Pre-Calculus

Name Key ID: 1

#9 Add/ Rational Expressions & Solving

Date _____ Period ____

Simplify each expression.

1) $\frac{a-2}{6a-24}+\frac{2a+1}{6a-24}$ $\quad 6(a-4)\quad 6(a-4)$

$=\boxed{\frac{3a-1}{6(a-4)}}$

2) $\frac{x-4}{6x-2}-\frac{6}{6x-2}$

3) $\frac{6}{2x}+\frac{6x}{2}\left(\frac{x}{x}\right)$

$\frac{6}{2x}+\frac{6x^2}{2x}=\frac{6x^2+6}{2x}$

$\frac{3\cancel{2}(x^2+1)}{\cancel{2}x}=\boxed{\frac{3(x^2+1)}{x}}$

4) $\frac{5v}{6v^3}+\frac{5u}{2v}$

6) $\frac{5}{3a-5}+\frac{3}{a-4}$

$\left(\frac{5}{5}\right)\frac{x-5}{x-3}+\frac{5x}{5}\left(\frac{x-3}{x-3}\right)$

$\frac{5x-25}{5(x-3)}+\frac{5x^2-15x}{5(x-3)}$

$\frac{5x^2-10x-25}{5(x-3)}=\frac{5(x^2-2x-5)}{5(x-3)}$

$\boxed{\frac{x^2-2x-5}{x-3}}$

8) $2n+\frac{n+3}{n^2+5n+4}$

$\frac{5v(v+3)}{5v(v+3)}\frac{5v}{3v+2}+\frac{6v}{5v^2+15v}\left(\frac{3v+2}{3v+2}\right)$ $\quad 5v(v+3)$

$\frac{25v^2(v+3)}{5v(3v+2)(v+3)}+\frac{18v^2+12v}{5v(3v+2)(v+3)}$

$\frac{25v^3+78v^2+12v}{5v(3v+2)(v+3)}=\boxed{\frac{25v^2+78v+12}{5(3v+2)(v+3)}}=\frac{(3v+2)(25+6v)}{5(3v+2)(v+3)}=\frac{25+6v}{5(v+3)}$

Solve each equation. Remember to check for extraneous solutions.

9) $\frac{2}{3x}+\frac{1}{1}=\frac{1}{6x}$ $\quad 6x$

10) $\frac{4}{5x}=\frac{1}{5x}+\frac{2x-12}{5x^2}$

$4+6x=1$

$6x=-3$

$\boxed{x=\frac{-1}{2}}$

11) $\frac{6}{x+6} = 1 + \frac{1}{x+6}$

$x+6$

$\times 1$

$6 = x+6+1$

$-1 = x$

12) $\frac{5}{4p} = \frac{1}{4p} + 1$

13) $\left(\sqrt{43-2k}\right)^2 = \left(\sqrt{k-8}\right)^2$ Sq. both sides

$43-2k = k-8$

$51 = 3k$

$17 = k$ ✓

check answer in original question

14) $\sqrt{11x-1} = \sqrt{10x}$

15) $\left(\sqrt{2n-15}\right)^2 = \left(\sqrt{25-2n}\right)^2$

$2n-15 = 25-2n$

$4n = 40$

$n = 10$ ✓

16) $-81 = -9\sqrt{2b+75}$

17. $x-3\sqrt{x}-4=0$ "u" substitution OR square

$u = \sqrt{x}$

$u^2 - 3u - 4 = 0$

$(u-4)(u+1) = 0$

$u = 4 \quad u = -1$

$\sqrt{x} = 4 \quad \sqrt{x} = -1$

$x = \pm 2 \quad x = \pm i$

18. $x-11\sqrt{x}+30=0$

19. $(2x-1)^2 - 5(2x-1) + 4 = 0$

$u = (2x-1)$

$u^2 - 5u + 4 = 0$

$(u-1)(u-4) = 0$

$u = 1 \quad u = 4$

$2x-1 = 1 \quad 2x-1 = 4$

$2x = 2 \quad 2x = 5$

$x = 1 \quad x = \frac{5}{2}$

20. $2(x^2-4)^2 + 5(x^2-4) - 3 = 0$