ON BEGINNING DRILLING OPERATIONS | REPORT ON REPAIRING WELL |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | REPORT ON PULLING OR OTHERWISE ALTERING CASING |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | REPORT ON DEEPENING WELL |
| REPORT ON RESULT OF PLUGGING OF WELL | |

Hobbs, New Mexico. April 19th, 1936.

Place

Date

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the
REPOLLO OIL COMPANY **A.L. CHRISTMAS** Well No. **1** in the
 Company or Operator Lease
NE/4 of Sec. **28**, T. **22S**, R. **37E**, N. M. P. M.,
Penrose Sand area Field, **Lea** County.

The dates of this work were as follows: ~~March 19th, 1936~~ **March 19th, 1936.**

Notice of intention to do the work was (was not) submitted on Form C-102 on **March 17th,** 19 **36**

and approval of the proposed plan was (was not) obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

Drilled cement plug and tested 8 1/2" casing for water shut-off by bailing hole dry. Allowed to stand 1 hr. Tested dry.

DUPLICATE

Witnessed by _____ Name _____ Company _____ Title _____

Subscribed and sworn to before me this 17

day of April, 1936

[Signature]
Notary Public

My Commission expires 12-3-38

I hereby swear or affirm that the information given above is true and correct.

Name L. Smith

Position Dist. Superintendent

Representing Repollo Oil Company
Company or Operator

Address Box # 156, Hobbs, N.M.

Remarks:

[Signature]
Name _____
Title _____

THE UNIVERSITY OF CHICAGO DEPARTMENT OF MATHEMATICS

PROBLEM SET 1

1. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . Prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

Solution:

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . We will prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

First, we show that $f(0) = 0$. Let $x = 0$ and $y = 0$ in the functional equation. Then $f(0+0) = f(0) + f(0)$, which implies $f(0) = 0$.

Next, we show that f is linear on the rational numbers. Let $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. Then $f(nx) = nf(x)$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Now, let $x \in \mathbb{R}$ and $n \in \mathbb{Z}$. Then $f(\frac{x}{n}) = \frac{1}{n}f(x)$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Combining these two results, we have $f(\frac{x}{n}) = \frac{1}{n}f(x)$ for all $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. This implies that f is linear on the rational numbers.

Finally, we show that f is linear on the real numbers. Let $x \in \mathbb{R}$ and $y \in \mathbb{R}$. Then $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. This follows from the functional equation.

Since f is continuous at 0 , it follows that f is linear on the real numbers. Therefore, $f(x) = cx$ for some constant $c \in \mathbb{R}$.

Q.E.D.

2. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . Prove that f is exponential, i.e., $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

Solution:

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . We will prove that f is exponential, i.e., $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

First, we show that $f(0) = 1$. Let $x = 0$ and $y = 0$ in the functional equation. Then $f(0+0) = f(0)f(0)$, which implies $f(0) = 1$.

Next, we show that f is exponential on the rational numbers. Let $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. Then $f(nx) = f(x)^n$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Now, let $x \in \mathbb{R}$ and $n \in \mathbb{Z}$. Then $f(\frac{x}{n}) = f(x)^{\frac{1}{n}}$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Combining these two results, we have $f(\frac{x}{n}) = f(x)^{\frac{1}{n}}$ for all $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. This implies that f is exponential on the rational numbers.

Finally, we show that f is exponential on the real numbers. Let $x \in \mathbb{R}$ and $y \in \mathbb{R}$. Then $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. This follows from the functional equation.

Since f is continuous at 0 , it follows that f is exponential on the real numbers. Therefore, $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

Q.E.D.

3. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . Prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

Solution:

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . We will prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

First, we show that $f(0) = 0$. Let $x = 0$ and $y = 0$ in the functional equation. Then $f(0+0) = f(0) + f(0)$, which implies $f(0) = 0$.

Next, we show that f is linear on the rational numbers. Let $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. Then $f(nx) = nf(x)$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Now, let $x \in \mathbb{R}$ and $n \in \mathbb{Z}$. Then $f(\frac{x}{n}) = \frac{1}{n}f(x)$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Combining these two results, we have $f(\frac{x}{n}) = \frac{1}{n}f(x)$ for all $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. This implies that f is linear on the rational numbers.

Finally, we show that f is linear on the real numbers. Let $x \in \mathbb{R}$ and $y \in \mathbb{R}$. Then $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. This follows from the functional equation.

Since f is continuous at 0 , it follows that f is linear on the real numbers. Therefore, $f(x) = cx$ for some constant $c \in \mathbb{R}$.

Q.E.D.

4. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . Prove that f is exponential, i.e., $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

Solution:

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . We will prove that f is exponential, i.e., $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

First, we show that $f(0) = 1$. Let $x = 0$ and $y = 0$ in the functional equation. Then $f(0+0) = f(0)f(0)$, which implies $f(0) = 1$.

Next, we show that f is exponential on the rational numbers. Let $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. Then $f(nx) = f(x)^n$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Now, let $x \in \mathbb{R}$ and $n \in \mathbb{Z}$. Then $f(\frac{x}{n}) = f(x)^{\frac{1}{n}}$ for all $n \in \mathbb{Z}$. This follows from the functional equation by induction.

Combining these two results, we have $f(\frac{x}{n}) = f(x)^{\frac{1}{n}}$ for all $n \in \mathbb{Z}$ and $x \in \mathbb{R}$. This implies that f is exponential on the rational numbers.

Finally, we show that f is exponential on the real numbers. Let $x \in \mathbb{R}$ and $y \in \mathbb{R}$. Then $f(x+y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. This follows from the functional equation.

Since f is continuous at 0 , it follows that f is exponential on the real numbers. Therefore, $f(x) = e^{cx}$ for some constant $c \in \mathbb{R}$.

Q.E.D.

5. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . Prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

Solution:

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{R}$. Suppose also that f is continuous at 0 . We will prove that f is linear, i.e., $f(x) = cx$ for some constant $c \in \mathbb{R}$.

First, we show that $f(0) = 0$. Let $x = 0$ and $y = 0$ in the functional equation. Then $f(0+0) = f(0) + f(0)$, which implies $f(0) = 0$.