8.1 p481

(1) $\frac{5}{2x}$, $2x \neq 0$, $\frac{2x}{2} \neq \frac{0}{2}$

$\boxed{x \neq 0}$

(3) $\frac{x}{x-8}$, $x-8=0$

$\boxed{x=8}$

(5) $\frac{13}{5x-20}$, $5x-20=0$

$5x=20$

$\boxed{x=4}$

(7) $\frac{x+3}{(x+9)(x-2)}$

$x+9=0$ and $x-2=0$

$\boxed{x=-9 \text{ and } x=2}$

(9) $\frac{4x}{(3x-17)(x+3)}$

$3x-17=0$ and $x+3=0$

$3x=17$ and $x=-3$

$\boxed{x=\frac{17}{3}}$

(11) $\frac{x+5}{x^2+x-12}$

$x^2+x-12=0$

$(x+4)(x-3)=0$

$x+4=0$ and $x-3=0$

$\boxed{x=-4 \text{ and } x=3}$

(13) $\frac{x+5}{5}$

$5 \neq 0$

Hence defined for all Real Numbers

(15) $\frac{y+3}{4y^2+y-3}$

$4y^2+y-3=0$

$(4y-3)(y+1)=0$

$4y-3=0$ and $y+1=0$

$4y=3$ and $y=-1$

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

$\boxed{y=\frac{3}{4}}$

(17) $\frac{y+5}{y^2-25}$

$y^2-25=0$

$y^2=25$

$y=\pm\sqrt{25}$

$y=\pm 5$

$\boxed{y=-5 \text{ and } y=5}$

(19) $\frac{5}{x^2+1}$

$x^2+1=0$

$x^2=-1$

$x=\pm\sqrt{-1}$

$\boxed{\text{Defined for all real } \neq 5}$

(21) $\frac{14x^2}{7x}$

$=\frac{2 \cdot 7 x}{7x}$

$=\boxed{2}$

(23) $\frac{5x-15}{25}$

$=\frac{5(x-3)}{5 \cdot 5}$

$=\boxed{\frac{x-3}{5}}$

8.1 p487

(25) $\frac{3x-9}{6x} = \frac{3(x-3)}{3(3x)}$

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

(27) $\frac{3}{3x-9} = \frac{3\cdot 1}{3(x-3)}$

$= \boxed{\frac{1}{x-3}}$

(29) $\frac{-15}{3x-9} = \frac{3(-5)}{3(x-3)}$

$= \boxed{\frac{-5}{x-3}}$

(31) $\frac{3x+9}{x+3} = \frac{3(x+3)}{1\cdot(x+3)}$

$= \boxed{3}$

(33) $\frac{x+5}{x^2-25} = \frac{(x+5)\cdot 1}{(x+5)(x-5)}$

$= \boxed{\frac{1}{x-5}}$

(35) $\frac{2y-10}{3y-15} = \frac{2(y-5)}{3(y-5)}$

$= \boxed{\frac{2}{3}}$

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

$= \boxed{\frac{1}{x-3}}$

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

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

(41) $\frac{y^2-3y+2}{y^2+7y-18} = \frac{(y-2)(y-1)}{(y+9)(y-2)}$

$= \boxed{\frac{y-1}{y+9}}$

8.1 p484

(43) $\dfrac{2y^2 - 7y + 3}{2y^2 - 5y + 2}$

$= \dfrac{(2y-1)(y-3)}{(2y-1)(y-2)}$

$= \boxed{\dfrac{y-3}{y-2}}$

(45) $\dfrac{2x+3}{2x+5}$ Already Simplified

(47) $\dfrac{x^2 + 12x + 36}{x^2 - 36}$

$= \dfrac{(x+6)(x+6)}{(x-6)(x+6)}$

$= \boxed{\dfrac{x+6}{x-6}}$

(49) $\dfrac{x^3 - 2x^2 + x - 2}{x - 2}$

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

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

$= \boxed{x^2 + 1}$

(51) $\dfrac{x^3 - 8}{x - 2}$

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

$= \boxed{x^2 + 2x + 4}$

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

$= \dfrac{(x-4)(x-4)}{(x-4)(x+4)}$

$= \boxed{\dfrac{x-4}{x+4}}$

8.1 p481

(55) $\frac{x}{x+1}$

already simplified

(57) $\frac{x+4}{x^2+16}$

already simplified

(59) $\frac{x-5}{5-x}$

$= \frac{1(x-5)}{-1(x+5)}$

$= \boxed{-1}$

(61) $\frac{2x-3}{3-2x}$

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

$= -1$

(63) $\frac{x-5}{x+5}$

Already Simplified

(65) $\frac{4x-6}{3-2x}$

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

$= \boxed{-2}$

(67) $\frac{4-6x}{3x^2-2x}$

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

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

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

(69) $\frac{x^2-1}{1-x}$

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

$= -(x+1)$

$= \boxed{-x-1}$

(71) $\frac{y^2-y-12}{4-y}$

$= \frac{(y-4)(y+3)}{-1(y-4)}$

$= \frac{y+3}{-1}$

$= -1(y+3)$

$= \boxed{-y-3}$

8.1 p402

(73) $$\frac{x^2y - x^2}{x^3 - x^3y}$$

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

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

$$= \boxed{\frac{1}{x}}$$

(75) $$\frac{x^2 + 2xy - 3y^2}{2x^2 + 5xy - 3y^2}$$

$$= \frac{(x-y)(x+3y)}{(2x-y)(x+3y)}$$

$$= \boxed{\frac{x-y}{2x-y}}$$

(77) $$\frac{x^2 - 9x + 18}{x^3 - 27}$$

$$= \frac{(x-6)(x-3)}{(x-3)(x^2+3x+9)}$$

$$= \boxed{\frac{x-6}{x^2+3x+9}}$$

(85) $$\frac{130x}{100-x}$$

a) $$\frac{130(40)}{100-40} \doteq 86.67$$

Costs about \$86.67 million to inoculate 40% of the population

$$\frac{130(80)}{100-80} = 520$$

Costs about \$520 million to inoculate 80% of the population

$$\frac{130(90)}{100-90} = 1170$$

Costs about \$1170 million to inoculate 90% of the population.

b) $$\frac{130x}{100-x}, \quad 100 - x = 0$$

$$+x \qquad +x$$

$$\boxed{100 = x}$$

c) The cost continues rising as $x \to 100$, the cost approach infinity, hence no amount of money could inoculate entire population