# Chapter 6 review

## Sections labeled at the start of the related problems

**6.1    Simplify by removing a factor equal to 1.**

1) $\dfrac{2y^6}{6y^{12}}$

**Simplify by removing a factor equal to 1.**

2) $\dfrac{10x - 5}{25}$

3) $\dfrac{3x + 2}{6x^2 + 19x + 10}$

4) $\dfrac{m^2 - 9m}{9 - m}$

5) $\dfrac{x^3 - 125}{x^2 + 5x + 25}$

**Write in simplified form and list all restrictions on the domain.**

6) $f(x) = \dfrac{x^2 + 7x + 6}{x^2 - 4x - 5}$

**Multiply and simplify.**

7) $\dfrac{7p - 7}{p} \cdot \dfrac{5p^2}{8p - 8}$

8) $\dfrac{k^2 + 9k + 20}{k^2 + 11k + 28} \cdot \dfrac{k^2 + 7k}{k^2 + 13k + 40}$

**Divide and simplify.**

9) $\dfrac{5x - 15}{x} \div \dfrac{x - 3}{x^3}$

10) $\dfrac{y^3 - 10y}{y^2 - 100} \div \dfrac{y^2 - 14y + 45}{y^2 + 5y - 50}$

**Perform the indicated operations and, if possible, simplify. Recall that multiplications and divisions are performed in order from left to right.**

11) $\dfrac{3x^2 - 4x - 4}{y^2 + 2y - 3} \cdot \dfrac{y^2 + 3y - 4}{9x^2 + 9x + 2} \div \dfrac{3x^2 - 5x - 2}{6x^2 - 7x - 3}$

12) $\dfrac{r^2 - s^2}{(r - s)^2} \div \dfrac{r^2 - 2rs + s^2}{r^2 - rs + s^2} \cdot \dfrac{(r - s)^4}{r^3 + s^3}$

**Perform the indicated operation and simplify.**

13) $\dfrac{x + 4y}{x + y} + \dfrac{2x - y}{x + y}$

14) $\dfrac{2x + 5}{x^2 + 7x + 10} - \dfrac{x + 3}{x^2 + 7x + 10}$

**Find the simplified form for f(x) and list all restrictions on the domain.**

15) $f(x) = \dfrac{4x - 1}{x^2 + 2x - 24} - \dfrac{x - 1}{x^2 - 1}$

**Perform the indicated operation and simplify.**

16) $\dfrac{6x}{x^2 - 16} - \dfrac{x}{x - 4}$

17) $\dfrac{2}{y^2 - 3y + 2} + \dfrac{5}{y^2 - 1}$

18) $\dfrac{4x + 5}{x^2 + 2x - 48} - \dfrac{x + 1}{x^2 - 64}$

**Perform the indicated operation.**

19) $\dfrac{x}{2x - 3y} - \dfrac{y}{3y - 2x}$

**Perform the indicated operations and simplify.**

20) $\dfrac{8}{4 - 5x} - \dfrac{2}{5x - 4} + \dfrac{x - 4}{5x^2 + 16x - 16}$

**Simplify.**

21) $\dfrac{4 + \dfrac{2}{x}}{\dfrac{x}{4} + \dfrac{1}{8}}$

22) $\dfrac{m^{-1} + z^{-1}}{m^{-1} - z^{-1}}$

23) $\dfrac{x^{-2} - 4y^{-2}}{8y - 16x}$

24) $\dfrac{\dfrac{25s^2 - 49t^2}{s\,t}}{\dfrac{5}{t} - \dfrac{7}{s}}$

25) $\dfrac{\dfrac{2}{x - 2} + \dfrac{5}{x + 5}}{\dfrac{5}{x + 5} - \dfrac{2}{x - 5}}$

26) $\dfrac{\dfrac{x}{x^2 + 7x + 10} + \dfrac{5}{x^2 + 7x + 10}}{\dfrac{x}{x^2 + 5x + 6} - \dfrac{6}{x^2 + 5x + 6}}$

**Solve.**

27) $\dfrac{4}{x} + \dfrac{5}{6} = 1$

28) $\dfrac{2}{t} = \dfrac{t}{5t - 12}$

29) $\dfrac{6}{x - 8} + \dfrac{6}{x} = \dfrac{-48}{x^2 - 8x}$

30) $\dfrac{x}{2x + 2} = \dfrac{-2x}{4x + 4} + \dfrac{2x - 3}{x + 1}$

**Find all values of a for which f(a) is the indicated value.**

31) $f(x) = \dfrac{x - 1}{x - 8}$; $f(a) = \dfrac{1}{5}$

**For the pair of functions f and g, find all values of a for which f(a) = g(a).**

32) $f(x) = \dfrac{x + 3}{110x}$,

$g(x) = \dfrac{1}{x^2 + 2x}$

**Solve.**

33) The sum of a number and its reciprocal is –2. Find the number.

34) One maid can clean the house three times faster than another. Working together they can clean the entire house in 3 hours. How long would it take the faster maid cleaning alone?

35) Frank can type a report in 4 hours and James takes 5 hours. How long will it take the two of them typing together?

36) Jeff takes 5 hr longer to build a fence than it takes Bill. When they work together, it takes them 6 hours. How long would it take Bill to do the job alone?

37) A loaded moving truck is traveling 20 mph faster than a freight train. In the time it takes the train to travel 90 miles, the truck travels 150 miles. Find the speed of the truck.

38) The speed of a stream is 5 mph. If a boat travels 48 miles downstream in the same time that it takes to travel 24 miles upstream, what is the speed of the boat in still water?

39) A jet plane traveling at a constant speed goes 1200 miles with the wind, then turns around and travels for 1000 miles against the wind. If the speed of the wind is 50 mph and the total flight took 4 hours, find the speed of the plane in still air.

**Divide.**

40) $(15x^5y^4 - 12x^2y^2 - 9x^3y) \div (-3x^2y)$

41) $(x^2 + 13x + 31) \div (x + 9)$

42) $(x^2 - 10x + 16) \div (x - 8)$

43) $(25y^4 + 10y^3 + 2y - 1) \div (5y^2 + 1)$

**Find a simplified expression for F(x) if F(x) = (f/g)(x).**
44) $f(x) = 20x^2 - 46x - 10$, $g(x) = 5x + 1$

**Solve the formula for the specified letter.**
45) $A = \dfrac{1}{2}h(B + b)$  for b

46) $P = \dfrac{A}{1 + rt}$  for r

47) $\dfrac{1}{a} + \dfrac{1}{b} = \dfrac{1}{c}$  for c

**Solve the problem.**
48) The formula

$$A = \frac{2Tt + Qq}{2T + Q}$$

gives a student's average A after T tests and Q quizzes, where each test counts as 2 quizzes, t is the test average and q is the quiz average. Solve for T.

A) $T = \dfrac{Qq - QA}{2A - 2t}$

B) $T = \dfrac{2At + QA - Qq}{2t}$

C) $T = \dfrac{2t + Qq - QA}{2A}$

D) $T = \dfrac{Qq - A}{2A - 2t}$

1) $\dfrac{1}{3y^6}$

2) $\dfrac{2x-1}{5}$

3) $\dfrac{1}{2x+5}$

4) $-m$

5) $x-5$

6) $f(x) = \dfrac{x+6}{x-5}, \ x \neq -1, 5$

7) $\dfrac{35p}{8}$

8) $\dfrac{k}{k+8}$

9) $5x^2$

10) $\dfrac{y(y^2-10)}{(y-10)(y-9)}$

11) $\dfrac{(y+4)(2x+3)}{(y+3)(3x-1)}$

12) $r-s$

13) $3$

14) $\dfrac{1}{x+5}$

15) $f(x) = \dfrac{3x^2+1x+23}{(x-4)(x+1)(x+6)}, \ x \neq -6, -1, 1, 4$

16) $\dfrac{-x^2+2x}{x^2-16}$

17) $\dfrac{7y-8}{(y-1)(y+1)(y-2)}$

18) $\dfrac{3x^2-22x-34}{(x+8)(x-8)(x-6)}$

19) $\dfrac{x+y}{2x-3y}$

20) $\dfrac{-9x-44}{(5x-4)(x+4)}$

21) $\dfrac{16}{x}$

22) $\dfrac{z+m}{z-m}$

23) $\dfrac{y+2x}{8x^2y^2}$

24) $5s+7t$

25) $\dfrac{7x(x + 5)}{3x^2 - 41x + 70}$

26) $\dfrac{x + 3}{x - 6}$

27) 24

28) 4, 6

29) No solution

30) 3

31) $-\dfrac{3}{4}$

32) 8, −13

33) −1

34) 4 hr

35) $\dfrac{20}{9}$ hr

36) 10 hours

37) 50 mph

38) 15 mph

39) 550 mph

40) $-5x^3y^3 + 4y + 3x$

41) $x + 4 - \dfrac{5}{x + 9}$

42) $x - 2$

43) $5y^2 + 2y - 1$

44) $4x - 10$

45) $b = \dfrac{2A - Bh}{h}$

46) $r = \dfrac{A - P}{Pt}$

47) $c = \dfrac{ab}{a + b}$

48) A