

Algebraic Fractions - Lesson 5

Adding and Subtracting Algebraic Fractions (Easy Types)

LI

- +, - easy algebraic fractions.

SC

- +, - numerical fractions.
- Simplify fully.

Example 1

$$\frac{7x}{4} - \frac{5x}{4}$$

$$= \frac{2x}{4}$$

$$= \frac{x}{2}$$

Example 2

$$\frac{x \times 2}{6 \times 2} + \frac{7x}{12}$$

$$= \frac{2x}{12} + \frac{7x}{12}$$

$$= \frac{9x}{12}$$

$$= \frac{3x}{4}$$

Example 3

$$\begin{aligned} & \frac{x \times 6}{2 \times 6} - \frac{x \times 4}{3 \times 4} + \frac{3 \times x \times 3}{4 \times 3} \\ = & \frac{6x}{12} - \frac{4x}{12} + \frac{9x}{12} \\ = & \boxed{\frac{11x}{12}} \end{aligned}$$

Example 4

$$\begin{aligned} & \frac{13 \times y}{w \times y} - \frac{4 \times w}{y \times w} \\ = & \frac{13 y}{w y} - \frac{4 w}{w y} \\ = & \boxed{\frac{13 y - 4 w}{w y}} \end{aligned}$$

Example 5

$$\frac{w \times h}{p \times h} - \frac{x \times p}{h \times p}$$

$$= \frac{wh}{ph} - \frac{xp}{ph}$$

$$= \frac{wh - xp}{ph}$$

1 Express each of the following as a single fraction in its simplest form.

a $\frac{5x}{8} - \frac{x}{8}$

b $\frac{7x}{8} + \frac{x}{4}$

c $\frac{3x}{4} - \frac{x}{5}$

d $\frac{x}{3} + \frac{5x}{9}$

e $\frac{x}{2} + \frac{x}{3} + \frac{x}{6}$

f $\frac{x}{3} - \frac{x}{4} + \frac{5x}{6}$

g $\frac{x}{2} + \frac{2x}{3} - \frac{3x}{4}$

h $\frac{5x}{3} - \frac{x}{4} - \frac{x}{5}$

2 Express each of the following as a single fraction in its simplest form.

a $\frac{5}{x} - \frac{2}{y}$

b $\frac{a}{c} + \frac{b}{d}$

c $\frac{3}{4x} + \frac{2}{3x}$

d $\frac{7}{4x} - \frac{3}{5x^2}$

e $\frac{1}{x} + \frac{2}{y} + \frac{3}{z}$

f $\frac{1}{pr} - \frac{3}{qr}$

g $\frac{2}{s^2t} - \frac{3}{st^2}$

h $\frac{a}{d} - \frac{b}{e} + \frac{c}{f}$

3 Express each of the following as a single fraction in its simplest form.

a $7 + \frac{3}{x}$

b $5 - \frac{2}{3x}$

c $x - \frac{2}{3}$

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

e $x + \frac{5}{x}$

f $7 + \frac{x-y}{x}$

g $3 - \frac{x-y}{x}$

h $x^2 - \frac{5}{x}$

Answers

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|----------|----------|------------------|----------|----------|---------------------------|----------|----------|--------------------|
| 1 | a | $\frac{x}{2}$ | 2 | a | $\frac{5y-2x}{xy}$ | 3 | a | $\frac{7x+3}{x}$ |
| | b | $\frac{9x}{8}$ | | b | $\frac{ad+bc}{cd}$ | | b | $\frac{15x-2}{3x}$ |
| | c | $\frac{11x}{20}$ | | c | $\frac{17}{12x}$ | | c | $\frac{3x-2}{3}$ |
| | d | $\frac{8x}{9}$ | | d | $\frac{35x-12}{20x^2}$ | | d | $\frac{2+3x}{3x}$ |
| | e | x | | e | $\frac{zy+2xz+3xy}{xyz}$ | | e | $\frac{x^2+5}{x}$ |
| | f | $\frac{11x}{12}$ | | f | $\frac{q-3p}{pqr}$ | | f | $\frac{8x-y}{x}$ |
| | g | $\frac{5x}{12}$ | | g | $\frac{2t-3s}{s^2t^2}$ | | g | $\frac{2x+y}{x}$ |
| | h | $\frac{73x}{60}$ | | h | $\frac{afe-bdf+cde}{def}$ | | h | $\frac{x^3-5}{x}$ |

| | | | | | |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|
| 1. $\frac{a}{4} + \frac{a}{8}$ | 2. $\frac{b}{5} + \frac{b}{10}$ | 3. $\frac{c}{3} + \frac{c}{12}$ | 28. $\frac{p}{4} - \frac{p}{6}$ | 29. $\frac{q}{6} - \frac{q}{15}$ | 30. $\frac{r}{12} - \frac{r}{20}$ |
| 4. $\frac{d}{2} + \frac{d}{6}$ | 5. $\frac{e}{2} + \frac{e}{10}$ | 6. $\frac{m}{3} + \frac{m}{4}$ | 31. $\frac{3a}{4} - \frac{a}{12}$ | 32. $\frac{5b}{6} - \frac{b}{30}$ | 33. $\frac{9c}{10} - \frac{c}{40}$ |
| 7. $\frac{n}{3} + \frac{n}{5}$ | 8. $\frac{p}{4} + \frac{p}{5}$ | 9. $\frac{q}{10} + \frac{q}{15}$ | 34. $\frac{3d}{10} - \frac{d}{20}$ | 35. $\frac{e}{4} - \frac{3e}{20}$ | 36. $\frac{3p}{4} - \frac{p}{5}$ |
| 10. $\frac{r}{6} + \frac{r}{10}$ | 11. $\frac{x}{2} + \frac{3x}{10}$ | 12. $\frac{y}{5} + \frac{11y}{20}$ | 37. $\frac{5q}{6} - \frac{q}{4}$ | 38. $\frac{r}{2} - \frac{2r}{5}$ | 39. $\frac{7x}{10} - \frac{x}{6}$ |
| 13. $\frac{z}{4} + \frac{5z}{12}$ | 14. $\frac{3u}{4} + \frac{u}{20}$ | 15. $\frac{3v}{10} + \frac{v}{30}$ | | | |
| 16. $\frac{a}{3} + \frac{2a}{5}$ | 17. $\frac{3b}{4} + \frac{b}{6}$ | 18. $\frac{c}{6} + \frac{3c}{10}$ | | | |
| 19. $\frac{d}{10} + \frac{11d}{15}$ | 20. $\frac{e}{12} + \frac{4e}{15}$ | 21. $\frac{x}{2} - \frac{x}{8}$ | | | |
| 22. $\frac{y}{3} - \frac{y}{9}$ | 23. $\frac{z}{4} - \frac{z}{12}$ | 24. $\frac{t}{4} - \frac{t}{20}$ | | | |
| 25. $\frac{u}{10} - \frac{u}{30}$ | 26. $\frac{m}{2} - \frac{m}{5}$ | 27. $\frac{n}{3} - \frac{n}{10}$ | | | |

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|--|--|--|--|--|---|
| 1. $\frac{a}{4} + \frac{a}{8} = \frac{3a}{8}$ | 2. $\frac{3b}{10} + \frac{b}{10} = \frac{4b}{10}$ | 3. $\frac{5c}{12} + \frac{c}{12} = \frac{6c}{12}$ | 28. $\frac{p}{4} - \frac{p}{6} = \frac{p}{12}$ | 29. $\frac{q}{6} - \frac{q}{15} = \frac{q}{10}$ | 30. $\frac{r}{12} - \frac{r}{20} = \frac{r}{30}$ |
| 4. $\frac{d}{2} + \frac{d}{6} = \frac{2d}{3}$ | 5. $\frac{3e}{5} + \frac{e}{10} = \frac{7e}{10}$ | 6. $\frac{7m}{12} + \frac{m}{4} = \frac{10m}{12}$ | 31. $\frac{3a}{4} - \frac{a}{12} = \frac{2a}{3}$ | 32. $\frac{5b}{6} - \frac{b}{30} = \frac{4b}{5}$ | 33. $\frac{9c}{10} - \frac{c}{40} = \frac{17c}{40}$ |
| 7. $\frac{n}{3} + \frac{n}{5} = \frac{8n}{15}$ | 8. $\frac{9p}{20} + \frac{p}{5} = \frac{13p}{20}$ | 9. $\frac{q}{10} + \frac{q}{15} = \frac{7q}{30}$ | 34. $\frac{3d}{10} - \frac{d}{20} = \frac{5d}{20}$ | 35. $\frac{e}{4} - \frac{3e}{20} = \frac{e}{5}$ | 36. $\frac{3p}{4} - \frac{p}{5} = \frac{11p}{20}$ |
| 10. $\frac{r}{6} + \frac{r}{10} = \frac{4r}{15}$ | 11. $\frac{4x}{5} + \frac{3x}{10} = \frac{11x}{10}$ | 12. $\frac{3y}{4} + \frac{11y}{20} = \frac{17y}{20}$ | 37. $\frac{5q}{6} - \frac{q}{4} = \frac{7q}{12}$ | 38. $\frac{r}{2} - \frac{2r}{5} = \frac{3r}{10}$ | 39. $\frac{7x}{10} - \frac{x}{6} = \frac{31x}{30}$ |
| 13. $\frac{z}{4} + \frac{5z}{12} = \frac{2z}{3}$ | 14. $\frac{4u}{5} + \frac{3u}{4} = \frac{31u}{20}$ | 15. $\frac{v}{3} + \frac{3v}{10} = \frac{13v}{10}$ | | | |
| 16. $\frac{a}{3} + \frac{2a}{5} = \frac{11a}{15}$ | 17. $\frac{11b}{12} + \frac{3b}{4} = \frac{17b}{6}$ | 18. $\frac{7c}{15} + \frac{c}{6} = \frac{17c}{10}$ | | | |
| 19. $\frac{d}{10} + \frac{11d}{15} = \frac{7d}{6}$ | 20. $\frac{7e}{20} + \frac{4e}{15} = \frac{31e}{60}$ | 21. $\frac{3x}{8} - \frac{x}{2} = -\frac{5x}{8}$ | | | |
| 22. $\frac{y}{3} - \frac{y}{9} = \frac{2y}{9}$ | 23. $\frac{z}{4} - \frac{z}{12} = \frac{2z}{6}$ | 24. $\frac{t}{4} - \frac{t}{20} = \frac{4t}{5}$ | | | |
| 25. $\frac{u}{10} - \frac{u}{30} = \frac{2u}{15}$ | 26. $\frac{3m}{10} - \frac{m}{5} = \frac{m}{10}$ | 27. $\frac{7n}{30} - \frac{n}{3} = -\frac{13n}{30}$ | | | |