

**NORTHWEST FLORIDA STATE COLLEGE**  
**Department of Mathematics**

## **Experiments in Creating Random Problems**

**D. P. Story**

**Quiz** Answer each of the following. Passing is 100%.

### Arithmetic

1.  $\frac{4}{9} + \frac{1}{2} =$

2.  $\frac{1}{2} - \frac{5}{16} =$

3.  $\frac{1}{2} - \frac{3}{16} =$

This next problem illustrates the use of `\RandomL` and `\RansomAS`. The summands are determined from a list of rational numbers. Addition or subtraction of the summands is determined by `\RandomAS`.

4.  $\frac{1}{2} - \frac{3}{4} =$

This next example illustrates how you can create a solution to a problem. This is a simple addition problem using the built-in command `\qAdd`. Solutions to more advanced problems might be obtained using the `fp` package.

5.  $\frac{5}{9} + \frac{5}{7} =$

## Definite Integrals

$$6. \int_{1/2}^3 2x^{5/4} dx =$$

$$7. \int_{2/9}^2 2x^{-2/5} dx =$$

$$8. \int_1^6 -x dx =$$

$$9. \int_2^3 -2x^{-5/3} dx =$$

$$10. \int_{5/12}^{7/6} 3x^{-1/3} dx =$$

This next problem was created from random lists of values using \RandomL.

$$11. \int_0^{\pi/6} \cos(2x) dx =$$

## Indefinite Integration

12.  $\int \frac{5}{6}x^2 + \frac{3}{2}x + 1 dx =$

13.  $\int \frac{4}{3}x^2 + \frac{2}{3}x + 3 dx =$

## Differentiation

14.  $\frac{d}{dx} 1x =$

This next problem uses a random sign, defined by \RandomS.

15.  $\frac{d}{dx} - \frac{5}{2}x^{-3/2} =$

16.  $\frac{d}{dx} \frac{3}{4}x^{17/4} =$

## Analytic Geometry

17. Let  $P(6, -3)$  be a point and  $Q(9, 4)$  be a point. Find the equation of the line that passes through  $P$  and  $Q$ .
18. Let  $P(5, -2)$  be a point and  $Q(7, 9)$  be a point. Find the equation of the line that passes through  $P$  and  $Q$ .

## Solutions to Quizzes

**Solution to Quiz:** The solution to this problem is

$$\frac{5}{9} + \frac{5}{7} = \frac{80}{63}$$

