

Accelerated Geom/Alg 2
Rational Functions Review

Name key
Date 0 Period

1. For the given function, $f(x) = \frac{2x+1}{(x+2)(x+3)}$, state the following:

Vertical Asymptote: $x = -2, x = -3$ Domain: $\mathbb{R}, x \neq -2, -3$

Horizontal Asymptote: $y = 0$ Range: \mathbb{R}

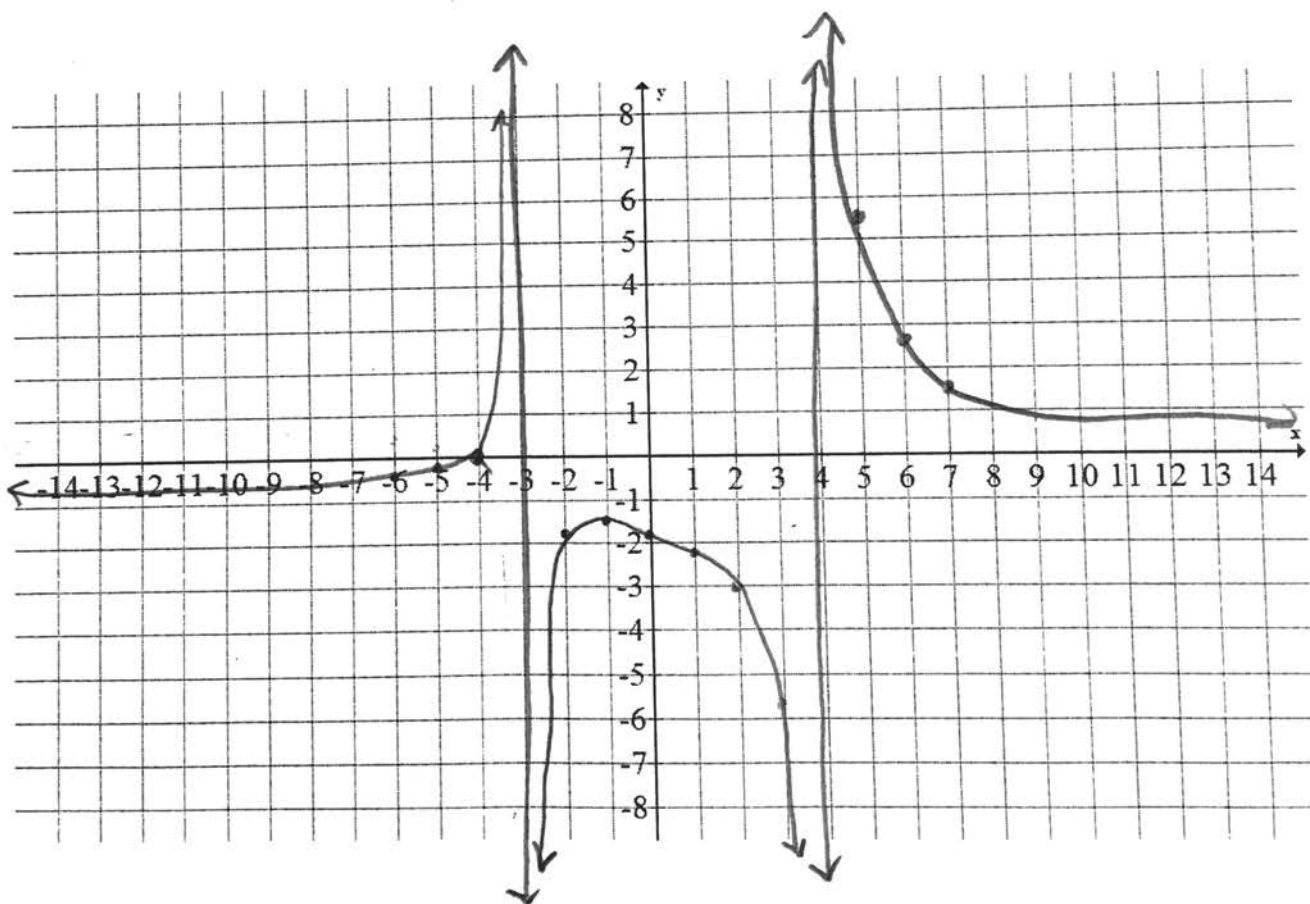
Zeros: $(-\frac{1}{2}, 0)$ y-intercept: $(0, \frac{1}{6})$

2. For the function $h(x) = \frac{5(x+4)}{(x-4)(x+3)}$, graph and state the following:

Vertical Asymptote: $x = 4, x = -3$ Domain: $\mathbb{R}, x \neq 4, -3$

Horizontal Asymptote: $y = 0$ Range: \mathbb{R}

Zeros: $(-4, 0)$ y-int: $(0, -\frac{5}{3})$



x	y	(3)	x	y	(4)	x	y
-4	0		-2	-1.667		5	5.625
-5	-0.2778		0	-1.667		6	2.778
-6	-0.333		2	-3		7	1.833

$$\textcircled{3} \frac{12x^2y}{5y^2} \cdot \frac{2xy}{3x^2}$$

$$\frac{24x^3y^2}{15x^2y^2}$$

$$\boxed{\frac{8x}{5}}$$

$$\textcircled{4} \frac{x-11}{2(x+5)} \cdot \frac{x+5}{(x-11)(x+3)} \cdot \frac{x+3}{x^2}$$

$$\boxed{\frac{1}{2x^2}}$$

$$\textcircled{5} \frac{(x+5)(x-4)}{x+1} \cdot \frac{2}{3} \frac{16(x+1)}{3x(x-4)} \cdot \frac{11(x+4)}{8(x+5)}$$

$$\boxed{\frac{2(x+4)}{3x}}$$

$$\textcircled{6} \frac{x}{(x-6)(x+5)} - \frac{1}{x+5}$$

$$\frac{x}{(x-6)(x+5)} + \frac{-1(x-6)}{(x-6)(x+5)}$$

$$\frac{x-x+6}{(x-6)(x+5)}$$

$$\boxed{\frac{6}{(x-6)(x+5)}}$$

$$\textcircled{7} \frac{2x}{x+2} - \frac{8}{x(x+2)} + \frac{3}{x}$$

$$\frac{2x(x)}{x(x+2)} + \frac{-8}{x(x+2)} + \frac{3(x+2)}{x(x+2)}$$

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

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

$$\frac{(2x-1)(x+2)}{x(x+2)}$$

$$\boxed{\frac{2x-1}{x}}$$

$$\textcircled{8} \frac{\frac{2}{4(x+3)}}{\frac{4}{2(x+3)} + \frac{1}{x+3}} \rightarrow \frac{\frac{2}{4(x+3)}}{\frac{4+2}{2(x+3)}} \rightarrow \frac{2}{4(x+3)} \div \frac{6}{2(x+3)} \rightarrow \frac{2}{4(x+3)} \cdot \frac{2(x+3)}{6} \rightarrow \boxed{\frac{1}{6}}$$

$$\textcircled{9} \frac{(x-6)(x-2)}{(x+5)(x-2)} \rightarrow \boxed{\frac{(x-6)}{(x+5)}}$$

$$\textcircled{10} \frac{(x-5)(x^2+5x+25)}{(x+5)(x-5)} \rightarrow \boxed{\frac{x^2+5x+25}{x+5}}$$

$$\textcircled{11} \frac{81x^{11}y^7}{36x^5y^5} \rightarrow \boxed{\frac{9x^6y^2}{4}}$$

$$\textcircled{12} \frac{5(y^2-4)}{25y^2} \cdot \frac{(y+6)(y+4)}{(y+4)(y+2)} \rightarrow \frac{5(y-2)(y+2)(y+6)}{5 \cdot 25y^2(y+2)} \rightarrow \boxed{\frac{(y-2)(y+6)}{5y^2}}$$

$$\textcircled{13} \frac{(x-2)(x-1)}{x+2} \cdot \frac{3x}{x-2} \cdot \frac{2(x+2)}{5x(x-1)} \rightarrow \boxed{\frac{6}{5}}$$

$$\textcircled{14} \frac{x}{x-1} + \frac{5}{x-1} \rightarrow \boxed{\frac{x+5}{x-1}}$$

$$\textcircled{15} \frac{2x^2}{x-2} - \frac{4x}{x-2} \rightarrow \frac{2x^2-4x}{x-2} \rightarrow \frac{2x(x-2)}{x-2} \rightarrow \boxed{2x}$$

$$\textcircled{16} \frac{4x}{(x-2)(x+2)} - \frac{3}{x-2} \rightarrow \frac{4x}{(x-2)(x+2)} + \frac{-3(x+2)}{(x-2)(x+2)} \rightarrow \frac{4x-3x-6}{(x-2)(x+2)} \rightarrow \boxed{\frac{x-6}{(x-2)(x+2)}}$$

$$\textcircled{17} \frac{x}{(x+2)(x-1)} + \frac{1}{x+2} \rightarrow \frac{x}{(x+2)(x-1)} + \frac{1(x-1)}{(x+2)(x-1)} \rightarrow \frac{x+x-1}{(x+2)(x-1)} \rightarrow \boxed{\frac{2x-1}{(x+2)(x-1)}}$$

$$\textcircled{18} \frac{\frac{10}{x+1}}{\frac{1}{2} + \frac{3}{x+1}} \rightarrow \frac{\frac{10}{x+1}}{\frac{1(x+1)+3(2)}{2(x+1)}} \rightarrow \frac{10}{x+1} \div \frac{x+7}{2(x+1)} \rightarrow \frac{10}{x+1} \cdot \frac{2(x+1)}{x+7} \rightarrow \boxed{\frac{20}{x+7}}$$

$$\textcircled{19} \frac{\frac{2}{x-3} + \frac{-3}{(x-3)(x+3)}}{\frac{1}{6(x-3)}} \rightarrow \frac{\frac{2(x+3)-3}{(x-3)(x+3)}}{\frac{1}{6(x-3)}} \rightarrow \frac{2x+3}{(x-3)(x+3)} \div \frac{1}{6(x-3)} \rightarrow$$

$$\frac{2x+3}{(x-3)(x+3)} \cdot \frac{6(x-3)}{1} \rightarrow \boxed{\frac{6(2x+3)}{x+3}}$$

$$\textcircled{20} \frac{2z}{5} = \frac{z^2 - 5z}{5z}$$

$$\begin{aligned} 2z^2 &= z^2 - 5z \\ z^2 + 5z &= 0 \\ z(z+5) &= 0 \\ \underline{z=0} \quad \underline{z+5=0} \\ \underline{z=-5} \end{aligned}$$

$$\boxed{z=-5}$$

$$\textcircled{21} x - \frac{24}{x} = 5$$

$$\begin{aligned} x^2 - 24 &= 5x \\ x^2 - 5x - 24 &= 0 \\ (x-8)(x+3) &= 0 \\ \boxed{x=8} \quad \boxed{x=-3} \end{aligned}$$

$$\textcircled{22} \frac{3}{x+1} + \frac{x-2}{3} = \frac{13}{3(x+1)}$$

$$\begin{aligned} 3(3) + (x-2)(x+1) &= 13 \\ 9 + x^2 - x - 2 &= 13 \\ x^2 - x - 6 &= 0 \\ (x-3)(x+2) &= 0 \\ \boxed{x=3} \quad \boxed{x=-2} \end{aligned}$$

$$\textcircled{23} \quad \frac{5x}{x-1} - 3 = \frac{2x+5}{(x-1)(x+1)}$$

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

$$5x^2 + 5x - 3(x^2 - 1) - 2x - 5 = 0$$

$$5x^2 + 5x - 3x^2 + 3 - 2x - 5 = 0$$

$$2x^2 + 3x - 2 = 0$$

$$(2x-1)(x+2) = 0$$

$$\textcircled{x = \frac{1}{2}} \quad \textcircled{x = -2}$$

$$\textcircled{24} \quad \frac{2x+3}{x-6} + \frac{2(5x+11)}{(2x-5)(x-6)} = \frac{-2}{2x-5}$$

$$(2x+3)(2x-5) + 2(5x+11) = -2(x-6)$$

$$4x^2 - 4x - 15 + 10x + 22 = -2x + 12$$

$$4x^2 + 6x + 7 + 2x - 12 = 0$$

$$4x^2 + 8x - 5 = 0$$

$$(2x-1)(2x+5) = 0$$

$$\textcircled{x = \frac{1}{2}} \quad \textcircled{x = -\frac{5}{2}}$$

5. For the function. $h(x) = \frac{x(x+3)}{x^2-x-6}$ graph and state the following:

Vertical Asymptote: $x=3, x=-2$

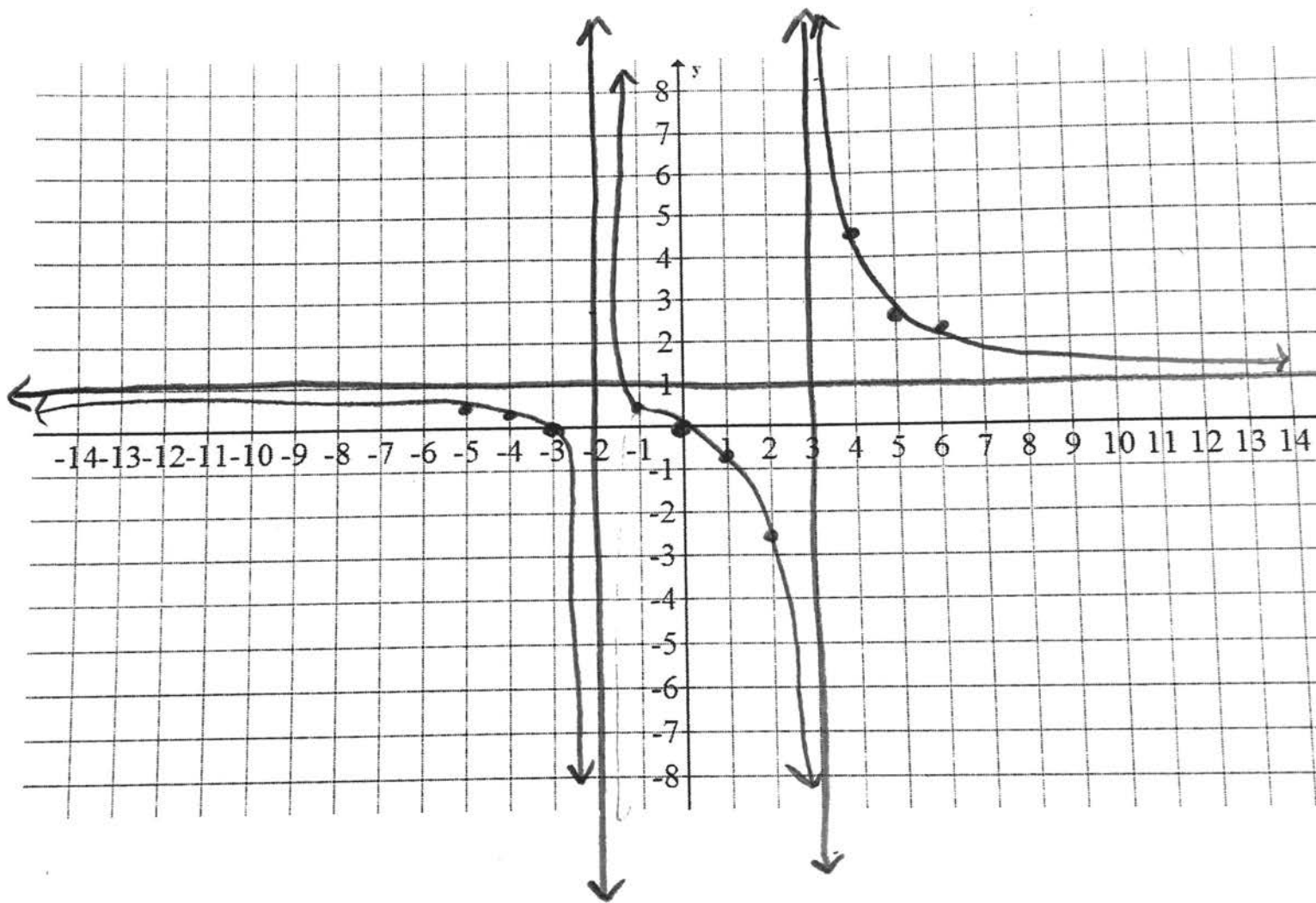
Domain: $\mathbb{R}, x \neq 3, -2$

Horizontal Asymptote: $y=1$

Range: \mathbb{R}

Zeros: $(0,0), (-3,0)$

y-int: $(0,0)$



x	y	(2)
-3	0	
-4	.28571	
-5	.41667	

x	y	(3)
-1	.5	
1	-.667	
2	-2.5	

x	y
4	4.667
5	2.8571
6	2.25

26. For the function. $h(x) = \frac{(x-3)(x+2)}{x^2-x-6}$ graph and state the following:
 $(x-1)(x+1)$

Vertical Asymptote: $x=1, x=-1$

Zeros: $(3, 0), (-2, 0)$

Horizontal Asymptote: $y=1$

y-int: $(0, 6)$

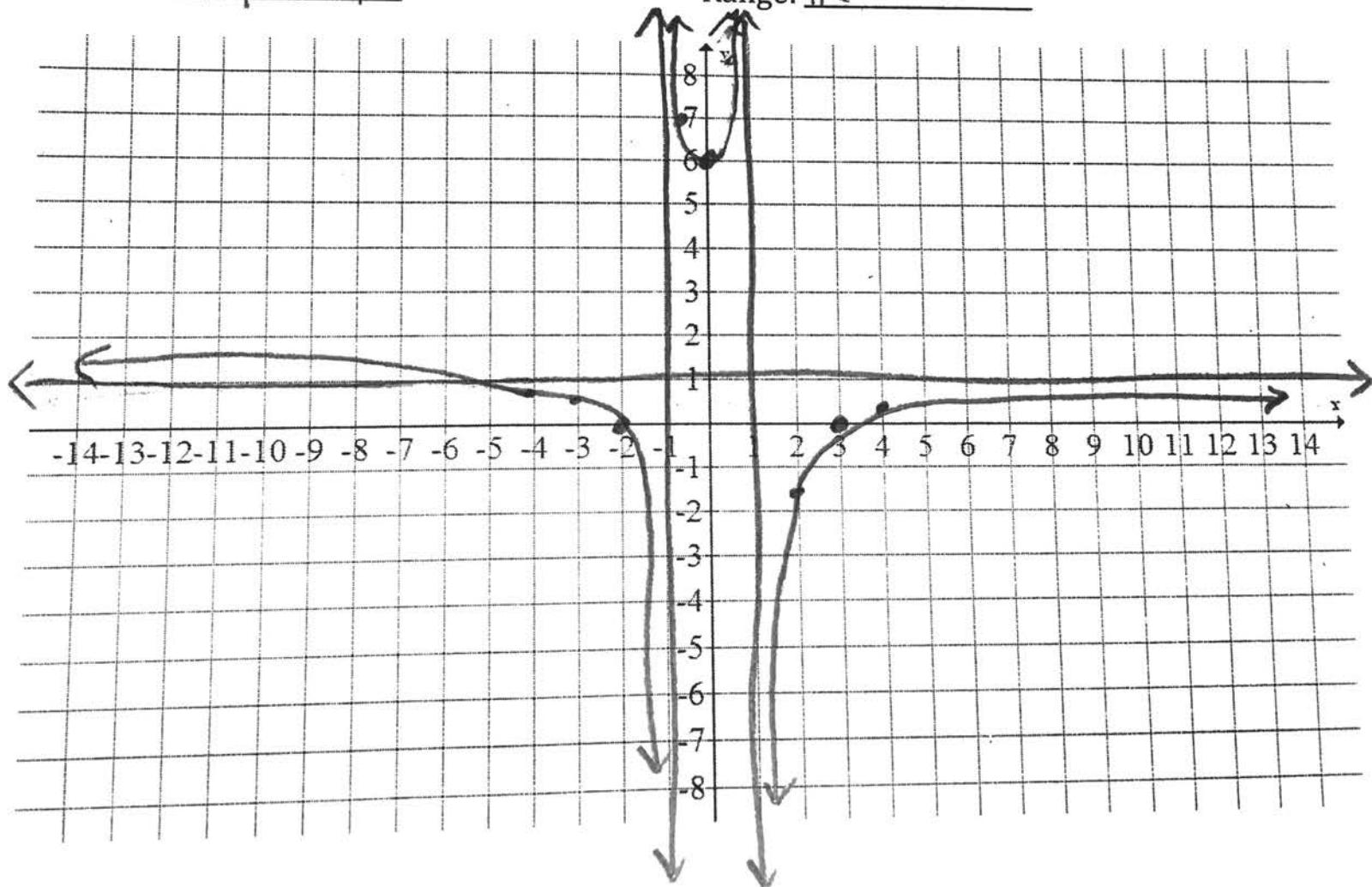
Domain: $\mathbb{R}, x \neq 1, -1$

Range: \mathbb{R}

x	y
-2	0
-3	.75
-4	.933

x	y
-.5	7
0	6
.5	8.333

x	y
2	-7.333
3	0
4	.4



... hours to clean the garage than her sister Betsy. When they both work

$$\textcircled{27} \frac{6}{x} + \frac{6}{2x} = 1$$

$$\begin{aligned} \text{Betsy} &= x \\ \text{Ansley} &= 2x \end{aligned}$$

$$6(2) + 6 = 2x$$

$$12 + 6 = 2x$$

$$18 = 2x$$

$$\textcircled{9 = x}$$

Betsy takes 9 hrs.

$$\textcircled{28} \frac{2}{6} + \frac{2}{x} = 1$$

$$2x + 2(6) = 6x$$

$$2x + 12 = 6x$$

$$12 = 4x$$

$$3 = x$$

Betty will take 3 hrs.

$$\textcircled{29} \frac{1}{3} = \frac{1}{x-1} + \frac{1}{\frac{2x+2}{2(x+1)}}$$

$$2(x-1)(x+1) = 6(x+1) + 3(x-1)$$

$$2(x^2 - 1) = 6x + 6 + 3x - 3$$

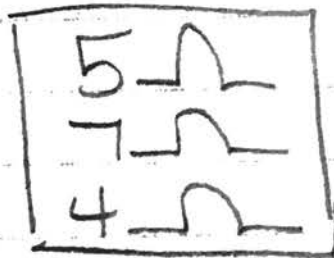
$$2x^2 - 2 = 9x + 3$$

$$2x^2 - 9x - 5 = 0$$

$$(2x+1)(x-5) = 0$$

$$\underline{x = -\frac{1}{2}} \quad \underline{x = 5}$$

$$\textcircled{x = 5}$$



$$(30) \quad \frac{1}{2} = \frac{1}{x+1} + \frac{1}{3x}$$

$$3x(x+1) = 2(3x) + 2(x+1)$$

$$3x^2 + 3x = 6x + 2x + 2$$

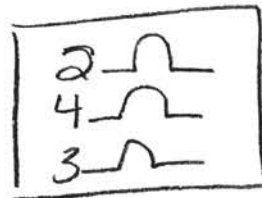
$$3x^2 + 3x = 8x + 2$$

$$3x^2 - 5x - 2 = 0$$

$$(3x+1)(x-2) = 0$$

$$\underline{x = -\frac{1}{3}} \quad \underline{x = 2}$$

$$\textcircled{x=2}$$



$$(31) \quad \frac{1}{4} = \frac{1}{x+1} + \frac{1}{5x}$$

$$5x(x+1) = 4(5x) + 4(x+1)$$

$$5x^2 + 5x = 20x + 4x + 4$$

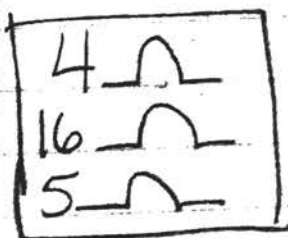
$$5x^2 + 5x = 24x + 4$$

$$5x^2 - 19x - 4 = 0$$

$$(5x+1)(x-4) = 0$$

$$\underline{x = -\frac{1}{5}} \quad \underline{x = 4}$$

$$\textcircled{x=4}$$



$$(32) \quad \frac{1}{5} = \frac{1}{2x+4} + \frac{1}{3x+1}$$

$$2(x+2)$$

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

$$2(3x^2 + 7x + 2) = 15x + 5 + 10x + 20$$

$$6x^2 + 14x + 4 = 25x + 25$$

$$6x^2 - 11x - 21 = 0$$

$$(6x+7)(x-3) = 0$$

$$\underline{x = -\frac{7}{6}} \quad \underline{x = 3}$$

$$\textcircled{x=3}$$

