Problem 1 *Consider the following rational function:*

$$f(x) = \frac{x^3 - 13\,x^2 + 56\,x - 80}{x^3 + 4\,x^2 - 16\,x - 64}$$

What is the sum of the x values which have holes? $\boxed{4}$.

Feedback(attempt): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 1.1 *What are the coordinates of the hole with x-value of 4?* ($\boxed{4}$, $\boxed{0}$)

Feedback(attempt): *Since you found the hole's x-value to be 4 in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*

Problem 2 *Consider the following rational function:*

$$f(x) = \frac{x^4 - 11\,x^3 + 33\,x^2 - 5\,x - 50}{x^2 - 4\,x - 5}$$

What is the sum of the x values which have holes? $\boxed{4}$.

Feedback(attempt): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 2.1 *What are the coordinates of the hole with x-value of -1?* ($\boxed{-1}$, $\boxed{18}$)

Feedback(attempt): *Since you found the hole's x-value to be -1 in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*

Problem 3 *Consider the following rational function:*

$$f(x) = \frac{x^3 + x^2 - 17\,x + 15}{x^2 + 4\,x - 5}$$

What is the sum of the x values which have holes? $\boxed{-4}$.

Feedback(*`attempt`*): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 3.1 *What are the coordinates of the hole with x-value of 1?* ($\boxed{1}$, $\boxed{-2}$)

Feedback(*`attempt`*): *Since you found the hole's x-value to be 1 in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*

Problem 4 *Consider the following rational function:*

$$f(x) = \frac{(x+6)(x+5)^2(x+4)(x+1)^3}{(x+7)^3(x+6)^2(x+5)^2(x+1)}$$

What is the sum of the x values which have holes? $\boxed{-6}$.

Feedback(*`attempt`*): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 4.1 *What are the coordinates of the hole with x-value of -1?* ($\boxed{-1}$, $\boxed{0}$)

Feedback(*`attempt`*): *Since you found the hole's x-value to be -1 in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*

Problem 5 *Consider the following rational function:*

$$f(x) = \frac{(x+7)^2(x-5)^3(x-7)}{(x+7)(x-4)^2(x-5)^3}$$

What is the sum of the x values which have holes? $\boxed{-2}$.

Feedback(*`attempt`*): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 5.1 *What are the coordinates of the hole with x-value of -7?* ($\boxed{-7}$, $\boxed{0}$)

Feedback(*`attempt`*): *Since you found the hole's x-value to be -7 in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*

Problem 6 *Consider the following rational function:*

$$f(x) = \frac{(x+2)^2(x+1)^3(x-6)(x-7)}{(x-7)(x-8)^2}$$

What is the sum of the x values which have holes? $\boxed{7}$.

Feedback(*`attempt`*): *First you need to find all the domain restrictions, i.e. where the denominator is zero. To do this, you may need to factor the denominator to find all the zeros. Remember though, that the values that give holes are the values that are "canceled out" of the denominator when you fully simplify the rational function (by canceling factors in the top with factors in the bottom).*

Problem 6.1 *What are the coordinates of the hole with x-value of 7?* ($\boxed{7}$, $\boxed{41472}$)

Feedback(*`attempt`*): *Since you found the hole's x-value to be* 7 *in the previous step, you want to plug this number into the simplified function (after you have canceled factors in the top and bottom) to get the y-value of the hole.*