College Algebra CHS

Name Key

Rational Equations

Date

Solve each equation. Remember to check for extraneous solutions.

1) $\frac{1}{n} + 1 = \frac{6}{n}$ LCD: n

$\frac{1n}{n} + 1 \cdot n = \frac{6n}{n}$

$1 + n = 6$

$n = 5$

2) $\frac{(x-1)}{4x} - \frac{(1)}{2x} = \frac{(2)}{x}$ LCD: $4x$

$\frac{4x(x-1)}{4x} - \frac{1(4x)}{2x} = \frac{2(4x)}{x}$

$(x-1) - \frac{4x}{2x} = \frac{8x}{x}$

$(x-1) - 2 = 8$

$x - 3 = 8$

$x = 11$

3) $\frac{2}{p} + \frac{1}{p} = \frac{4p+6}{p^2-4p}$ LCD: $p(p-4)$

$p(p-4)$

$\frac{2p(p-4)}{p} + \frac{1p(p-4)}{p} = \frac{(4p+6)(p(p-4))}{p(p-4)}$

$2(p-4) + (p-4) = 4p+6$

$2p - 8 + p - 4 = 4p + 6$

$-18 = p$

4) $\frac{3}{p^2-5p} + \frac{1}{p} = \frac{1}{p^2-5p}$ LCD: $p(p-5)$

$3 + 1(p-5) = 1$

$3 + p - 5 = 1$

$p = 3$

5) $\frac{3}{m+3} = 4 + \frac{4}{m+3}$ LCD: $m+3$

$3 = 4(m+3) + 4$

$3 = 4m + 12 + 4$

$3 = 4m + 16$

$-13 = 4m$

$m = \frac{-13}{4}$

6) $\frac{1}{k+6} + \frac{5}{k^2+6k} = \frac{6k+12}{k^2+6k}$ LCD: $k(k+6)$

$k + 5 = 6k + 12$

$-7 = 5k$

$k = -\frac{7}{5}$

7) $\frac{1}{n+1} + \frac{4n-8}{n^2+n} = \frac{1}{n}$

LCD: $n(n+1)$

$n + 4n - 8 = n + 1$

$5n - 8 = n + 1$

$4n = 9$

$n = 9/4$

8) $\frac{4n-3}{n^2-2n-15} = \frac{1}{n^2-2n-15} - \frac{1}{n-5}$

LCD: $(n-5)(n+3)$

$(n-5)(n+3)$

$4n - 3 = 1 - (n+3)$

$4n - 3 = 1 - n - 3$

$4n - 3 = -2 - n$

$5n = 1$

$n = 1/5$

9) $\frac{4}{m} = \frac{1}{m^2-m} - \frac{2}{m-1}$

LCD: $m(m-1)$

$4(m-1) = 1 - 2(m)$

$4m - 4 = 1 - 2m$

$6m = 5$

$m = 5/6$

10) $\frac{1}{k+1} + \frac{k-3}{k^2+7k+6} = \frac{k-1}{k^2+7k+6}$

LCD: $(k+1)(k+6)$

$(k+1)(k+6)$

$(k+6) + (k-3) = k-1$

$2k + 3 = k - 1$

$k = -4$

11) $\frac{3}{x^2-5x} = \frac{1}{x^2-5x} + \frac{2}{x}$

LCD: $x(x-5)$

$x(x-5)$

$3 = 1 + 2(x-5)$

$3 = 1 + 2x - 10$

$12 = 2x$

$x = 6$

12) $\frac{1}{x+3} - \frac{6}{x^2+6x+9} = \frac{1}{x^2+6x+9}$

LCD: $(x+3)^2$

$(x+3)(x+3)^2$

$(x+3) - 6 = 1$

$x - 3 = 1$

$x = 4$

13) $\frac{n^2 - 12n + 36}{5n^2} + \frac{3}{n^2} = \frac{1}{5}$

LCD = $5n^2$

$n^2 - 12n + 36 + 5(3) = n^2$

$-12n + 51 = 0$

$n = 17/4$

14) $\frac{1}{6a^2} + \frac{1}{3} = \frac{1}{2a^2}$

LCD: $6a^2$

$1 + 2a^2 = 3$

$2a^2 = 2$

$a^2 = 1$

$a = 1, a = -1$

15) $\frac{1}{v} = \frac{v^2 - 12v + 36}{v^2} + \frac{6}{v^2}$

LCD: v^2

$v = v^2 - 12v + 36 + 6$

$0 = v^2 - 13v + 42$

$0 = (v - 7)(v - 6)$

$v = 7, v = 6$

16) $\frac{1}{x^2} + 1 = \frac{2}{x^2}$

LCD: x^2

$1 + x^2 = 2$

$x^2 = 1$

$x = 1, x = -1$

17) $\frac{6v-6}{v} + \frac{3v+15}{v^2+3v} = \frac{4v-8}{v^2+3v}$

LCD: $v(v+3)$

$(6v-6)(v+3) + 3v+15 = 4v-8$

$6v^2+18v-6v-18+3v+15 = 4v-8$

$6v^2+15v-3 = 4v-8$

$6v^2+11v+5 = 0$

$6v^2+6v+5v+5 = 0$

$6v(v+1)+5(v+1) = 0$

$(6v+5)(v+1) = 0$

$v = \frac{-5}{6}$ $v = -1$

18) $3 = \frac{v}{v^2-5v+6} - \frac{v-5}{v-3}$

LCD: $(v-3)(v-2)$

$(v-3)(v-2)$

$3(v^2-5v+6) = v - (v-5)(v-2)$

$3v^2-15v+18 = v-(v^2-7v+10)$

$3v^2-15v+18 = v-v^2+7v-10$

$4v^2-23v+28 = 0$

$-7 \cdot -16 = 112$

$4v^2-7v-16v+28 = 0$

$v(4v-7)-4(4v-7) = 0$

$(v-4)(4v-7) = 0$

$v = 4$ $v = 7/4$

19) $p+6-\frac{2}{p-6} = \frac{p^2+3p-10}{p-6}$

LCD: $(p-6)$

$(p+6)(p-6)-2 = p^2+3p-10$

$p^2-36-2 = p^2+3p-10$

$3p+28 = 0$

$p = -28/3$

20) $\frac{2}{b^2-b} = 1 - \frac{b^2+5b+6}{b^2-b}$

LCD: $b(b-1)$

$2 = b^2-b-(b^2+5b+6)$

$2 = b^2-b-b^2-5b-6$

$0 = -6b-8$

$b = -4/3$

College Algebra CHS

Name_____

Rational Equations

Date_____

Solve each equation. Remember to check for extraneous solutions.

1) $\frac{1}{n} + 1 = \frac{6}{n}$

2) $\frac{x-1}{4x} - \frac{1}{2x} = \frac{2}{x}$

3) $\frac{2}{p} + \frac{1}{p} = \frac{4p+6}{p^2-4p}$

4) $\frac{3}{p^2-5p} + \frac{1}{p} = \frac{1}{p^2-5p}$

5) $\frac{3}{m+3} = 4 + \frac{4}{m+3}$

6) $\frac{1}{k+6} + \frac{5}{k^2+6k} = \frac{6k+12}{k^2+6k}$

7) $\frac{1}{n+1} + \frac{4n-8}{n^2+n} = \frac{1}{n}$

8) $\frac{4n-3}{n^2-2n-15} = \frac{1}{n^2-2n-15} - \frac{1}{n-5}$

9) $\frac{4}{m} = \frac{1}{m^2-m} - \frac{2}{m-1}$

10) $\frac{1}{k+1} + \frac{k-3}{k^2+7k+6} = \frac{k-1}{k^2+7k+6}$

11) $\frac{3}{x^2-5x} = \frac{1}{x^2-5x} + \frac{2}{x}$

12) $\frac{1}{x+3} - \frac{6}{x^2+6x+9} = \frac{1}{x^2+6x+9}$

13) $\frac{n^2 - 12n + 36}{5n^2} + \frac{3}{n^2} = \frac{1}{5}$

14) $\frac{1}{6a^2} + \frac{1}{3} = \frac{1}{2a^2}$

15) $\frac{1}{v} = \frac{v^2 - 12v + 36}{v^2} + \frac{6}{v^2}$

16) $\frac{1}{x^2} + 1 = \frac{2}{x^2}$

17) $\frac{6v-6}{v}+\frac{3v+15}{v^2+3v}=\frac{4v-8}{v^2+3v}$

18) $3=\frac{v}{v^2-5v+6}-\frac{v-5}{v-3}$

19) $p+6-\frac{2}{p-6}=\frac{p^2+3p-10}{p-6}$

20) $\frac{2}{b^2-b}=1-\frac{b^2+5b+6}{b^2-b}$