

Unit 10 Test Study Guide

Rational Expressions & Equations

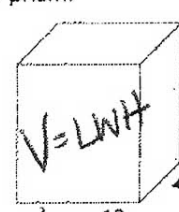
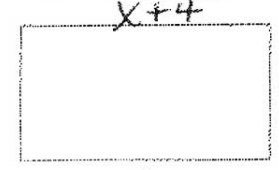
Simplifying Rational Expressions

<p>1. $\frac{8 \cdot 16xy^5}{42x^2y^3}$</p> $\frac{8y^2}{21x}$	<p>2. $\frac{x^2+2x}{5x+10} = \frac{x(\cancel{x+2})}{5(\cancel{x+2})} = \frac{x}{5}$</p>
<p>3. $\frac{x^3-x}{x^3+8x^2-9x} = \frac{x(x^2-1)}{x(x^2+8x-9)}$ $= \frac{(x+1)\cancel{(x-1)}}{(x+9)\cancel{(x-1)}} = \frac{x+1}{x+9}$</p>	<p>4. $\frac{5x^3 \cdot \frac{2}{21x^2}}{7x^2 \cdot \frac{20x}{4}} = \frac{3x^5}{4x^3} = \frac{3x^2}{4}$</p>
<p>5. $\frac{x^2+x-6}{x^2-x-2} \cdot \frac{x^2+5x+4}{x^2+2x-3}$</p> $\frac{(x+3)\cancel{(x-2)} \cdot (x+4)\cancel{(x+1)}}{\cancel{(x-2)}\cancel{(x+1)} \cdot (x+3)\cancel{(x-1)}} = \frac{x+4}{x-1}$	<p>6. $\frac{10x+10}{8x^2+12x} \cdot \frac{2x^2+x-3}{x^2-1}$</p> $\frac{5\cancel{(x+1)} \cdot (2x+3)\cancel{(x-1)}}{4x\cancel{(2x+3)} \cdot \cancel{(x+1)}\cancel{(x-1)}} = \frac{5}{2x}$
<p>7. $\frac{6x^6}{8x^5} + \frac{9x}{8x^2}$</p> $\frac{6}{8} \cdot \frac{8x^2}{9x} = \frac{2x^2}{3x} = \frac{2x}{3}$	<p>8. $\frac{x^2-6x+8}{x^2-2x} \div (3x-12)$</p> $\frac{(x-4)\cancel{(x-2)}}{x\cancel{(x-2)}} \cdot \frac{1}{3\cancel{(x-4)}} = \frac{1}{3x}$
<p>9. $\frac{x^2-36}{2x^2+3x+1} \div \frac{4x-24}{8x+4}$</p> $\frac{(x+6)\cancel{(x-6)} \cdot 4\cancel{(2x+1)}}{(x+1)\cancel{(2x+1)} \cdot 4\cancel{(x-6)}} = \frac{x+6}{x+1}$	<p>10. $\frac{3x+10}{x^2-49} + \frac{x+18}{x^2-49}$</p> $\frac{4x+28}{x^2-49} = \frac{4(x+7)}{\cancel{(x+7)}\cancel{(x-7)}} = \frac{4}{x-7}$
<p>11. $\frac{x^2+7x}{x^2+4x-32} - \frac{x+16}{x^2+4x-32}$</p> $\frac{x^2+6x-16}{x^2+4x-32} = \frac{\cancel{(x+8)}\cancel{(x-2)}}{\cancel{(x+8)}\cancel{(x-4)}} = \frac{x-2}{x-4}$	<p>12. $\frac{5}{18x} + \frac{(1)9}{(2x)9}$</p> $\frac{7+4}{9+8x} = \frac{7}{9x}$
<p>13. $\frac{6x-2}{10x-20} \cdot \frac{(1)10}{(x-2)10}$</p> $\frac{6x-12}{10x-20} = \frac{6\cancel{(x-2)}}{10\cancel{(x-2)}} = \frac{3}{5}$	<p>14. $\frac{x^2-10x+1}{5x^2-2x-3} + \frac{1}{(x-1)(5x+3)}$</p> $\frac{x^2-5x+4}{5x^2-2x-3} = \frac{\cancel{(x-4)}\cancel{(x+1)}}{\cancel{(x-1)}\cancel{(5x+3)}} = \frac{x-4}{5x+3}$

Rational Equations

<p>15. $\frac{(x+2)(2x-10)}{6 \cdot 8}$ $4x = 76$</p> <p>$12x - 60 = 8x + 16$ $x = 19$</p> <p>$4x - 60 = 16$</p>	<p>16. $\frac{(x+1) \cdot 14}{4 \cdot x}$ $(x+8)(x-7) = 0$</p> <p>$x^2 + x = 56$ $x = \{-8, 7\}$</p> <p>$x^2 + x - 56 = 0$</p>
<p>17. $\frac{8}{3x} = \frac{x}{6}$ $3(x^2 - 16) = 0$</p> <p>$3x^2 = 48$ $3(x+4)(x-4) = 0$</p> <p>$3x^2 - 48 = 0$ $x = \{-4, 4\}$</p>	<p>18. $\frac{(x-7) \cdot 4}{6(x+3)}$ $x^2 + 3x - 7x - 21 = 24$</p> <p>$x^2 - 4x - 45 = 0$ $x = \{9, -5\}$</p> <p>$(x-9)(x+5) = 0$</p>
<p>19. $\frac{4(2)}{4(x-3)} \cdot \frac{1}{4x-12} = \frac{2}{x-5}$</p> <p>$\frac{1}{4x-12} = \frac{2}{x-5}$ $8x - 24 = 7x - 35$</p> <p>$x - 24 = -35$ $x = -11$</p>	<p>20. $\frac{7}{12x} \cdot \frac{(x-1)^2}{(6x)^2} = \frac{x-1}{x+1}$ $12x^2 - 12x = 5x + 5$</p> <p>$\frac{5}{12x} = \frac{(x-1)}{(x+1)}$ $12x^2 - 17x - 5 = 0$</p> <p>$x^2 - 17x - 60 = 0$</p> <p>$(x-20)(x+3) = 0$</p> <p>$(3x-5)(4x+1) = 0$</p> <p>$x = \{\frac{5}{3}, -\frac{1}{4}\}$</p>

Applications with Rational Expressions

<p>21. Find an expression to represent the area of the rectangle.</p> <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> <p>$A = L \cdot W$</p> <p>$\frac{2x^2 - 10x}{x^2 - 9x + 20}$</p> </div> <p>$\frac{x^2 - 8x + 16}{4x^2}$</p>	<p>$A = \frac{2x^2 - 10x}{x^2 - 9x + 20} \cdot \frac{x^2 - 8x + 16}{4x^2}$</p> <p>$= \frac{2x(x-5)}{(x-4)(x-5)} \cdot \frac{(x-4)(x-4)}{4x^2}$</p> <p>$= \frac{x-4}{2x}$</p>
<p>22. Find an expression to represent the volume of the rectangular prism.</p> <div style="text-align: center;">  <p>$V = LWH$</p> </div> <p>$\frac{3x^2 + 3x - 60}{5x^2 + x}$ $\frac{10x^2 + 2x}{x^2 - 16}$</p> <p>$\frac{x^2 + x - 12}{x + 5}$</p>	<p>$V = \frac{3(x+5)(x-4)}{x(5x+1)} \cdot \frac{(x+4)(x-3)}{x+5} \cdot \frac{2x(5x+1)}{(x+4)(x-4)}$</p> <p>$= 6(x-3) = 6x - 18$</p>
<p>23. Find an expression to represent the perimeter of the rectangle.</p> <div style="text-align: center;">  </div> <p>$\frac{x^2 - 5}{x + 4}$ $\frac{3x + 1}{x + 4}$ $\frac{3x + 1}{x + 4}$ $\frac{x^2 - 5}{x + 4}$</p>	<p>$P = \frac{2x^2 + 6x - 8}{x + 4}$</p> <p>$= \frac{2(x^2 + 3x - 4)}{x + 4}$</p> <p>$= \frac{2(x+4)(x-1)}{x+4} = 2x - 2$</p>