Pre-Calculus 11 Chapter 7 Test Practice. **Name:** KEY

Date:_____ **Block:**_____

Multiple Choice *For #1 to #5, choose the best answer.*

1. The value of the expression $|-9-3|-|5-2^3|+|-7+1-4|$ is

12 - 3 +10

A 13 **B** 19 **C** 21 **D** 25

2. The range of the function $f(x)=|x-3|$ is

A $\{y \mid y>3, y \in R\}$
B $\{y \mid y \geq 3, y \in R\}$
C $\{y \mid y \geq 0, y \in R\}$
D $\{y \mid y>0, y \in R\}$

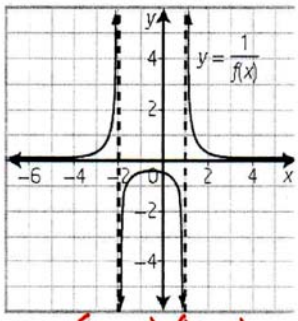
3. The absolute value equation $|1-2x|=9$ has solution(s)

$1-2x=9$ | $1-2x=-9$
$1-9=2x$ | $1+9=2x$
$-4=x$ | $5=x$

A $x=-4$
B $x=5$
C $x=-5$ and $x=4$
D $x=-4$ and $x=5$

4. The graph represents the reciprocal of which quadratic function?

A $f(x)=x^2+x-2$
B $f(x)=x^2-3x+2$
C $f(x)=x^2-x-2$
D $f(x)=x^2+3x+2$



(x+2)(x-1)

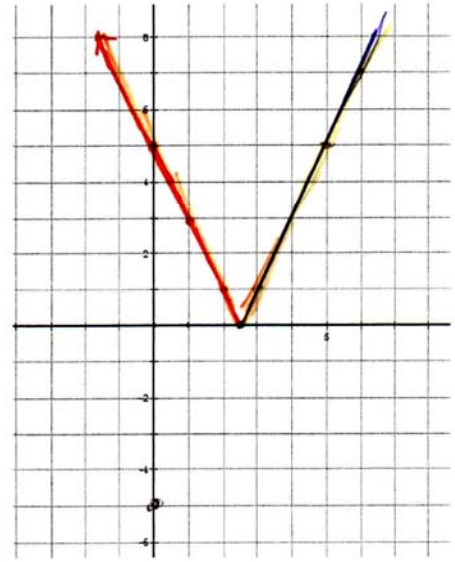
5. One of the vertical asymptotes of the graph of the reciprocal function $y=\frac{1}{x^2-16}$ has equation

A $x=0$ **B** $x=4$ **C** $x=8$ **D** $x=16$

Short Answer

6. Consider the function $f(x) = |2x - 5|$.

a) Sketch the graph of the function.



b) Determine the intercepts.

x-int : (2.5, 0)

y-int : (0, 5)

c) State the domain and range.

$x \in R$

$y \geq 0,\ y \in R$

d) What is the piecewise notation form of the function?

$$y = \begin{cases} 2x-5; & x \geq 2.5,\ x \in R \\ -2x+5; & x < 2.5,\ x \in R \end{cases}$$

7. Solve the equation algebraically.

a) $|2w - 3| = w + 1$

Case I

$2w - 3 = w + 1$

$\underline{w = 4}$

Case II

$2w - 3 = -w - 1$

$3w = 2$

$\underline{w = \frac{2}{3}}$

check

$|2(4) - 3| = 4 + 1$ ✓

$|2(\frac{2}{3}) - 3| = \frac{2}{3} + 1$ ✓

b) $|3x^2 - x| = 4x - 2$

Case I

$3x^2 - x = 4x - 2$

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

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

$x = \frac{2}{3}$ ✓

$x = 1$ ✓

Case II

$3x^2 - x = -4x + 2$

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

$x = \frac{-3 \pm \sqrt{9 + 24}}{6}$

$\frac{-3 + \sqrt{33}}{6}$ ✗

$\frac{-3 - \sqrt{33}}{6}$ ✗

check

8. Determine the error(s) in the following solution. Explain how to correct the solution.

Solve $|x - 4| = x^2 + 4x$.

Case 1

$x + 4 = x^2 + 4x$
$0 = x^2 + 3x - 4$
$0 = (x + 4)(x - 1)$
$x + 4 = 0$ or $x - 1 = 0$
$x = -4$ or $x = 1$

Case 2

error

$-x - 4 = x^2 + 4x$
$0 = x^2 + 5x + 4$
$0 = (x + 4)(x + 1)$
$x + 4 = 0$ or $x + 1 = 0$
$x = -4$ or $x = -1$

$-x + 4 = x^2 + 4x$
$0 = x^2 + 5x - 4$
$0 = (x \quad x \quad)$
Can not factor!

$x = \frac{-5 \pm \sqrt{25 + 16}}{2}$

$x = \frac{-5 \pm \sqrt{41}}{2}$

$\approx 0.70 \qquad \approx -5.70$

The solutions are $x = -4$, $x = -1$, and $x = 1$.

check:

~~$x = -4$~~, ~~$x = 1$~~ extraneous root

$x = \frac{-5 + \sqrt{41}}{2}$ ✓

$x = \frac{-5 - \sqrt{41}}{2}$ ✓

9. Consider the function $f(x) = 3 - 2x$.

a) Determine its reciprocal function.

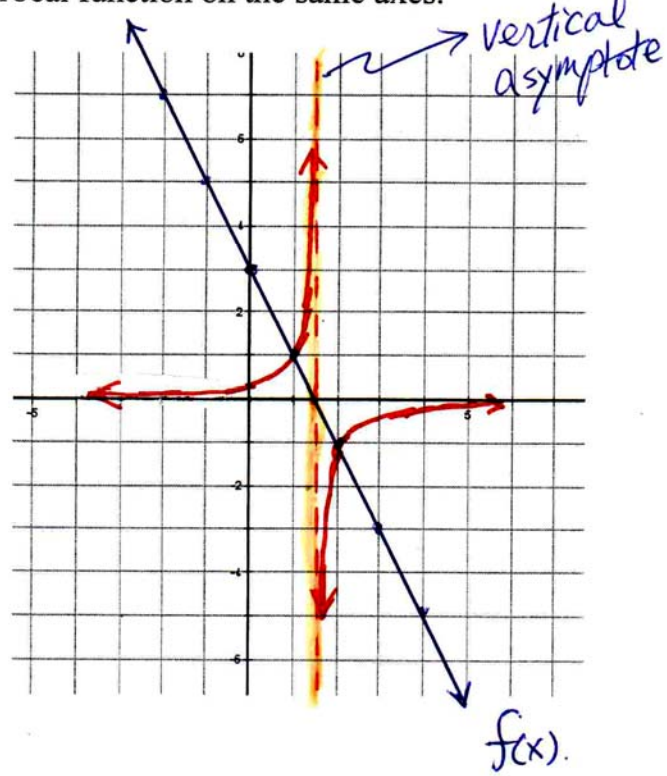
b) State the equations of any vertical asymptotes of the reciprocal function.

c) Graph the function $f(x)$ and its reciprocal function on the same axes.

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

b) $3 - 2x = 0$

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

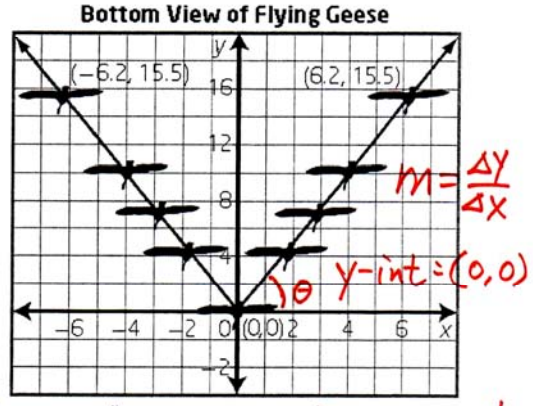


10. A biologist studying Canada geese migration analysed the vee flight formation of a particular flock using a coordinate system, in metres. The centre of each bird was assigned a coordinate point. The lead bird has the coordinates (0, 0), and the coordinates of two birds at the ends of each leg are (6.2, 15.5) and (-6.2, 15.5).

a) Write an absolute value function whose graph contains each leg of the vee formation.

$m = \frac{15.5-0}{6.2-0} = 2.5$

$y = |2.5x|$



b) What is the angle between the legs of the vee formation, to the nearest tenth of a degree?

Let θ be the refence angle shown in the grid.

$\theta = \tan^{-1}\left(\frac{15.5}{6.2}\right) \approx 68.2^\circ$

$180^\circ - 2(68.2^\circ) = 43.6^\circ$

linear equation: $mx+b=y$

$m = 2.5$ and $b=0$

$\therefore \underline{y = 2.5x}$

The angle between the legs of the Vee formation is $\underline{43.6^\circ}$

c) The absolute value function $y = |2.8x|$ describes the flight pattern of a different flock of geese. What is the angle between the legs of this vee formation, to the nearest tenth of a degree?

$\theta = \tan^{-1}(2.8) \approx 70.346^\circ$

$180^\circ - 2(70.346^\circ) \approx 39.3^\circ$

The angle between the legs of this Vee formation is $\underline{39.3^\circ}$.