

11-5 Solving Rational Equations

Solve each equation. Be sure to check for extraneous solutions!

$$1. \frac{2}{p+3} = \frac{7}{2p}$$

$$2(2p) = 7(p+3)$$

$$4p = 7p + 21$$

$$\begin{array}{r} 4p \\ -7p \\ \hline -3p = 21 \\ \frac{-3p}{-3} = \frac{21}{-3} \\ \boxed{p = -7} \end{array}$$

Check:

$$\frac{2}{-7+3} = \frac{7}{2(-7)}$$

$$\frac{2}{-4} = \frac{7}{-14}$$

$$-\frac{1}{2} = -\frac{1}{2} \checkmark$$

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$$2. \frac{4}{p+3} = \frac{p-3}{4}$$

$$4(4) = (p+3)(p-3)$$

$$16 = p^2 - 9$$

$$25 = p^2$$

$$\pm\sqrt{25} = \sqrt{p^2}$$

$$\boxed{\pm 5 = p}$$

check $p = 5$

$$\frac{4}{5+3} = \frac{5-3}{4}$$

$$\frac{4}{8} = \frac{2}{4}$$

$$\frac{1}{2} = \frac{1}{2} \checkmark$$

check $p = -5$

$$\frac{4}{-5+3} = \frac{-5-3}{4}$$

$$\frac{4}{-2} = \frac{-8}{4}$$

$$-2 = -2 \checkmark$$

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$$3. \frac{1}{p-5} = \frac{p}{p^2-25}$$

$$1(p^2-25) = p(p-5)$$

$$\begin{array}{r} p^2-25 \\ -p^2 \\ \hline -25 = -5p \\ \frac{-25}{-5} = \frac{-5p}{-5} \\ \cancel{5} \neq p \end{array}$$

check:

$$\frac{1}{5-5} = \frac{5}{5^2-25}$$

$$\frac{1}{0} \neq \frac{5}{0}$$

∅ no solution

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