



Year 9 Worksheet 8: Quadratic and Algebraic Fractions

Question 1: Answer the following.

(1) Expand and simplify $(5 - 3x)(x + 4)$

- A. $3x^2 - 7x - 20$ B. $3x^2 - 7x + 20$ C. $-3x^2 - 7x + 20$
D. $3x^2 + 7x + 20$ E. $-3x^2 - 7x - 20$

(2) Factorise $2x^2 - 2x - 8 - 8x$

- A. $2(x - 4)(x - 1)$ B. $(2x - 4)(x - 1)$ C. $(2x - 4)(x - 1)$
D. $(x - 8)(2x - 10)$ E. $(2x - 8)(x - 10)$

(3) If $x^2 - 8x + 15$ has the factor $(x - 3)$. What is the other factor?

- A. $x + 5$ B. $x - 5$ C. $x + 15$ D. $x - 15$ E. $x - 8$

(4) What is the factored form of $x^2 + 11x + 30$?

- A. $(x - 11)(x - 30)$ B. $(x + 11)(x + 30)$ C. $(x - 5)(x - 6)$
D. $(x + 5)(x + 6)$ E. $(2x - 5)(x + 6)$

(5) Expand $(2x - 3y)^2$

- A. $4x^2 - 12xy - 9y^2$ B. $2x^2 - 6xy + 3y^2$ C. $2x^2 - 11xy + 9y^2$
D. $2x^2 - 6xy - 3y^2$ E. $4x^2 - 12xy + 9y^2$



(6) Factorise $4x^2 - 81$

- A. $(4x - 81)(x + 81)$ B. $(2x - 9)(4x + 9)$ C. $(2x - 9)(9 + 2x)$
D. $(2x - 9)^2$ E. $2(2x - 9)^2$

(7) Add and simplify the following fraction: $\frac{3x-5}{4} + \frac{x+8}{6}$

- A. $\frac{11x-5}{24}$ B. $\frac{4x+3}{10}$ C. $\frac{4x-3}{24}$ D. $\frac{11x+1}{12}$ E. $\frac{4x+13}{10}$

(8) Simplify the following fraction: $\frac{5(x+7)}{x^2+5x-14} \times \frac{(x-2)}{(x+1)}$

- A. $\frac{5}{(x+1)}$ B. $\frac{1}{(x-2)}$ C. $\frac{5(x+7)}{(x-2)}$ D. $\frac{(x-2)}{(x+1)}$ E. $\frac{5(x+7)}{x^2+5x-14}$

(9) The LCM (Lowest Common Multiple) of $\frac{x+4}{x+3}$ and $\frac{3x+5}{4x}$ is

- A. $(x^2 + 12)$ B. $(4x + 3)$ C. $(5x + 3)$ D. $4x(x + 3)$ E. $12x$

(10) Solve for x when $\frac{x+4}{x+3} = \frac{3x+5}{4x}$

- A. 3 or - 5 B. - 3 or 5 C. 3 or 5 D. - 3 or - 5 E. - 3



Question 2: Answer the following.

1 Expand the following expressions.

a. $(x - 4)(x + 8)$

b. $(x + 7)(3x + 1)$

c. $3(2x + 7)(x - 7)$

d. $(x - 12)(x - 5)$



2 Expand the following expressions.

a. $(x + 5)^2$

b. $(x - 7)^2$

c. $2(3x - 8)^2$

d. $(x - 9)(x + 9)$

e. $(x + 5)(5 - x)$

f. $(7x - 4)(7x + 4)$



3 Factorise the following expressions.

a. $3a - 24b$

b. $4xy^2 + 10xy$

c. $(3x - 5)x - 2(3x - 5)$

d. $4x^2 - 81$

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

f. $(x - 4)^2 - 121$



4 Factorise the given expressions by grouping.

a. $4xy + 3x^2 - 2y - 6x$

b. $5ab + 10a - 3b - 6$

c. $6x^2 - 5xy - 8x + 10y$

5 Factorise the given trinomials.

a. $x^2 + 5x - 14$

b. $x^2 + 8x + 7$



c. $x^2 - 2x - 15$

d. $x^2 + x - 42$

6 Simplify the following fraction.

a. $\frac{8x + 24}{12}$

b. $\frac{4x + 14}{3x + 15}$

c. $\frac{x^2 - 25}{5x - 25}$



7

Simplify the following fraction.

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

b. $\frac{2x-8}{3x^2+15x} \div \frac{(x-4)}{4(x+5)}$

c. $\frac{4}{5(x-4)} \times \frac{4x^2-16}{2(x+4)}$

d. $\frac{x^2+4x+3}{(x-6)} \div \frac{2(x+1)(x-2)}{x^2-8x+12}$



8

Solve for x

a. $\frac{x}{5} + \frac{2x}{4} = 7$

b. $\frac{x+5}{3} - \frac{2x-1}{2} = \frac{29}{6}$

c. $\frac{7}{x-3} + \frac{6}{x+4} = 0$

d. $\frac{4}{x-7} + \frac{5x}{(x-7)^2} = 0$



Personalised English & Math Tutoring

Redeem Free Assessment





Answer Key

Question 1: Answer the following.

(1) Expand and simplify $(5 - 3x)(x + 4)$

- A. $3x^2 - 7x - 20$ B. $3x^2 - 7x + 20$ C. $-3x^2 - 7x + 20$
D. $3x^2 + 7x + 20$ E. $-3x^2 - 7x - 20$

Answer: C. $-3x^2 - 7x + 20$

(2) Factorise $2x^2 - 2x - 8 - 8x$

- A. $2(x - 4)(x - 1)$ B. $(2x - 4)(x - 1)$ C. $(2x - 4)(x - 1)$
D. $(x - 8)(2x - 10)$ E. $(2x - 8)(x - 10)$

Answer: A. $2(x-4)(x-1)$

(3) If $x^2 - 8x + 15$ has the factor $(x - 3)$. What is the other factor?

- A. $x + 5$ B. $x - 5$ C. $x + 15$ D. $x - 15$ E. $x - 8$

Answer: B. $x-5$

(4) What is the factored form of $x^2 + 11x + 30$?

- A. $(x - 11)(x - 30)$ B. $(x + 11)(x + 30)$ C. $(x - 5)(x - 6)$
D. $(x + 5)(x + 6)$ E. $(2x - 5)(x + 6)$

Answer: D. $(x+5)(x+6)$

(5) Expand $(2x - 3y)^2$



- A. $4x^2 - 12xy - 9y^2$ B. $2x^2 - 6xy + 3y^2$ C. $2x^2 - 11xy + 9y^2$
D. $2x^2 - 6xy - 3y^2$ E. $4x^2 - 12xy + 9y^2$

Answer: E. $4x^2-12xy+9y^2$

(6) Factorise $4x^2 - 81$

- A. $(4x - 81)(x + 81)$ B. $(2x - 9)(4x + 9)$ C. $(2x - 9)(9 + 2x)$
D. $(2x - 9)^2$ E. $2(2x - 9)^2$

Answer: C. $(2x-9)(9+2x)$

(7) Add and simplify the following fraction: $\frac{3x-5}{4} + \frac{x+8}{6}$

- A. $\frac{11x-5}{24}$ B. $\frac{4x+3}{10}$ C. $\frac{4x-3}{24}$ D. $\frac{11x+1}{12}$ E. $\frac{4x+13}{10}$

Answer: D. $(11x+1)/12$

(8) Simplify the following fraction: $\frac{5(x+7)}{x^2+5x-14} \times \frac{(x-2)}{(x+1)}$

- A. $\frac{5}{(x+1)}$ B. $\frac{1}{(x-2)}$ C. $\frac{5(x+7)}{(x-2)}$ D. $\frac{(x-2)}{(x+1)}$ E. $\frac{5(x+7)}{x^2+5x-14}$

Answer: A. $5/(x+1)$

(9) The LCM (Lowest Common Multiple) of $\frac{x+4}{x+3}$ and $\frac{3x+5}{4x}$ is



A. $(x^2 + 12)$ B. $(4x + 3)$ C. $(5x + 3)$ D. $4x(x + 3)$ E. $12x$

Answer: D. $4x(x+3)$

(10) Solve for x when $\frac{x+4}{x+3} = \frac{3x+5}{4x}$

A. 3 or - 5 B. - 3 or 5 C. 3 or 5 D. - 3 or - 5 E. - 3

Answer: A. 3 or -5

Question 2: Answer the following.

1	Expand the following expressions.		
	a. Solution $x^2 + 4x - 32$	c. Solution $6x^2 - 21x - 147$	
	b. Solution $3x^2 + 22x + 7$	d. Solution $x^2 - 17x + 60$	
2	Expand the following expressions.		
	a. Solution $x^2 + 10x + 25$	b. Solution $x^2 - 14x + 49$	c. Solution $18x^2 - 96x + 128$



	<p>d.</p> <p>Solution</p> $x^2 - 81$	<p>e.</p> <p>Solution</p> $x^2 - 25$	<p>f.</p> <p>Solution</p> $49x^2 - 16$
3	Factorise the following expressions.		
	<p>a.</p> <p>Solution</p> $3(a - 8b)$	<p>b.</p> <p>Solution</p> $2yx(2y + 5)$	<p>c.</p> <p>$(3x - 5)(x - 2)$ or</p> <p>Solution</p> $3x^2 - 11x + 10$
	<p>d.</p> <p>Solution</p> $(2x + 9)(2x - 9)$	<p>e.</p> <p>Solution</p> $4x^2 + 2x - 6$	<p>f.</p> <p>Solution</p> $x^2 - 8x - 105$
4	Factorise the given expressions by grouping.		
	<p>a.</p> $(2y - 3)(2x + 3x^2)$	<p>b.</p> $(b + 2)(5a - 3)$	<p>c.</p> $(6x - 5y)(x - 2)$
5	Factorise the given trinomials.		
	<p>a. $x^2 + 5x - 14 = (x - 2)(x + 7)$</p>		
	<p>b. $x^2 + 8x + 7 = (x + 1)(x + 7)$</p>		
	<p>c. $x^2 - 2x - 15 = (x + 3)(x - 5)$</p>		
	<p>d. $x^2 + x - 42 = (x - 6)(x + 7)$</p>		



6 Simplify the following fraction.

a.

$$\frac{2(x+3)}{3}$$

b.

$$\frac{2(2x+7)}{3(x+5)}$$

c.

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

7 Simplify the following fraction.

a.

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

Apply the fraction rule: $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$

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

Cancel the common factor: $x+5$

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

Factor the number: $4 = 2 \cdot 2$

$$= \frac{x \cdot 2}{2 \cdot 2(x-1) \cdot 3}$$

Cancel the common factor: 2

$$= \frac{x}{2(x-1) \cdot 3}$$

Multiply the numbers: $2 \cdot 3 = 6$

$$= \frac{x}{6(x-1)}$$

c.

$$\frac{4x^2-16}{2(x+4)} \cdot \frac{4}{5(x-4)}$$

Cancel $\frac{4x^2-16}{2(x+4)}$: $\frac{2(x+2)(x-2)}{x+4}$

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

Apply the fraction rule: $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$

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

Multiply the numbers: $2 \cdot 4 = 8$

$$= \frac{8(x+2)(x-2)}{(x+4) \cdot 5(x-4)}$$

$$= \frac{8(x+2)(x-2)}{5(x+4)(x-4)}$$



b.

$$\frac{\frac{2x-8}{3x^2+15x}}{\frac{x-4}{4(x+5)}}$$

Apply the fraction rule: $\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \cdot d}{b \cdot c}$

$$= \frac{(2x-8) \cdot 4(x+5)}{(3x^2+15x)(x-4)}$$

Cancel $\frac{(2x-8) \cdot 4(x+5)}{(3x^2+15x)(x-4)}$: $\frac{8}{3x}$

$$= \frac{8}{3x}$$

d.

$$\frac{\frac{x^2+4x+3}{x-6}}{\frac{2(x+1)(x-2)}{x^2-8x+12}}$$

Apply the fraction rule: $\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \cdot d}{b \cdot c}$

$$= \frac{(x^2+4x+3)(x^2-8x+12)}{(x-6) \cdot 2(x+1)(x-2)}$$

Cancel $\frac{(x^2+4x+3)(x^2-8x+12)}{(x-6) \cdot 2(x+1)(x-2)}$: $\frac{x+3}{2}$

$$= \frac{x+3}{2}$$



8

a.

$$\frac{x}{5} + \frac{2x}{4} = 7$$

Cancel $\frac{2x}{4}$: $\frac{x}{2}$

$$\frac{x}{5} + \frac{x}{2} = 7$$

Multiply by LCM

$$7x = 70$$

Divide both sides by 7

$$x = 10$$

c.

$$\frac{7}{x-3} + \frac{6}{x+4} = 0$$

Multiply by LCM

$$13x + 10 = 0$$

Move 10 to the right side

$$13x = -10$$

Divide both sides by 13

$$x = -\frac{10}{13}$$

Verify Solutions

Find undefined (singularity) points: $x = 3, x = -4$

Combine undefined points with solutions:

$$x = -\frac{10}{13}$$



b.

$$\frac{x+5}{3} - \frac{2x-1}{2} = \frac{29}{6}$$

Multiply by LCM

$$2(x+5) - 3(2x-1) = 29$$

Expand $2(x+5) - 3(2x-1)$: $-4x + 13$

$$-4x + 13 = 29$$

Move 13 to the right side

$$-4x = 16$$

Divide both sides by -4

$$x = -4$$

d.

$$\frac{4}{x-7} + \frac{5x}{(x-7)^2} = 0$$

Multiply by LCM

$$9x - 28 = 0$$

Move 28 to the right side

$$9x = 28$$

Divide both sides by 9

$$x = \frac{28}{9}$$

Verify Solutions

Find undefined (singularity) points: $x = 7$

Combine undefined points with solutions:

$$x = \frac{28}{9}$$