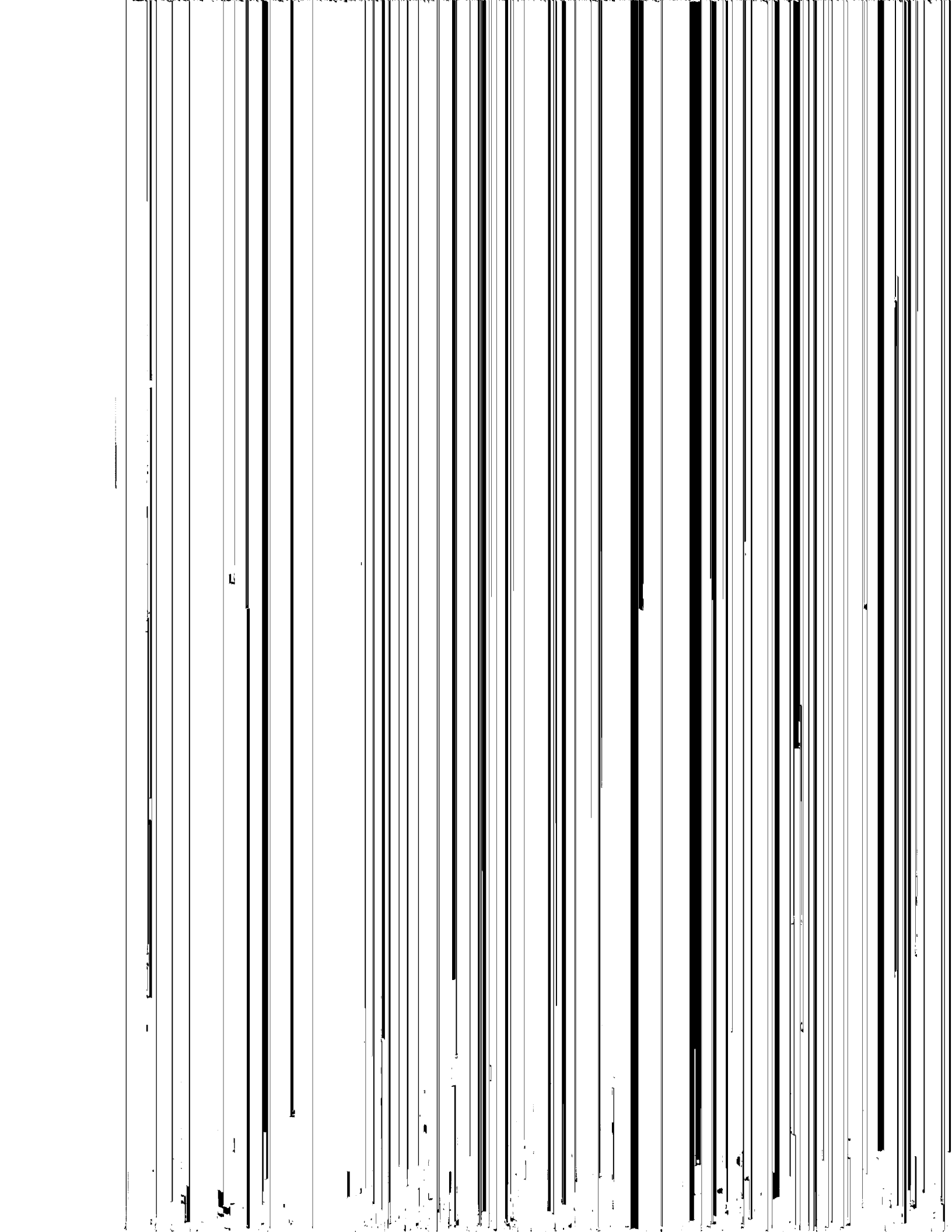


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Substitute  $x =$

Substitute  $x =$

The partial fra.

### EXERCISES

1.  $\frac{4}{(x+1)(x-5)}$

4.  $\frac{5x+4}{(x+3)(x+2)}$

7.  $\frac{x+2}{x^2+8x+15}$

10.  $\frac{x^2-2}{(x+1)(x^2+1)}$

### SOLUTIONS

1.  $\frac{4}{(x+1)(x-5)}$

$x=5 \rightarrow B$

$\frac{4}{(x+1)(x-5)}$

2.  $\frac{2x-3}{x^2-5x+6}$

$x=3 \rightarrow B$

$\frac{2x-3}{x^2-5x+6}$

$$3. \frac{5x}{2x^2+11x+12} = \frac{\quad}{(2x+4)}$$

$$x=-4 \rightarrow B=4 \quad a$$

$$\frac{5x}{2x^2+11x+12} = \frac{4}{x+4}$$

$$4. \frac{5x+1}{(x+3)(x+2)(x-4)} =$$

$$\rightarrow 5x+1 = A(x+2)(x-4)$$

$$x=-2 \rightarrow B = \frac{3}{2} \quad a$$

$$\frac{5x+1}{(x+3)(x+2)(x-4)} =$$

$$5. \frac{4x^2-x+3}{(x+5)(x-1)(x-2)} =$$

$$\rightarrow 4x^2-x+3 = A(x-1)(x-2)$$

$$x=1 \rightarrow B = -1 \quad an$$

$$\frac{4x^2-x+3}{(x+5)(x-1)(x-2)} =$$

$$6. \frac{2x^2-5}{x^3-2x^2-3x} = \frac{2x}{x(x+3)}$$

$$\rightarrow 2x^2-5 = A(x+3)$$

$$x=-1 \rightarrow B = -\frac{3}{4}$$

$$\frac{2x^2-5}{x^3-2x^2-3x} = \frac{5}{3} \cdot \frac{1}{x}$$

$$7. \frac{x+2}{x^2+8x+16} = \frac{x+2}{(x+4)^2}$$

$$x=-4 \rightarrow B = -2$$

$$\frac{2x^2-5}{(x+4)(x+1)(x-3)} =$$

8.  $\frac{-}{x}$

$x$

$x$

9.  $\frac{-}{(x$

$\rightarrow$

$x =$

$\frac{-}{(x$

10.  $\frac{-}{(x$

$x =$

$\frac{-}{(x$

11.  $\frac{-}{(x$

$x =$

$\frac{-}{(x$

12.  $\frac{-}{(x$

$x =$

$\frac{-}{(x$

## PART B:

### Integration of Pro

In this part the student  
The student is also expected to use (partial fraction inspection) of the following

In Part B each indefinite integral is to be expressed as a sum of partial fractions. The student is to show the work. If necessary, use the following

**Example 1** Find the integral

$$\int \frac{7x+1}{(x+3)(x-1)} dx = \int \left[ \frac{5}{x+3} + \frac{2}{x-1} \right] dx$$

**Example 2** Find the integral

$$\int \frac{6x^2+2x}{(x+3)(x-1)(x-5)} dx =$$

**Example 3** Find the integral

$$\int \frac{1-3x}{x^3+4x^2+4x} dx = \int \frac{1-3x}{x(x+2)^2} dx$$

**Example 4** Find the integral

$$\int \sqrt{x}$$

Exa

$$\int \sqrt{x}$$

EXE

1.  $\int$

4.  $\int$

7.  $\int$

10.  $\int$

ANS

1.  $\int$

2.  $\int$

3.  $\int$

4.  $\int$



5.

6.

7.

8.

9.

10.

11.

12.

**PA**

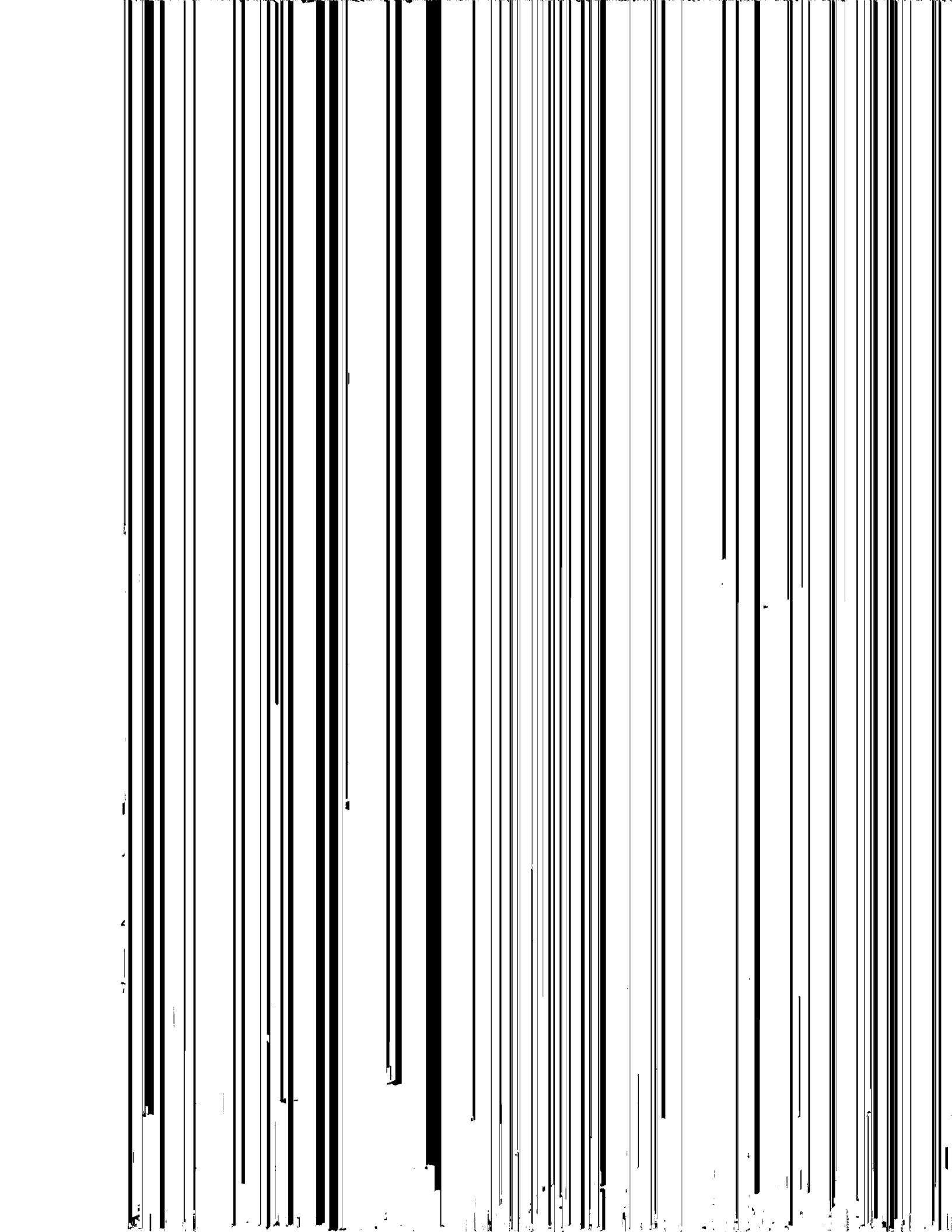
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**Exa**

∫  $\frac{3x}{\dots}$



$$9. \int \frac{x^5 - 2x^4 - 7x^3 + 20x^2}{x^3 + x^2 - 6} dx$$

$$11. \int \frac{2x^3 - 15x^2 + 17x + 2}{x^3 - 10x^2 + 25x} dx$$

### ANSWERS

$$1. \int \frac{6x+5}{x+2} dx = \int \left[ 6 - \frac{7}{x+2} \right] dx$$

$$2. \int \frac{4x^2 - 12x - 25}{x-5} dx = \int \left[ 4x + 8 + \frac{15}{x-5} \right] dx$$

$$3. \int \frac{5x^3 + 3x - 2}{x-1} dx = \int \left[ 5x^2 + 8x + 11 + \frac{9}{x-1} \right] dx$$

$$4. \int \frac{x^3 + 3x^2 - 4x - 6}{x^2 + 2x - 15} dx = \int \left[ x + 1 + \frac{9}{2} \cdot \frac{1}{x+5} - \frac{3}{2} \cdot \frac{1}{x-3} \right] dx$$

$$5. \int \frac{4x^2 - 8x + 3}{x^2 - 3x - 4} dx = \int \left[ 4 + \frac{3}{x+1} - \frac{3}{x-4} \right] dx = 4x - 3 \ln|x+1| + \frac{3}{4} \ln|x-4| + C$$

$$6. \int \frac{x^3 - 3x^2}{x^2 - 3x - 10} dx = \int \left[ x + \frac{20}{7} \cdot \frac{1}{x+2} - \frac{3}{7} \cdot \frac{1}{x-5} \right] dx = \frac{1}{2}x^2 + \frac{20}{7} \ln|x+2| - \frac{3}{7} \ln|x-5| + C$$

$$7. \int \frac{4x^3 + 20x^2 + 15x + 8}{x^3 + 5x^2 + 4x} dx = \int \left[ 4 + 2 \ln|x| + \frac{1}{x+4} - \frac{1}{x+1} \right] dx = 4x + 2 \ln|x| + \ln|x+4| - \ln|x+1| + C$$

$$8. \int \frac{x^4 - 10x^3 + 28x^2 - 15x - 15}{x^3 - 7x^2 + 10x} dx = \int [x - 3$$

$$= \int \left[ x - 3 - \frac{3}{2} \cdot \frac{1}{x} - \frac{1}{2} \cdot \frac{1}{x-2} - \frac{1}{x-5} \right] dx =$$

$$9. \int \frac{x^5 - 2x^4 - 7x^3 + 20x^2 - 12x + 4}{x^3 + x^2 - 6x} dx = \int [x^2$$

$$= \int \left[ x^2 - 3x + 2 - \frac{2}{3} \cdot \frac{1}{x} + \frac{4}{15} \cdot \frac{1}{x+3} + \right.$$

$$\left. = \frac{1}{3}x^3 - \frac{3}{2}x^2 + 2x - \frac{2}{3}\ln|x| + \frac{4}{15}\ln|x| + \right.$$

$$10. \int \frac{4x^5 + 6x^4 + 2x^3 + 3x^2 - 5x - 7}{x^3 + 2x^2 + x} dx = \int [4x^2$$

$$= \int \left[ 4x^2 - 2x + 2 - \frac{7}{x} + \frac{8}{x+1} - \frac{1}{x+} \right.$$

$$\left. = \frac{4}{3}x^3 - x^2 + 2x - 7\ln|x| + 8\ln|x+1| \right.$$

$$11. \int \frac{2x^3 - 15x^2 + 17x + 25}{x^3 - 10x^2 + 25x} dx = \int \left[ 2 + \frac{5x^2 - 33}{x(x-} \right.$$

$$\left. = 2x + \ln|x| + 4\ln|x-5| + \frac{3}{x-5} + C \right.$$

$$12. \int \frac{x^4 + 2x^3 - 6x^2 - 6x + 3}{x^3 + 4x^2 + 4x} dx = \int \left[ x - 2 + \frac{-} \right.$$

$$= \int \left[ x - 2 + \frac{3}{4} \cdot \frac{1}{x} - \frac{11}{4} \cdot \frac{1}{x+2} + \frac{9}{2} \cdot \frac{1}{x+} \right.$$

$$\left. = \frac{1}{2}x^2 - 2x + \frac{3}{4}\ln|x| - \frac{11}{4}\ln|x+1| - \right.$$

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