

2015

Math 172-Quiz # 2

Name: _____

Total: 40 Points

1. [12 points] Find the solution set of each equation and state whether the equation is conditional, inconsistent or an identity.

a) $\frac{3y}{5} + \frac{1}{10} - \frac{y-4}{10} = \frac{7}{2}$

$\cancel{10} \left(\frac{3y}{5} \right) + \frac{1}{10} - \cancel{10} \left(\frac{y-4}{10} \right) = \frac{7}{2} \left(\frac{5}{5} \right)$

$6y + 1 - (y-4) = 35$

$6y + 1 - y + 4 = 35$

$5y = 30$

$y = 6$

6
conditional

b) $4(6m - 0.5) = 12(3m - 1) - 10(1.2m - 1)$

$24m - 2 = 36m - 12 - 12m + 10$

$24m - 2 = 24m - 2$

$-2 = -2$

R or $(-\infty, \infty)$
identity

c) $2(13 - 11a) = -4(5a - 6) - 2(3 + a)$

$26 - 22a = -20a + 24 - 6 - 2a$

$26 - 22a = -22a + 18$

$26 = 18$

\emptyset
inconsistent

2. [8 points] Solve for y .

a) $5x + 0.1y = 0.03$

$$\underline{y = 0.3 - 50x}$$

$$50x + y = 0.3$$

$$y = 0.3 - 50x$$

b) $6(y - w) = 8(6w - 3)$

$$\underline{y = 9w - 4}$$

$$6y - 6w = 48w - 24$$

$$6y = 54w - 24$$

$$y = 9w - 4$$

c) $5y - 7ay - a = 0$

$$\underline{y = \frac{a}{5-7a}}$$

$$5y - 7ay = a$$

$$y(5 - 7a) = a$$

$$y = \frac{a}{5-7a}$$

d) $\frac{x}{3} + \frac{1}{y} = \frac{1}{4}$

$$\underline{y = \frac{-12}{4x-3} \text{ or } y = \frac{12}{3-4x}}$$

$$12y\left(\frac{x}{3}\right) + 12y \cdot \frac{1}{y} = \frac{1}{4} \cdot 12y$$

$$4xy + 12 = 3y$$

$$4xy - 3y = -12$$

$$(4x - 3)y = -12$$

$$y = \frac{-12}{4x-3} \text{ or } y = \frac{12}{3-4x}$$

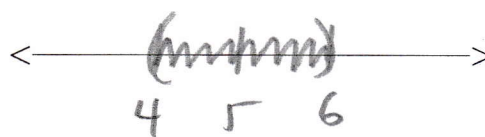
3. [8 points] Solve the following inequalities, state the solution in interval notation and graph it.

a) $-4 < \frac{10-3x}{2} < -1$

$$\begin{aligned} -8 < 10-3x < -2 \\ -18 < -3x < -12 \\ 6 > x > 4 \end{aligned}$$

or $4 < x < 6$

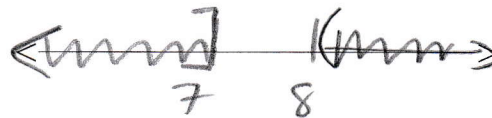
$(4, 6)$



b) $4x-12 \leq 16$ or $3x-10 > 14$

$$\begin{aligned} \swarrow \\ 4x &\leq 28 \\ x &\leq 7 \end{aligned} \qquad \begin{aligned} \downarrow \\ 3x &> 24 \\ x &> 8 \end{aligned}$$

$(-\infty, 7] \cup (8, \infty)$



4. [4 points] Solve the following equations.

a) $4|y+7| - 5 = 11$

$$\begin{aligned} 4|y+7| &= 16 \\ |y+7| &= 4 \\ \swarrow \quad \downarrow \\ y+7 &= 4 \quad y+7 = -4 \quad \textcircled{1} \\ y &= -3 \quad y = -11 \end{aligned}$$

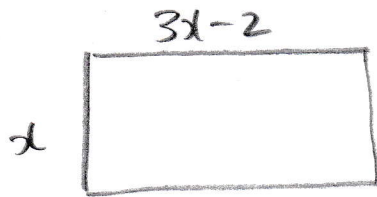
$\{-3, -11\}$ $\textcircled{2}$

b) $|5(x+2) + 6(x+3)| = -7$

absolute value can't be negative

\emptyset $\textcircled{1}$

5. [3 points] The length of a rectangular yard is 2 metres less than 3 times the width. If the perimeter of the yard is 68m, find the dimensions of the yard.



Let $x = \text{width (m)}$

$$2x + 2(3x - 2) = 68$$

$$2x + 6x - 4 = 68$$

$$8x = 72$$

$$x = 9$$

$$3x - 2 = 3(9) - 2 = 25$$

The dimensions are: width = 9m
length = 25m

6. [5 points] You need to make 60L of 10% acid solution, but you only have 5% acid solution and 20% acid solution in your lab. How much of each should you combine?

Let $x = \text{volume of 5\% (L)}$

$60 - x = \text{volume of 20\% (L)}$

(2)

V_{solution}	%	$V_{\text{acid}} = V_{\text{solution}} (\%)$
x	0.05	$0.05x$
$60 - x$	0.2	$0.2(60 - x)$
60	0.1	$0.1(60)$

Total $V_{\text{acid}} = 0.1(60)$

$$0.05x + 0.2(60 - x) = 0.1(60)$$

$$0.05x + 12 - 0.2x = 6$$

$$-0.15x = -6$$

$$x = \frac{-6}{-0.15} = \frac{600}{15} = 40$$

40L of 5%
and 20L of 20%

(1)

(2)