Math 80 Test 4 Practice test 1 Fall 2015

Fill in the blanks using the words term, factor, sum, product, difference, quotient, base, exponent, power, index, radicand or root.

1) Solve $|7r-5|=|10r-13|$ Expression your answer as a **solution set**.

$7r-5=10r-13$

$8=3r$

$8/3=r$

$7r-5=-(10r-13)$

$7r-5=-10r+13$

$17r=18$

$r=18/17$

$\{18/17, 8/3\}$

Check

$|13.\overline{6}|=|13.\overline{6}|$ ✓

$|-2\frac{7}{17}|=|-2\frac{7}{17}|$ ✓

2) Solve $-2|k+18|+4\geq -2$. Express your solution as a **graph**.

$-2|k+18|\geq -6$

$|k+18|\leq 3$

$-3\leq k+18\leq 3$

$-21\leq k\leq -15$

-21 -15

Check

$-2|-100+18|+4\geq -2$

$-2|-82|+4$

$-164+4\geq -2$ F ✓

$-2|-20+18|+4$

$-2|-2|+4$

$-4+4\geq -2$ T ✓

$-2|0+18|+4$

$-36+4\geq -2$

F ✓

3) Simplify $\dfrac{4x^2-1}{6x^2-11x-7}\times\dfrac{12x^2-28x}{2x^2-3x+1}$.

$\dfrac{(2x-1)(2x+1)}{(3x-7)(2x+1)}\times\dfrac{4x(3x-7)}{(2x-1)(x-1)}$

$x^2-14x+3x-7$

$(3x-7)+1(3x-7)$

$\boxed{\dfrac{4x}{x-1}}$

$-42=-2\cdot 3\cdot 7$

$1\cdot 42$

$2\cdot 21$

$\boxed{3\cdot 14}$

Check

$2x^2(x^3 - 3x^2 + 9x + 3x^2 - 9x + 27)$

$2x^2(x^3+27)$

4) Factor $2x^5 + 54x^2$ completely.

$2x^2(x^3+27)$

$2x^2(x+3)(x^2-3x+9)$

5) Factor $x^4 - xy^3 + x^3y - y^4$ completely.

$x(x^3-y^3)+y(x^3-y^3)$

$(x+y)(x^3-y^3) = (x+y)(x-y)(x^2+xy+y^2)$

6) Factor $10y^5 - 17y^4 + 3y^3$ completely.

$y^3(10y^2-17y+3)$

$(10y^2-2y-15y+3)$

$2y(5y-1)-3(5y-1)$

$\boxed{y^3(5y-1)(2y-3)}$

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$2\cdot3\cdot5$

$1\cdot30$

$\boxed{2\cdot15}$

$3\cdot10$

$5\cdot6$

7) Factor $2x^{10} + 5x^5 + 2$ by introducing an appropriate substitution.

let $y = x^5$

then $y^2 = (x^5)^2 = x^{10}$

$2y^2+5y+2$

$(2y+1)(y+2)$

$(2x^5+1)(x^5+2)$

8) Factor $18x^7 - 72x^6 + 54x^5$ completely.

$18 = 3\cdot3\cdot2$

$72 = 2\cdot2\cdot3\cdot2\cdot3$

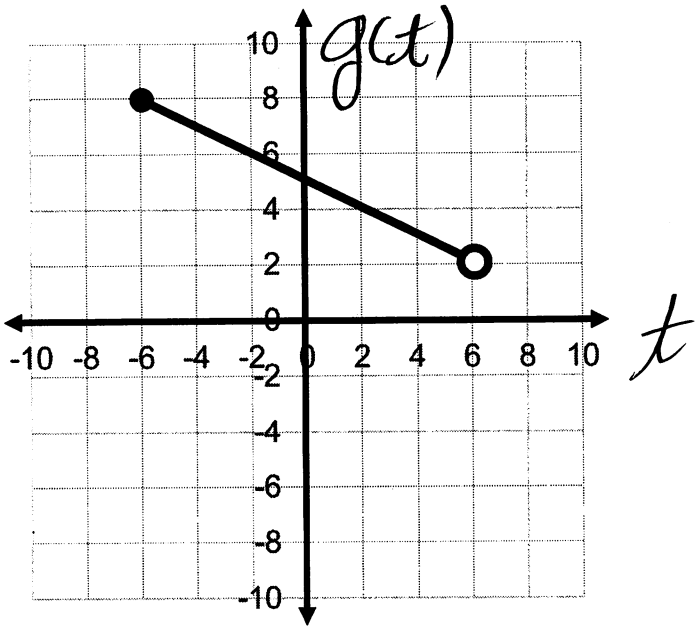
$54 = 2\cdot3\cdot3\cdot3$

$GCF = 18\cdot x^5$

$18x^5(x^2-4x+3)$

$18x^5(x-3)(x-1)$

9) Given this is the graph of function $g(t)$.



a) What's the domain of $g(t)$?

$[-6, 6)$

b) What's the range of $g(t)$?

$(2, 8]$

c) Complete the description of $g(t)$

$g(t) = \begin{cases} -\frac{1}{2}t+5, & -6 \le t < 6 \end{cases}$

$\boxed{g(t) = -\frac{1}{2}t+5, \ -6 \le t < 6}$

$(-6, 8) \quad (6, 2)$

$m = \frac{8-2}{-6-6} = \frac{6}{-12} = -\frac{1}{2}$

$y = -\frac{1}{2}x + b$

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

$2 = -3 + b$

$5 = b$

$\boxed{y = -\frac{1}{2}x + 5}$

d) Find $\frac{g(4)}{g(-4)}$

$g(4) = -\frac{1}{2}(4) + 5 = 3$

$g(-4) = -\frac{1}{2}(-4) + 5 = 7$

$\frac{g(4)}{g(-4)} = \boxed{\frac{3}{7}}$

11) Simplify $\frac{4a^2}{-3b^5} \times \frac{9b^7}{14a^{11}}$ $= \frac{\cancel{2}\cdot 2\cdot \cancel{3}\cdot 3\, a^2 b^7}{-\cancel{3}\cdot \cancel{2}\cdot 7\, b^5 a^{11}} = -\frac{6b^2}{7a^9}$

12) Simplify $\frac{4a}{3b^2} + \frac{9b}{2a}$ LCD $= 2\cdot 3ab^2$ $\frac{4a(2a) + 9b(3b^2)}{LCD}$

$\boxed{\frac{8a^2 + 27b^3}{6ab^2}}$ ← close to the sum of two cubes but a^2 isn't a^3.

13) Simplify $\frac{3x}{2x-3} + \frac{3x+6}{2x^2+x-6}$ $\Rightarrow \frac{3x}{2x-3} + \frac{3x+6}{(2x-3)(x+2)}$

$\frac{3x(x+2) + 3x+6}{LCD} = \frac{3x^2+6x+3x+6}{LCD} =$

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

$\boxed{\frac{3(x+1)}{2x-3}}$

14) Simplify $\frac{\frac{1}{b}+\frac{1}{2}}{\frac{4}{b^2}-1}$

LCD $2b^2$

$\frac{2b+b^2}{8-2b^2} = \frac{b(2+b)}{2(4-b^2)} = \frac{b\cancel{(2+b)}}{2(2-b)\cancel{(2+b)}} = \boxed{\frac{b}{2(2-b)}}$

15) Simplify $\frac{2x-2}{4x^2-9} - \frac{5}{3-2x}$ $= \frac{2x-2}{(2x-3)(2x+3)} - \frac{5}{-1(2x-3)}$

$= \frac{2x-2}{(2x-3)(2x+3)} + \frac{5}{(2x-3)}$ LCD $= (2x-3)(2x+3)$

$= \frac{2x-2+5(2x+3)}{LCD} = \frac{2x-2+10x+15}{LCD}$

$= \frac{12x+13}{(2x-3)(2x+3)}$

16) Simplify $\frac{\frac{2}{x+3}+\frac{5x}{x^2-9}}{\frac{4}{x+3}+\frac{2}{x-3}}$ $\Rightarrow \frac{\frac{2}{x+3}+\frac{5x}{(x-3)(x+3)}}{\frac{4}{x+3}+\frac{2}{x-3}}$

LCD $= (x-3)(x+3)$

$\frac{2(x-3)+5x}{4(x-3)+2(x+3)} = \frac{2x-6+5x}{4x-12+2x+6} =$

$\frac{7x-6}{6x-6} = \boxed{\frac{7x-6}{6(x-1)}}$

17) Divide $(x^3 + 6x^2 - 2x + 3) \div (x - 1)$

$$
\begin{array}{r}
x^2 + 7x + 5 \\
x - 1 \overline{\big) x^3 + 6x^2 - 2x + 3} \\
-x^3 + x^2 \qquad\qquad \\
\hline
7x^2 - 2x \qquad \\
-7x^2 + 7x \qquad \\
\hline
5x + 3 \\
-5x + 5 \\
\hline
8
\end{array}
$$

$$\boxed{x^2 + 7x + 5 + \frac{8}{x-1}}$$

Check

$(x-1)(x^2 + 7x + 5 + \frac{8}{x-1})$

$\cancel{x^3} + \cancel{x^2} + \cancel{7x^2} - \cancel{7x}$

$+\cancel{5x} - 5 + 8$

$x^3 + 6x^2 - 2x + 3$ ✓

18) Given $\frac{3x}{x+1} + \frac{4}{x-2} = 3$

a. What are the excluded values?
b. Solve the equation
c. Check any solution(s). **Don't use decimals.**

a) $\{x \mid x \neq -1, x \neq 2\}$

b) LCD $= (x+1)(x-2)$

$3x(x-2) + 4(x+1) = 3(x+1)(x-2)$

$3x^2 - 6x + 4x + 4 = 3(x^2 - x - 2)$

$\cancel{3x^2} - 2x + 4 = \cancel{3x^2} - 3x - 6$

$-10 = x$

$\{-10\}$

Check

$\frac{3(-10)}{-10+1} + \frac{4}{-10-2}$

$\frac{-30}{-9} + \frac{4}{-12}$ ✓

$\frac{10}{3} + \frac{-1}{3} = \frac{9}{3} =$

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