MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find all numbers not in the domain of the function.

1) $f(x) = \dfrac{3}{x + 8}$

1) _____

    A) 8   B) None   C) –8   D) 0

2) $f(x) = \dfrac{x - 6}{8}$

2) _____

    A) None   B) –6   C) 6   D) 0

3) $f(x) = \dfrac{x^2 - 16}{x^2 + 2x - 48}$

3) _____

    A) 0   B) –8, 6   C) 8, –6   D) 4, –4

4) $h(x) = \dfrac{7x}{-4x^2 + 144}$

4) _____

    A) –6, 0, 6   B) 0   C) –6, 6   D) –6

Find all numbers that are not in the domain of the function. Then give the domain using set notation.

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

5) _____

    A) $-\dfrac{3}{2}, -1; \left\{ x \mid x \neq -\dfrac{3}{2}, -1 \right\}$ B) $\dfrac{3}{2}; \left\{ x \mid x \neq \dfrac{3}{2} \right\}$

    C) $-\dfrac{3}{2}; \left\{ x \mid x \neq -\dfrac{3}{2} \right\}$ D) none; $(-\infty, \infty)$

6) $f(x) = \dfrac{6}{x^2 + 11x + 28}$

6) _____

    A) 0; $\{x \mid x \neq 0\}$ B) 0, –7; $\{x \mid x \neq 0, -7\}$

    C) –7, –4; $\{x \mid x \neq -7, -4\}$ D) 4, 7; $\{x \mid x \neq 4, 7\}$

7) $f(x) = \dfrac{15x^2 - 2x + 1}{225x^2 - 49}$

7) _____

    A) $\dfrac{15}{7}, \dfrac{15}{7}; \left\{ x \mid x \neq \dfrac{15}{7}, -\dfrac{15}{7} \right\}$ B) $\dfrac{49}{225}, \dfrac{49}{225}; \left\{ x \mid x \neq \dfrac{49}{225}, -\dfrac{49}{225} \right\}$

    C) $\dfrac{7}{15}, \dfrac{7}{15}; \left\{ x \mid x \neq \dfrac{7}{15}, -\dfrac{7}{15} \right\}$ D) $\dfrac{7}{15}; \left\{ x \mid x \neq \dfrac{7}{15} \right\}$

8) $f(x) = \dfrac{x - 1}{x^2 + 5}$

8) _____

    A) 1; $\{x \mid x \neq 1\}$ B) –5, 5; $\{x \mid x \neq -5, 5\}$

    C) none; $(-\infty, \infty)$ D) –5; $\{x \mid x \neq -5\}$

9) $f(x) = \dfrac{x - 6}{4}$

    A) 6; $\{x \mid x \neq 6\}$ B) none; $(-\infty, \infty)$ C) 4; $\{x \mid x \neq 4\}$ D) 0; $\{x \mid x \neq 0\}$

9) _____

Express the rational expression in lowest terms.

10) $\dfrac{40m^2p^2}{8m^8p}$

    A) $5mp$ B) $5m^6p^2$ C) $\dfrac{5p}{m^6}$ D) $\dfrac{5m^6}{p}$

10) _____

11) $\dfrac{y^2 + 2y - 8}{y^2 + 8y + 16}$

    A) $\dfrac{2y + 8}{8y - 8}$ B) $-\dfrac{y^2 + 2y - 8}{y^2 + 8y + 16}$ C) $\dfrac{2y - 8}{8y + 16}$ D) $\dfrac{y - 2}{y + 4}$

11) _____

12) $\dfrac{2x + 2}{10x^2 + 16x + 6}$

    A) $\dfrac{2x + 5}{5x + 16}$ B) $\dfrac{2x}{5x + 3}$ C) $\dfrac{1}{5x + 3}$ D) $\dfrac{2x + 2}{10x^2 + 16x + 6}$

12) _____

13) $\dfrac{3x - 3y - bx + by}{3x - 3y + bx - by}$

    A) –1   B) 1

    C) Already in lowest terms   D) $\dfrac{3 - b}{3 + b}$

13) _____

14) $\dfrac{ab + 3a - 2b - 6}{bc - 4b + 3c - 12}$

    A) $\dfrac{a - 2}{c - 4}$ B) $\dfrac{a - 2}{c + 4}$ C) $\dfrac{b - 3}{c + 4}$ D) $\dfrac{a + 2}{c - 4}$

14) _____

Write the rational expression in lowest terms.

15) $\dfrac{4k - 28}{42 - 6k}$

    A) $\dfrac{2}{3}$ B) –1   C) $-\dfrac{2}{3}$ D) 1

15) _____

16) $\dfrac{m^2 + n^2}{m^2 - n^2}$

    A) $\dfrac{m - n}{m + n}$ B) $\dfrac{m + n}{m + n}$

    C) $\dfrac{m + n}{m - n}$ D) Already in lowest terms

16) _____

Perform the indicated operation and express in lowest terms.

17) $\dfrac{(x-1)(x+4)}{(x+8)(x-1)} \cdot \dfrac{(x-9)(x+8)}{(x+4)(x+5)}$

17) _____

    A) $\dfrac{x+9}{x-5}$ B) $-\dfrac{x-9}{x+5}$ C) $\dfrac{x+4}{x-1}$ D) $\dfrac{x-9}{x+5}$

18) $\dfrac{k^2+13k+36}{k^2+17k+72} \cdot \dfrac{k^2+8k}{k^2-3k-28}$

18) _____

    A) $\dfrac{k}{k-7}$ B) $\dfrac{k}{k^2+17k+72}$ C) $\dfrac{k^2+8k}{k-7}$ D) $\dfrac{1}{k-7}$

19) $\dfrac{5p-5}{p} \div \dfrac{9p-9}{2p^2}$

19) _____

    A) $\dfrac{10p}{9}$ B) $\dfrac{9}{10p}$

    C) $\dfrac{45p^2+90p+45}{2p^3}$ D) $\dfrac{10p^3-10p^2}{9p^2-9p}$

20) $\dfrac{z^2+6z+8}{z^2+9z+20} \div \dfrac{z^2+2z}{z^2+3z-10}$

20) _____

    A) $\dfrac{z}{z^2+9z+20}$ B) $z-2$ C) $\dfrac{z-2}{z^2+5z}$ D) $\dfrac{z-2}{z}$

21) $\dfrac{2k^2+21kp+27p^2}{9k^2-33kp+28p^2} \div \dfrac{6k^2+17kp+12p^2}{9k^2-16p^2}$

21) _____

    A) $\dfrac{k+p}{3k+7p}$ B) -1 C) $\dfrac{k+9p}{3k-7p}$ D) $\dfrac{k+10p}{2k-3p}$

Tell whether or not the rational expressions are equivalent.

22) $\dfrac{x^2(x+1)}{x(x-1)}, \dfrac{x(x+1)}{x-1}$

22) _____

    A) No   B) Yes

23) $\dfrac{2m+2}{m^2-1}, \dfrac{2}{m-1}$

23) _____

    A) No   B) Yes

Assume that the expressions given are the denominators of fractions. Find the least common denominator.

24) $6a-48, a^2-8a$

24) _____

    A) $6a^2-48$ B) $6a(a-8)$ C) $6a^2-8$ D) $6a-8$

25) $50x^5y, 90x^4y^3, 45x^2y^4$

25) _____

    A) $450x^5y^4$ B) $90x^5y$ C) $150x^5y^4$ D) $225x^{20}y^{12}$

26) $x^2 + 3x - 10$, $5x - 10$

    A) $5(x - 5)(x + 2)$ B) $5(x - 5)(x - 2)$ C) $5(x + 5)(x - 2)$ D) $5(x + 5)(x + 2)$

26) _____

27) $q + r$, $q - r$, $q^2 - r^2$

    A) $q(q - r)$ B) $(q + r)^2(q - r)^2$ C) $r(q + r)$ D) $(q + r)(q - r)$

27) _____

28) $3y + 30$, $y^2 - 100$, y

    A) $3y(y + 10)(y - 10)$ B) $30y(y + 10)^2(y - 10)$

    C) $y(y + 10)(y - 10)$ D) $30y(y^2 + 10)(y^2 - 10)$

28) _____

Perform the indicated operation and express in lowest terms.

29) $\dfrac{9}{r} + \dfrac{9}{r - 6}$

    A) $\dfrac{18r - 54}{r(6 - r)}$ B) $\dfrac{54r - 18}{r(r - 6)}$ C) $\dfrac{54r - 18}{r(6 - r)}$ D) $\dfrac{18r - 54}{r(r - 6)}$

29) _____

30) $\dfrac{2}{y^2 - 3y + 2} + \dfrac{6}{y^2 - 1}$

    A) $\dfrac{8y - 10}{(y - 1)(y - 2)}$ B) $\dfrac{8y - 10}{(y - 1)(y + 1)(y - 2)}$

    C) $\dfrac{10y - 8}{(y - 1)(y + 1)(y - 2)}$ D) $\dfrac{24y - 10}{(y - 1)(y + 1)(y - 2)}$

30) _____

31) $\dfrac{x}{x^2 - 16} - \dfrac{7}{x^2 + 5x + 4}$

    A) $\dfrac{x^2 + 6x + 28}{(x - 4)(x + 4)(x + 1)}$ B) $\dfrac{x^2 - 6x + 28}{(x - 4)(x + 4)(x + 1)}$

    C) $\dfrac{x^2 - 6}{(x - 4)(x + 4)(x + 1)}$ D) $\dfrac{x^2 - 6x + 28}{(x - 4)(x + 4)}$

31) _____

32) $\dfrac{3}{14x} + \dfrac{9}{10x^2}$

    A) $\dfrac{108}{70x^2}$ B) $\dfrac{12}{14x + 10x^2}$ C) $\dfrac{3(5x + 21)}{70x^2}$ D) $\dfrac{12}{140x^2}$

32) _____

33) $\dfrac{2}{15x} - \dfrac{4}{21x^2}$

    A) $-\dfrac{2}{315x^2}$ B) $\dfrac{-8}{105x^2}$ C) $\dfrac{2(7x - 10)}{105x^2}$ D) $\dfrac{-2}{15x + 21x^2}$

33) _____

34) $\dfrac{1}{9x^5y^2} - \dfrac{11}{3xy}$

    A) $\dfrac{1 - 33x^4y}{9x^5y^2}$ B) $\dfrac{6 - 33x^6}{9x^5y}$ C) $\dfrac{1 - 33x}{9x^5y^2}$ D) $\dfrac{8 - 33x^5y}{9x^6y^3}$

34) _____

35) $\dfrac{2}{3x - 18} + \dfrac{1}{6x + 42}$

    A) $\dfrac{5x + 22}{(3x - 6)(2x + 7)}$ B) $\dfrac{3x + 34}{6(x - 6)(x + 7)}$ C) $\dfrac{5x + 22}{6(x - 6)(x + 7)}$ D) $\dfrac{-3x - 34}{(3x - 6)(2x + 7)}$

35) _____

36) $\dfrac{7}{x - 7} - \dfrac{8}{7 - x}$

    A) -1 B) $\dfrac{17}{x - 7}$ C) $\dfrac{-1}{x + 7}$ D) $\dfrac{15}{x - 7}$

36) _____

37) $\dfrac{1}{9x - 3} + \dfrac{8}{3 - 9x}$

    A) $\dfrac{-7}{9x - 3}$ B) $\dfrac{9}{9x - 3}$ C) $\dfrac{-9}{9x - 3}$ D) $\dfrac{7}{9x - 3}$

37) _____

38) $\dfrac{9}{5x - 5} - \dfrac{2}{5 - 5x}$

    A) $\dfrac{7}{5x - 5}$ B) $\dfrac{11}{5x - 5}$ C) $\dfrac{-7}{5x - 5}$ D) $\dfrac{-11}{5x - 5}$

38) _____

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

    A) $\dfrac{-5}{m - n^2}$ B) $\dfrac{36}{m - n^2}$ C) $\dfrac{5}{m - n^2}$ D) $\dfrac{13}{m - n^2}$

39) _____

40) $\dfrac{x}{x - 4} + \dfrac{8}{x + 4} - \dfrac{32}{x^2 - 16}$

    A) 1 B) $\dfrac{x - 16}{x - 4}$ C) $\dfrac{x + 16}{x^2 - 16}$ D) $\dfrac{x + 16}{x + 4}$

40) _____

41) $\dfrac{2ab}{a^2 - b^2} - \dfrac{b}{a - b} + \dfrac{6}{2}$

    A) $\dfrac{2ab - b + 3}{a + b + 1}$ B) $\dfrac{3a + 4b}{a + b}$

    C) $\dfrac{3a + 4b}{a^2 - b^2}$ D) $\dfrac{(a - b)(3a + 4b)}{a^2 - b^2}$

41) _____

Simplify the complex fraction.

42) $\dfrac{\dfrac{x}{3}}{\dfrac{7}{x + 4}}$

    A) $\dfrac{x(x + 4)}{21}$ B) $\dfrac{7x}{3(x + 4)}$ C) $\dfrac{x + 4}{21x}$ D) $21x(x + 4)$

42) _____

43) $\dfrac{9 + \dfrac{3}{x}}{\dfrac{x}{4} + \dfrac{1}{12}}$

43) _____

    A) $\dfrac{x}{36}$ B) 36   C) 1   D) $\dfrac{36}{x}$

44) $\dfrac{\dfrac{1}{k + 2}}{\dfrac{3}{k^2 - 4}}$

44) _____

    A) $k - 2$ B) $\dfrac{3}{k - 2}$ C) $\dfrac{k - 2}{3}$ D) $\dfrac{k + 2}{3}$

45) $\dfrac{1 - \dfrac{5}{x}}{1 + \dfrac{5}{x}}$

45) _____

    A) -1 B) $\dfrac{x - 5}{x + 5}$ C) $-\dfrac{2}{3}$ D) $\dfrac{5 - x}{5 + x}$

46) $\dfrac{\dfrac{64p^2 - 25q^2}{pq}}{\dfrac{8}{q} - \dfrac{5}{p}}$

46) _____

    A) $5p + 8q$ B) $8p + 5q$ C) $\dfrac{5p + 8q}{pq}$ D) $\dfrac{pq}{8p + 5q}$

47) $\dfrac{\dfrac{4}{3r - 1} - 4}{\dfrac{4}{3r - 1} + 4}$

47) _____

    A) $\dfrac{2 + 3r}{3r}$ B) $\dfrac{2 - 3r}{3r}$ C) $\dfrac{2 - r}{r}$ D) $\dfrac{3r}{2 - 3r}$

48) $\dfrac{\dfrac{-2}{x + 2} + \dfrac{5}{x + 5}}{\dfrac{5}{x + 5} - \dfrac{-2}{x + 4}}$

48) _____

    A) $\dfrac{3x^2 + 12x}{3x^2 - 13x + 60}$ B) $\dfrac{-(x + 4)}{x + 2}$ C) $\dfrac{3x^2 - 32x + 80}{3x^2 - 36x + 60}$ D) $\dfrac{3x^2 + 12x}{7x^2 + 44x + 60}$

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

49) _____

    A) $\dfrac{z + m}{z}$ B) $\dfrac{z + m}{m}$ C) $\dfrac{z - m}{z}$ D) $\dfrac{z + m}{z - m}$

50) $\dfrac{x^{-2}}{x^{-2} - y^{-2}}$

50) _____

    A) $\dfrac{y}{y^2 - x^2}$ B) $\dfrac{y^2 - x^2}{y^2}$ C) $\dfrac{y^2}{y^2 - x^2}$ D) $\dfrac{y^2}{y^2 + x^2}$

51) $\dfrac{mn^{-1} - nm^{-1}}{m^2 - n^2}$

51) _____

    A) $\dfrac{1}{m+n}$ B) m+n   C) $\dfrac{1}{mn}$ D) mn

Without actually solving the equation, list all possible numbers that would have to be rejected if they appeared as potential solutions. Then give the domain using set notation.

52) $\dfrac{2}{x - 12} - \dfrac{10}{x + 16} = 0$

52) _____

    A) 12, –16; {x|x ≠ 12, –16}   B) –12, 16; {x|x ≠ –12, 16}
    C) 12, –16, 2, 10; {x|x ≠ 12, –16, 2, 10}   D) –12, 16, –2, –10; {x|x ≠ –12, 16, –2, –10}

53) $\dfrac{3}{10x + 11} - \dfrac{1}{x} = \dfrac{1}{8x - 11}$

53) _____

    A) $0, -\dfrac{11}{10}, \dfrac{11}{8}, 3; \left\{ x \middle| x \neq 0, -\dfrac{11}{10}, \dfrac{11}{8}, 3 \right\}$ B) $0, -\dfrac{11}{10}, \dfrac{11}{8}; \left\{ x \middle| x \neq 0, -\dfrac{11}{10}, \dfrac{11}{8} \right\}$

    C) $-\dfrac{11}{10}, \dfrac{11}{8}, -3; \left\{ x \middle| x \neq -\dfrac{11}{10}, \dfrac{11}{8}, -3 \right\}$ D) $-\dfrac{11}{10}, \dfrac{11}{8}; \left\{ x \middle| x \neq -\dfrac{11}{10}, \dfrac{11}{8} \right\}$

54) $\dfrac{x - 13}{x - 4} + \dfrac{19x - 1}{x - 12} = \dfrac{x}{x - 3}$

54) _____

    A) $4, 12, 3, 13, \dfrac{1}{19}; \left\{ x \middle| x \neq 4, 12, 3, 13, \dfrac{1}{19} \right\}$ B) 4, 12, 3; {x|x ≠ 4, 12, 3}

    C) none; $(-\infty, \infty)$ D) –4, –12, –3; {x|x ≠ –4, –12, –3}

Solve the equation.

55) $1 + \dfrac{1}{x} = \dfrac{20}{x^2}$

55) _____

    A) {4, 5}   B) $\left\{ -\dfrac{1}{5}, \dfrac{1}{4} \right\}$ C) {–4, 5}   D) {–5, 4}

56) $\dfrac{1}{y + 2} - \dfrac{3}{y - 2} = \dfrac{2}{y^2 - 4}$

56) _____

    A) {–5}   B) {5}   C) {10}   D) $\{\sqrt{5}\}$

57) $\dfrac{-5}{m-3} - \dfrac{5}{m+3} = \dfrac{10}{m^2 - 9}$

     A) { 1 }   B) { 10 }   C) { –1 }   D) { $\sqrt{26}$ }

57) _____

58) $\dfrac{2y+3}{y} = \dfrac{3}{2}$

     A) {0}   B) {–6}   C) {$\sqrt{2}$}   D) {6}

58) _____

59) $1 - \dfrac{3}{2x} = \dfrac{7}{4}$

     A) {2}   B) {–2}   C) $\left\{ -\dfrac{1}{2} \right\}$ D) $\left\{ \dfrac{1}{2} \right\}$

59) _____

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

     A) {–3}   B) $\left\{ \dfrac{3}{2} \right\}$ C) $\left\{ -\dfrac{12}{5} \right\}$ D) {3}

60) _____

61) $\dfrac{5}{5x} + \dfrac{1}{2x} = -\dfrac{1}{10}$

     A) $\varnothing$ B) {–16}   C) {–15}   D) {15}

61) _____

62) $\dfrac{4x-5}{2x+1} = \dfrac{2x-1}{x+5}$

     A) $\left\{ \dfrac{28}{15} \right\}$ B) $\left\{ -\dfrac{26}{15} \right\}$ C) $\varnothing$ D) $\left\{ \dfrac{8}{5} \right\}$

62) _____

63) $\dfrac{2}{t} = \dfrac{t}{-3t-4}$

     A) {–2, –4}   B) $\left\{ 0, \dfrac{4}{3} \right\}$ C) {0, 16}   D) $\varnothing$

63) _____

64) $\dfrac{6}{x-6} = 1 + \dfrac{8}{x+6}$

     A) {10, –12}   B) $\varnothing$ C) {–8, 12}   D) {–10, 12}

64) _____

65) $\dfrac{-2r-69}{r^2-25} = \dfrac{-2r^2-15r+6}{r^2-25} + \dfrac{2r+3}{r-5}$

     A) { r | r is a real number }   B) $\varnothing$

     C) { r | r ≠ –5, r ≠ 5 }   D) $\left\{ -5, 5, -\dfrac{2}{69}, \dfrac{3}{2} \right\}$

65) _____

66) $\dfrac{5}{x-7} + \dfrac{3}{x} = \dfrac{-21}{x^2-7x}$

     A) { –7}   B) { 0 }   C) { 0, 7}   D) $\varnothing$

66) _____

Solve the problem.

67) The resistance, in ohms, of a 25–foot piece of wire is given by the function $R(d) = \dfrac{0.025}{d^2}$, where d is   67) _____

the diameter of the wire in inches. What is the resistance, rounded to the nearest hundredth of an ohm, if the wire has a diameter of 0.02 inches?

   A) 62.50 ohms   B) 68.17 ohms   C) 62.16 ohms   D) 62.62 ohms

68) The resistance, in ohms, of a 25 foot piece of wire is given by the function $R(d) = \dfrac{0.025}{d^2}$, where d is   68) _____

the diameter of the wire in inches. What happens to the resistance of the wire as the diameter of the wire decreases?

   A) The answer cannot be determined without additional information.
   B) The resistance remains constant.
   C) The resistance decreases.
   D) The resistance increases.

69) The distance of an object from a fulcrum is given by $d = \dfrac{DW}{w}$. Find D if d = 4, w = 9, and W = 6.   69) _____

   A) 0.375   B) 6   C) 13.5   D) 0.074

70) The formula $s = \dfrac{a(1 - r^6)}{1 - r}$ gives the sum of the first six terms of a geometric series. Find a if   70) _____

$s = \dfrac{63}{2048}$ and $r = \dfrac{1}{2}$.

   A) $\dfrac{1}{32}$ B) $\dfrac{1}{64}$ C) $\dfrac{1}{128}$ D) $\dfrac{11}{128}$

71) A formula for electric circuits is $\dfrac{1}{a} = \dfrac{1}{b} + \dfrac{1}{c}$. If a = 15 and b = 19, find c.   71) _____

   A) 3.158   B) 5.067   C) 71.250   D) 0.014

72) A formula for electric circuits is $\dfrac{1}{a} = \dfrac{1}{b} + \dfrac{1}{c}$. If c = 19 and b = 8, find a.   72) _____

   A) 5.630   B) 64.125   C) 11.368   D) 0.178

Solve the formula for the specified variable.

73) $P = \dfrac{A}{1 + rt}$ for r   73) _____

   A) $r = \dfrac{P - 1}{At}$ B) $r = P - tA$ C) $r = \dfrac{P - A}{1 + t}$ D) $r = \dfrac{A - P}{Pt}$

74) $F = \dfrac{9}{5}C + 32$ for C   74) _____

   A) $C = \dfrac{9}{5}(F - 32)$ B) $C = \dfrac{F - 32}{9}$ C) $C = \dfrac{5}{9}(F - 32)$ D) $C = \dfrac{5}{F - 32}$

75) $S = 2\pi rh + 2\pi r^2$ for h   75) _____

   A) $h = hS - r$ B) $h = 2\pi(S - r)$ C) $h = \dfrac{S}{2\pi r} - 1$ D) $h = \dfrac{S - 2\pi r^2}{2\pi r}$

76) $A = \dfrac{1}{2}h(B + b)$ for b   76) _____

   A) $b = \dfrac{A - Bh}{h}$ B) $b = \dfrac{2A - Bh}{h}$ C) $b = \dfrac{2A + Bh}{h}$ D) $b = 2A - Bh$

Solve the problem.

77) Dr. Wong can see 11 patients in 2 hours. At this rate, how long would it take her to see 44 patients?   77) _____
   A) 8 hours   B) 22 hours   C) 7 hours   D) 242 hours

78) Martha can rake the leaves in her yard in 2 hours. Her younger brother can do the job in 6 hours.   78) _____
   How long will it take them to do the job if they work together?

   A) $\dfrac{3}{2}$ hr   B) $\dfrac{2}{3}$ hr   C) 6 hr   D) 3 hr

Answer the question.

79) Choose the equivalent form of the given formula for area of a regular polygon: 79) _____

   $A = \dfrac{1}{2}nsa.$

   A) $s = \dfrac{2n}{aA}$ B) $S = \dfrac{nA}{2a}$ C) $a = \dfrac{ns}{2A}$ D) $a = \dfrac{2A}{ns}$

Determine whether the equation represents direct, inverse, joint, or combined variation.

80) $y = \dfrac{7}{x}$ 80) _____

   A) Direct   B) Inverse   C) Combined   D) Joint

Solve the problem.

81) If m varies directly as p, and m = 35 when p = 5, find m when p is 6.   81) _____
   A) 42   B) 36   C) 25   D) 49

82) If s varies directly as t^2, and s = 192 when t = 8, find s when t is 4.   82) _____
   A) 32   B) 48   C) 96   D) 24

83) If x varies inversely as v, and x = 35 when v = 3, find x when v = 15.   83) _____
   A) 7   B) 9   C) 5   D) 21

84) If f varies jointly as q^2 and h, and f = 24 when q = 2 and h = 2, find f when q = 3 and h = 4.   84) _____
   A) 108   B) 27   C) 36   D) 12

85) If f varies jointly as q^2 and h, and f = 96 when q = 4 and h = 3, find q when f = 48 and h = 6.   85) _____
   A) 4   B) 2   C) 6   D) 3

86) If f varies jointly as q^2 and h, and f = 100 when q = 5 and h = 2, find h when f = 96 and q = 4.　　86) _____
    A) 4　　　　　　　　　B) 5　　　　　　　　　C) 3　　　　　　　　　D) 2

87) If f varies jointly as q^2 and h, and f = –96 when q = 4 and h = 2, find f when q = 2 and h = 5.　　87) _____
    A) –30　　　　　　　　B) –15　　　　　　　　C) –12　　　　　　　　D) –60

88) One maid can clean the house three times faster than another. Working together they can clean the　　88) _____
entire house in 3 hours. How long would it take the faster maid cleaning alone?

    A) 5 hr　　　　　　　　B) 3 hr　　　　　　　　C) 4 hr　　　　　　　　D) $\frac{3}{4}$ hr

89) Frank can type a report in 3 hours and James takes 7 hours. How long will it take the two of them　　89) _____
typing together?

    A) 7 hr　　　　　　　B) $\frac{21}{4}$ hr　　　　　　　C) $\frac{21}{10}$ hr　　　　　　　D) $\frac{10}{21}$ hr

90) An experienced accountant can balance the books twice as fast as a new accountant. Working　　90) _____
together it takes the accountants 4 hours. How long would it take the experienced accountant
working alone?
    A) 8 hr　　　　　　　　B) 10 hr　　　　　　　C) 2 hr　　　　　　　　D) 6 hr

91) Maria and Charlie can deliver 60 papers in 4 hours. How long would it take them to deliver 39　　91) _____
papers?
    A) 6.2 hours　　　　　　B) 156 hours　　　　　C) 3.3 hours　　　　　D) 2.6 hours

92) Sven can type 45 words per minute. How many words would he type in $\frac{3}{4}$ hour (45 minutes)?　　92) _____

    A) 60 words　　　　　　B) 34 words　　　　　C) 2025 words　　　　　D) 1519 words

93) A machine can fill 5055 boxes of cereal in 0.6 hour. How many boxes of cereal can it fill per hour?　　93) _____
    A) 3033 boxes　　　　　B) 5056 boxes　　　　　C) 8425 boxes　　　　　D) 7221 boxes

94) The weight of a liquid varies directly as its volume V. If the weight of the liquid in a cubical　　94) _____
container 5 cm on a side is 250 g, find the weight of the liquid in a cubical container 3 cm on a side.
    A) 12 g　　　　　　　　B) 6 g　　　　　　　　C) 27 g　　　　　　　　D) 54 g

95) The distance it takes to stop a car varies directly as the square of the speed of the car. If it takes 112　　95) _____
feet for a car traveling at 40 miles per hour to stop, what distance is required for a speed of
65 miles per hour?
    A) 308.05 ft　　　　　　B) 295.75 ft　　　　　C) 296.09 ft　　　　　D) 253.5 ft

96) The volume of wood in a tree varies jointly as the height of the tree and the square of the distance　　96) _____
around the tree trunk. If the volume of wood is 15.84 cubic feet when the height is 22 feet and the
distance around the trunk is 3 feet, what is the volume of wood obtained from a tree that is 32 feet
tall having a measurement of 4 feet around the trunk?
    A) 44.96 ft^3　　　　　B) 49.96 ft^3　　　　　C) 40.96 ft^3　　　　　D) 32.96 ft^3

Determine whether the equation represents direct, inverse, joint, or combined variation.

97) $y = 4x^5$ 97) _____

    A) Joint   B) Direct   C) Inverse   D) Combined

98) $y = 2x^2z^2$ 98) _____

    A) Joint   B) Direct   C) Combined   D) Inverse

99) $y = \dfrac{5x}{st}$ 99) _____

    A) Combined   B) Direct   C) Inverse   D) Joint
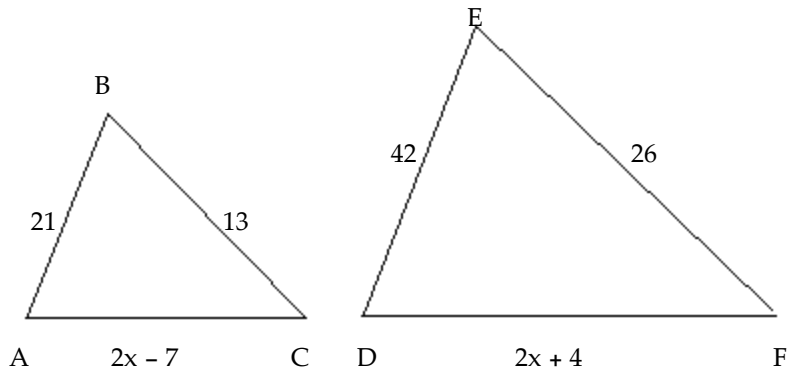
Suppose the triangles shown are similar with angle A = angle D, angle B = angle E, and angle C = angle F. Answer the question.

100)   100) _____

What is the value of x?

    A) 13   B) 21   C) 9   D) 34