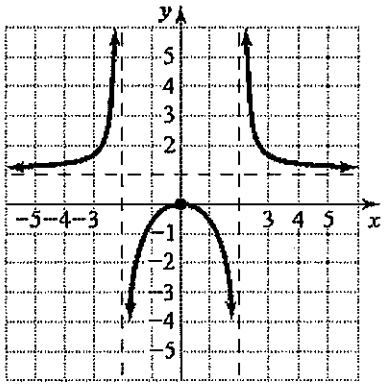
QA 1 Review Solutions

PreCalculus
Quarterly Assessment 1 Review: Rational Expressions/Functions and Trig Intro

1. The following graph represents a function $f(x)$.



a) Determine the domain of the function. $\{x \mid x \neq \pm 2\}$ or $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

b) Over what intervals does $f(x)$:

i. Increase $(-\infty, -2) \cup (-2, 0)$

ii. Decrease $(0, 2) \cup (2, \infty)$

2. Consider the function $r(x) = \frac{x-1}{x^2+2x-15}$... $\rightarrow$ $r(x) = \frac{x-1}{(x+5)(x-3)}$

a) Determine the domain of the function. $\{x \mid x \neq -5, x \neq 3\}$

b) What are the x-intercepts of the graph? $x - 1 = 0$, $x = 1$ or $(1, 0)$

3. Write the equation of the slant asymptote for the graph of $f(x) = \frac{x^2-6x+7}{x-2}$.

$x - 2 \overline{)\, x^2 - 6x + 7}$ gives $x - 4$ with $-x^2 + 2x$ and $-4x + 7$

$y = x - 4$

4. Consider the function $h(x) = \frac{x+4}{x^2-3x-28}$...

a. Determine the equation of the horizontal asymptote. $y = 0$

b. Determine the point at which the graph of the function has a hole. $\frac{x+4}{(x+4)(x-7)} \rightarrow \frac{1}{x-7}$ $x = -4$ $\rightarrow$ $\left(-4, -\frac{1}{11}\right)$

5. Write the equation(s) of the vertical asymptote(s) for the graph of $g(x) = \frac{x^2+5x-24}{2x^2+7x+3}$

$(2x+1)(x+3) \rightarrow x = -1/2,\ x = -3$

6. Simplify each expression.

a) $\frac{x^2-5x+6}{x^2+2x-15} \rightarrow \frac{(x-2)(x-3)}{(x-2)(x+5)} \rightarrow \frac{x-3}{x+5}$

b) $\frac{x^2-5x-6}{5x+15} \div \frac{x^2-3x-4}{7x+21} \rightarrow \frac{(x-6)(x+1)}{5(x+3)} \cdot \frac{7(x+3)}{(x-4)(x+1)} \rightarrow \frac{7(x-6)}{5(x-4)}$

c) $\frac{6x-12}{x^2-9x+18} \cdot \frac{7x-21}{5x-10} \rightarrow \frac{6(x-2)}{(x-3)(x-6)} \cdot \frac{7(x-3)}{5(x-2)} \rightarrow \frac{42}{5(x-6)}$

d) $\frac{2}{x-5} + \frac{3}{x-7} \rightarrow \frac{2(x-7)}{(x-5)(x-7)} + \frac{3(x-5)}{(x-5)(x+7)} \rightarrow \frac{2x-14+3x-15}{(x-5)(x+7)} \rightarrow \frac{5x-29}{(x-5)(x+7)}$

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7. The point (2, 5) lies on the terminal side of an angle θ. Determine the following: $r = \sqrt{(5)^2+(2)^2} = \sqrt{29}$

   a) $\sin\theta \rightarrow 5/\sqrt{29}$
   b) $\cos\theta \rightarrow 2/\sqrt{29}$
   c) $\tan\theta \rightarrow 5/2$

8. In which quadrant does the terminal side of each of the following angles (in standard position) lie?

   a. $550° \rightarrow$ QIII
   b. $-200° \rightarrow$ QII
   c. $-\frac{7\pi}{4} \rightarrow$ QI
   d. $\frac{10\pi}{9} \rightarrow$ QIII

9. Find one positive and one negative coterminal angle for each of the following: ← ADD/SUB $360°$ / ADD/SUB 2π

   a) $380°$ $580°, -340°$
   b) $\frac{5\pi}{7}$ $\frac{19\pi}{7}, -\frac{9\pi}{7}$

10. Find the reference angle for each of the following: * REFERENCE IS IN QUADRANT I !!

    a) $-130°$ $50°$
    b) $\frac{7\pi}{4}$ $\frac{\pi}{4}$

11. Convert each of the following to radians (in terms of π): → MULT DEG $\left(\frac{\pi}{180°}\right)$

    a) $315°$ $\frac{7\pi}{4}$
    b) $-600°$ $-\frac{10\pi}{3}$

12. Convert each of the following to degrees: → MULTIPLY RAD $\left(\frac{180°}{\pi}\right)$

    a) $-\frac{13\pi}{6}$ $-390°$
    b) $\frac{31\pi}{3}$ $1860°$

13. The point (7, -24) lies on the terminal side of an angle θ. Find $\csc\theta$. → QIV

    $r = \sqrt{(7)^2+(-24)^2} = 25$

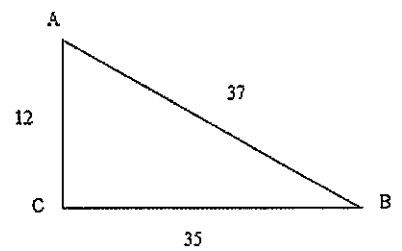
    $\csc\theta = \frac{r}{y} = -\frac{25}{24}$

14. Suppose $\cos\theta = -\frac{5}{13}$ and θ is in Quadrant II. Find the values of the remaining trig ratios of θ.

    $y = \sqrt{(13)^2-(5)^2} = 12$

    $\sec\theta = -\frac{13}{5}$
    $\sin\theta = \frac{12}{13}$ $\csc\theta = \frac{13}{12}$
    $\tan\theta = -\frac{12}{5}$ $\cot\theta = -\frac{5}{12}$

15. Find the exact values of the six trig ratios of $\angle B$.



    $\sin B = \frac{12}{37}$ $\csc\theta = \frac{37}{12}$
    $\cos B = \frac{35}{37}$ $\sec\theta = \frac{37}{35}$
    $\tan B = \frac{12}{35}$ $\cot\theta = \frac{35}{12}$