

1. Simplify

a. $\frac{24}{60}$

b. $\frac{x+2}{x+4}$

c. $\frac{5x+2}{10x+4}$

d. $\frac{2x+6}{\frac{1}{3}x+1}$

e. $\frac{\frac{1}{3}x+2}{\frac{1}{2}x+3}$

2. Simplify

a. $\frac{x^2-16}{x+4}$

b. $\frac{x^2+4x}{x^2-16}$

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

d. $\frac{x^2+5x+4}{x^2+8x+16}$

e. $\frac{x^4-4x^2}{x^2-2x-8}$

3. Simplify

a. $\frac{x^4-4}{x^3} \times \frac{x^4-x^3}{x^2-2}$

b. $\frac{x+1}{x^2-1} \div \frac{x^2+x-2}{x^3}$

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

d. $\frac{x}{x+2} - \frac{4}{x-3}$

e. $\frac{x+3}{x^3-2x^2} \div \frac{3}{x^2}$

4. Divide using long division

a. $x^3 + 5x^2 + 5x - 3$ by $(x + 3)$

b. $2x^3 - 5x^2 + 5x - 2$ by $(x - 1)$

c. $2x^3 - x^2 + x + 1$ by $(2x + 1)$

d. $2x^3 + 7x^2 - 9x - 9$ by $(2x - 3)$

e. $3x^3 + x^2 - 15x - 5$ by $(3x + 1)$

5. Divide using the remainder theorem

a. $2x^3 + 5x^2 - 1$ by $(x - 2)$

b. $x^4 - 2x^2 + 2x$ by $(x + 1)$

c. $3x^3 - x^2 + 1$ by $(x^2 + x - 1)$

d. $x^3 + 3x^2 + 2x - 1$ by $(x + 2)$

e. $2x^5 + 4x^2 - 5x - 3$ by $(x + 2)$

6. Express the following improper fractions in mixed form

a. $\frac{x^3+2x^2-x-2}{x-1}$

b. $\frac{8x^3+26x^2+7x-15}{4x+3}$

c. $\frac{4x^3-4x^2-21x-9}{x-3}$

7. Divide

a. $x^4 - 2x^3 + 6x^2 - 6x + 9$ by $x^2 + 3$

b. $x^4 + 3x^3 - 3x - 1$ by $x^2 + 2x - 1$

c. $4x^4 + 3x^2 - 5$ by $2x^2 + 3x$

8. Factorise $2x^3 - x^2 - 13x - 6$ fully given that 3 is a factor.

9. Find the value of the constants A, B, C and D in the following identity

$$3x^3 + 6x^2 + 6x + 7 =$$

$$(x + 2)(Ax^2 + Bx + C) + D$$

10. Show that $\frac{2x^4-3x^3-x^2+3x+2}{x^2-1}$ can be put

in the form of $Ax^2 + Bx + C + \frac{D}{x^2-1}$.

Find the values of the constants A, B, C, and D.

11. Factorise $x^3 - x^2 - 8x + 12$ fully.12. Divide $x^3 - 4x^2 - 7x + 10$ by $(x - 1)$ and factorise completely.

13. Explain the difference between the factor and the remainder theorem.