

LESSON 8-5 Practice C
Solving Rational Equations and Inequalities

Solve each equation.

$$r+2 \cdot \left(\frac{12r}{r+2} \right) = \left(\frac{4}{r+2} - 6 \right) r+2$$

$$r = -4/9$$

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

no solution

$$x^2 \cdot \left(-\frac{6}{x} + 1 \right) = \left(\frac{7}{x^2} \right) x^2$$

$x=7$ and $x=-1$

$$\frac{(d+2)}{(d-2)} \cdot \left(\frac{2}{d+2} + \frac{8}{d-2} \right) = \left(\frac{14}{d^2-4} \right) (d+2)(d-2)$$

$d=1/5$

Solve each inequality by using a graphing calculator and a table.

5. $\left(\frac{x-1}{(x)} \right) < 2$ graph:
 $x < -1$ or $x > 7$

6. $\frac{(3x)}{(x+5)} \leq -4$
 $-5 < x \leq -3$

7. $\frac{(2-x)}{(x+3)} \geq 4$
 $-3 < x \leq -2$

8. $\frac{(x)}{(4-x)} < 3$
 $x < 3$ or $x > 4$

Solve each inequality algebraically.

9. $\frac{(14)}{m} \leq \frac{7}{2}$ $14 \leq 7/2 m$
 $m < 0$ or $m \geq 4$

10. $\frac{(s-5)}{(s-5)} \cdot (3) \leq (s-5)$
 $5 < s < 9$

11. $\frac{(7z)}{(z-4)} \cdot (6) \geq (z-4)$
 $z \leq -24$ or $z \geq 4$

12. $\frac{(x+12)}{(x+12)} \cdot (-5) \leq (x+12)$
 $x < -12$ or $x \geq 15$

Solve.

13. An artist is designing a picture frame whose length, l , and width, w , satisfy the

Golden Ratio, which is $\frac{w}{l} = \frac{l}{l+w}$. If the length of the frame is 24 inches,

what is the width of the frame?

$w = 14.83$ in

$\frac{w}{24} = \frac{24}{24+w}$

$w(24+w) = 24(24)$
 $24w + w^2 = 576$
 -576

14. Team A can wash all the windows in the school in x hours. It takes Team B 3 hours longer to do the same job. If the teams work together, they can complete the job in 8.5 hours. How long does it take Team B to do the job alone?

18.6 hours for Team B.

$w^2 + 24w - 576 = 0$
 $w, w, 4, 4$

$$\frac{4}{r+2} - 6 = \frac{4}{r+2}$$

$$12r = 4 - 6(r+2)$$

$$12r = 4 - 6r - 12$$

$$12r = -6r - 8$$

$$+6r \quad +6r$$

$$\frac{18r}{18} = \frac{-8}{18}$$

$$r = -\frac{4}{9}$$

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

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

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

check

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

$$\frac{16}{0} = \frac{8+8}{0}$$

no solution

$$\frac{-6}{x^2} + 1 = \frac{7}{x^2}$$

$$-6x + x^2 = 7$$

$$-7 \quad -7$$

$$x^2 - 6x - 7 = 0$$

$$(x-7)(x+1) = 0$$

$$x = 7$$

$$x = -1$$

$$\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{(d+2)(d-2)}$$

$$2(d-2) + 8(d+2) = 14$$

$$2d - 4 + 8d + 16 = 14$$

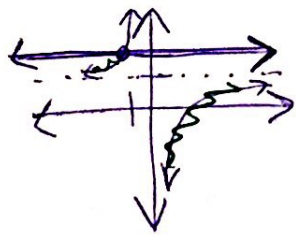
$$10d + 12 = 14$$

$$-12 \quad -12$$

$$\frac{10d}{10} = \frac{2}{10}$$

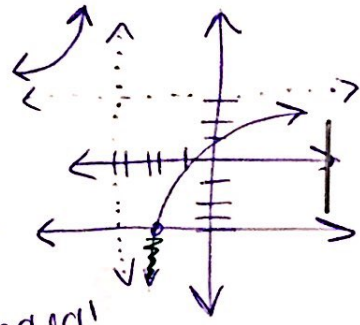
$$d = \frac{1}{5}$$

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



$$x < -1 \text{ OR } x > 0$$

$$\frac{3x}{x+5} \leq -4$$

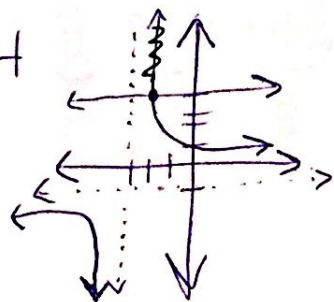


$$-5 < x \leq -2.85$$

rounded!

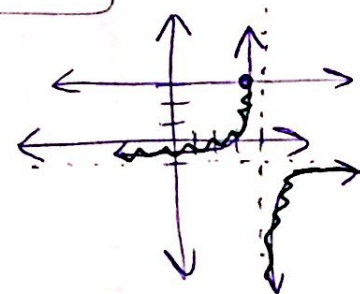
$$\left(-\frac{20}{7}\right)$$

$$\frac{2-x}{x+3} \geq 4$$



$$-3 < x \leq -2$$

$$\frac{x}{4-x} < 3$$



$$x < 4 \text{ OR } x > 7$$

$$x > 4$$

$$\frac{1}{m} \leq \frac{7}{2}$$

$$\frac{14}{7/2} \leq \frac{7}{2} m$$

$$(10) \frac{12}{s-5} > 3$$

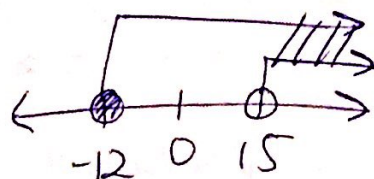
m is pos.	m is neg.
$m > 0$ and $4 \leq m$	$m < 0$ and $4 \geq m$
	$m < 0$
$m \geq 4$ OR $m < 0$	

$(s-5)$ is +	$(s-5)$ is -
$s-5 > 0$ $+5 +5$ $s > 5$	$s < 5$
and	and
$\frac{12}{s-5} > 3$ $12 > 3s-15$ $+15 +15$ $27 > 3s$ $9 > s$	$s > 9$
$5 < s < 9$	no solution

$$(11) \frac{7z}{z-4} \geq 6$$

$(z-4)$ is +	$(z-4)$ is -
$z-4 \geq 0$ $+4 +4$ $z \geq 4$	$z-4 \leq 0$ $+4 +4$ $z \leq 4$
and	and
$7z \geq 6(z-4)$ $7z \geq 6z-24$ $-6z -6z$ $z \geq -24$	$z \leq -24$
$z \geq 4$ OR $z \leq -24$	

$(12) \frac{-9x}{x+12} < (-5)(x+12)$	
$x+12$ is +	$x+12$ is -
$x+12 > 0$ $-12 -12$ $x > -12$	$x < -12$
and	and
$\frac{-9x}{x+12} < -5(x+12)$ $-9x < -5x-60$ $+5x +5x$ $-4x < -60$ $-4 -4$ $x > 15$	$x < 15$
$x > 15$ OR $x < -12$	



$$(x > 15)$$

$$\frac{1}{24} = \frac{24}{24+W}$$

$$W(24+W) = 24(24)$$

$$24W + W^2 = 576$$

$$-576 \quad -576$$

$$W^2 + 24W - 576 = 0$$

$$\frac{-24 \pm \sqrt{24^2 - 4(1)(-576)}}{2(1)} =$$

$$\frac{-24 + 53.7}{2} = \boxed{14.83 \text{ inches}}$$

(14) Team A rate $\frac{1}{x}$

Team B rate $\frac{1}{x+3}$

$$\frac{1}{x}(8.5) + \frac{1}{x+3}(8.5) = 1$$

$$\left(\frac{8.5}{x} + \frac{8.5}{x+3} = 1\right) x(x+3)$$

$$8.5(x+3) + 8.5x = x(x+3)$$

$$8.5x + 25.5 + 8.5x = x^2 + 3x$$

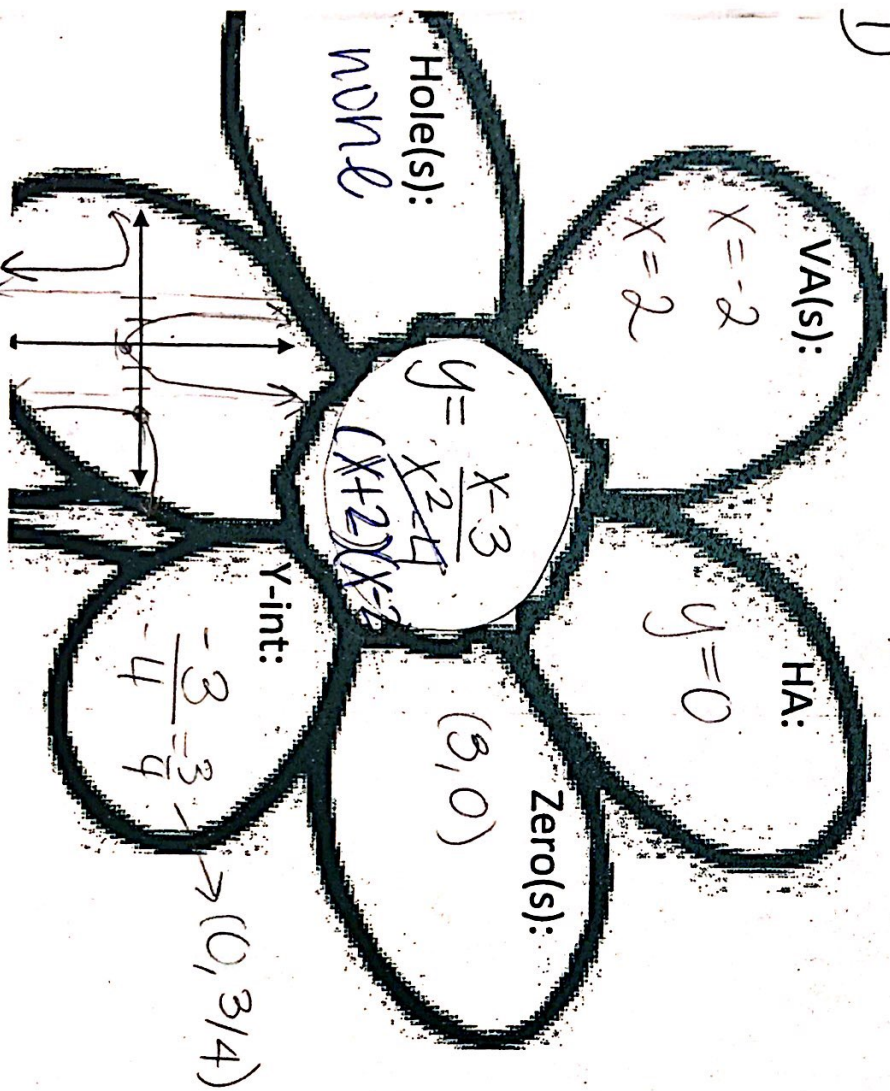
$$\begin{aligned} & \rightarrow 17x + 25.5 = x^2 + 3x \\ & \quad -17x - 25.5 \dots \\ \hline 0 &= x^2 - 14x - 25.5 \\ & \text{Quad. Formula.} \\ & x = 15.6 \text{ hours} \\ & 15.6 + 3 = 18.6 + 12.5 \end{aligned}$$

IDENTIFY THE DOMAIN and range.

D: \mathbb{R} except 2, -2

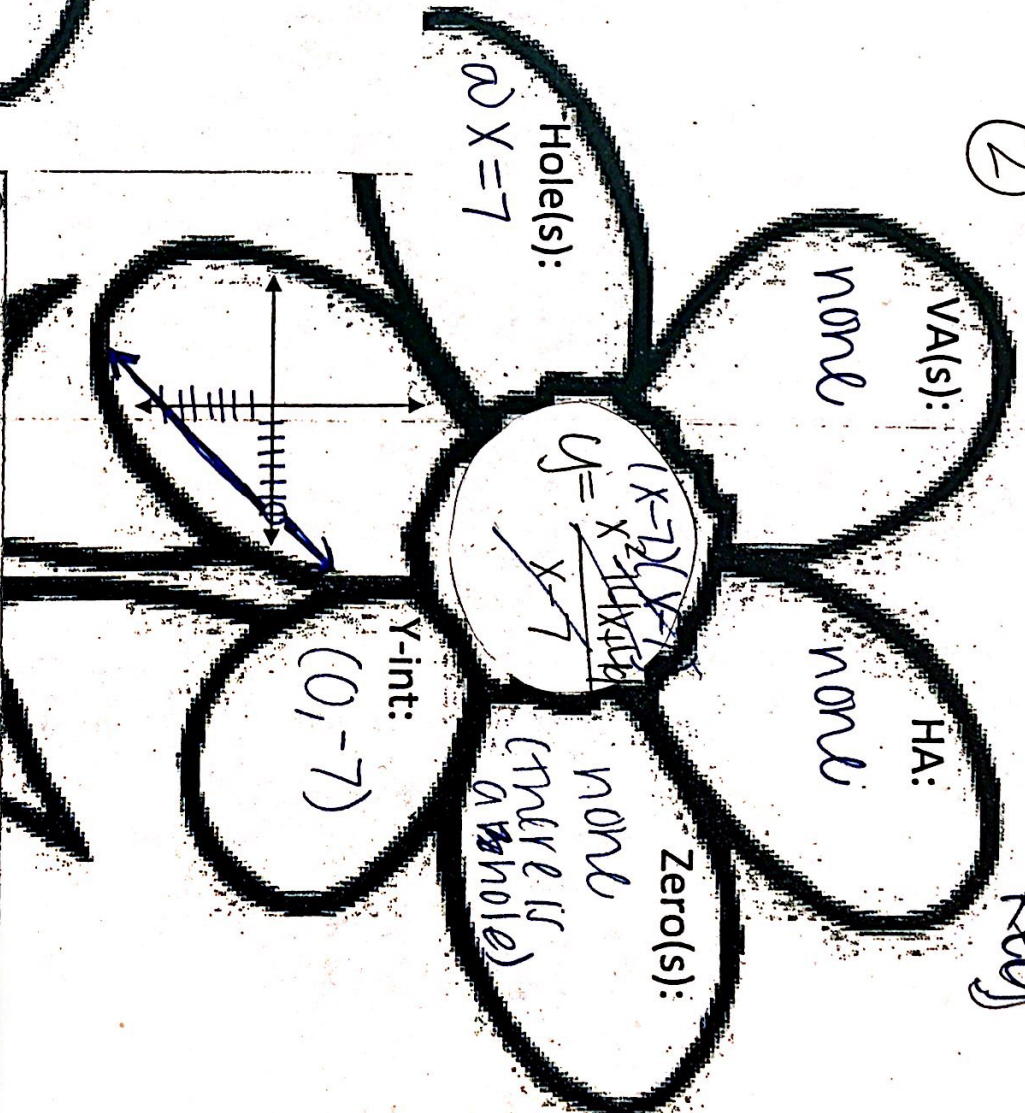
R: \mathbb{R}

1)



2)

KEYS



IDENTIFY THE DOMAIN and range.

D: \mathbb{R} except 7

R: \mathbb{R} except 0
 (look at hole!)