

Homework 5.2

$f(x) = \frac{3x^2 - 6x}{x^2 - 4}$ <p style="text-align: right; color: red;">y-int</p>	$g(x) = \frac{x^2 - x - 20}{2x^2 - 10x + 10}$ <p style="text-align: right; color: black;">y-int</p>	$h(x) = \frac{x^2 - 16}{x^2 - 6x + 8}$ <p style="text-align: right; color: black;">y-int</p>
<p>1. What is $f(x)$ written in factored form?</p> $f(x) = \frac{3x(x-2)}{(x+2)(x-2)}$ <p style="color: red;">Zero @ $x=0$ VA @ $x=-2$ Hole @ $x=2$</p>	<p>6. What is $g(x)$ written in factored form?</p> $g(x) = \frac{(x-5)(x+4)}{2x(x-5)}$ <p style="color: black;">Zero @ $x=-4$ VA @ $x=0$ Hole @ $x=5$</p>	<p>11. What is $h(x)$ written in factored form?</p> $h(x) = \frac{(x-4)(x+4)}{(x-4)(x-2)}$ <p style="color: black;">Zero @ $x=-4$ Hole @ $x=4$ VA @ $x=2$</p>
<p>2. Identify the restricted values of $f(x)$.</p> <p style="color: red;">$x \neq -2, 2$</p>	<p>7. Identify the restricted values of $g(x)$.</p> <p style="color: black;">$x \neq 0, 5$</p>	<p>12. Identify the restricted values of $h(x)$.</p> <p style="color: blue;">$x \neq 2, 4$</p>
<p>3. What is the domain of $f(x)$?</p> <p style="color: red;">$(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$</p>	<p>8. What is the domain of $g(x)$?</p> <p style="color: black;">$(-\infty, 0) \cup (0, 5) \cup (5, \infty)$</p>	<p>13. What is the domain of $h(x)$?</p> <p style="color: blue;">$(-\infty, 2) \cup (2, 4) \cup (4, \infty)$</p>
<p>4. What is/are the zero(s) of $f(x)$?</p> <p style="color: red;">$x = 0$</p>	<p>9. What is/are the zero(s) of $g(x)$?</p> <p style="color: black;">$x = -4$</p>	<p>14. What is/are the zero(s) of $h(x)$?</p> <p style="color: blue;">$x = -4$</p>
<p>5. What is the y-int of the graph of $f(x)$?</p> <p style="color: red;">y-int = $\frac{0}{-4} = 0$ $(0, 0)$</p>	<p>10. What is the y-int of the graph $g(x)$?</p> <p style="color: black;">y-int = $\frac{-20}{0} = \text{undefined}$ $g(x)$ doesn't have y-int</p>	<p>15. What is the y-int of the graph $h(x)$?</p> <p style="color: blue;">y-int = $\frac{-16}{8} = -2$ $(0, -2)$</p>

16. Given the rational function $p(x) = \frac{(3x+2)(x-4)}{(x-1)(x-4)}$, identify each of the following. $p(x) = \frac{3x^2 - 10x - 8}{x - 5x + 4}$

<p>Restricted Values & Domain:</p> <p style="color: red;">$x \neq 1, 4$</p>	<p>Zero(s):</p> <p style="color: red;">$3x+2 = 0$ $3x = -2$ $x = -2/3$</p>	<p>Y-intercept:</p> <p style="color: red;">y-int = $\frac{-8}{4} = -2$ $(0, -2)$</p>
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Pictured to the right is the graph of a rational function, $H(x)$. The graph of $H(x)$ crosses the x -axis at the point $(-\frac{3}{2}, 0)$.

17. What factor(s) is/are guaranteed to be in the denominator of the equation of $H(x)$? Explain your reasoning.

$H(x)$ is undefined at $x = -3$ and $x = -2$.

\therefore The factors $(x+3)$ and $(x+2)$ are guaranteed to be in the denominator of $H(x)$.

18. What factor(s) is/are guaranteed to be in the numerator of the function but not in the denominator of the function? Give a reason for your answer.

$H(x)$ has a zero at $x = -\frac{3}{2}$

$\therefore H(x)$ is guaranteed to have a factor of $(2x+3)$ in the numerator but not the denominator.

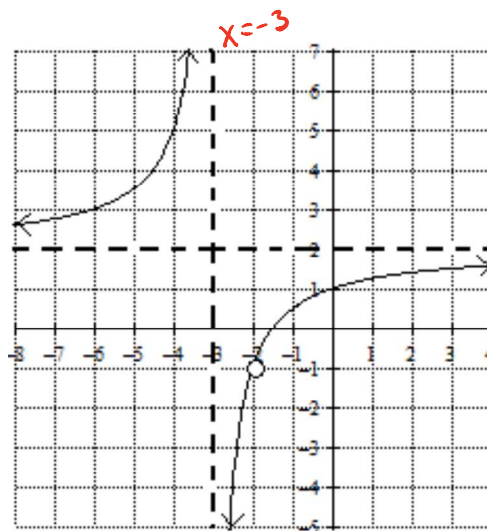
19. If c is the constant term of the numerator of $H(x)$ and d is the constant term of the denominator of $H(x)$, what is the value of $\frac{c}{d}$? Explain your reasoning.

$\bullet H(x)$ has a y -intercept at $y = 1$.

$$\therefore \frac{c}{d} = 1$$

20. What are the domain and range of $H(x)$?

Domain: $(-\infty, -3) \cup (-3, -2) \cup (-2, \infty)$ Range: $(-\infty, -1) \cup (-1, 2) \cup (2, \infty)$



or $(x + \frac{3}{2})$