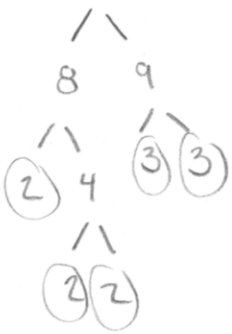
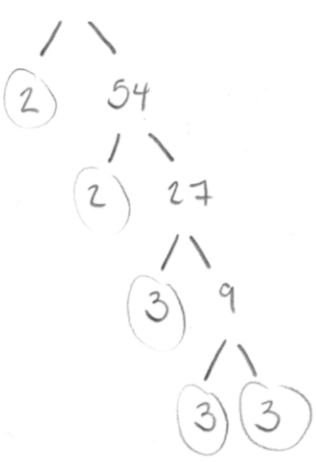
MATH 71 PRACTICE FINAL EXAM *ANSWER KEY*

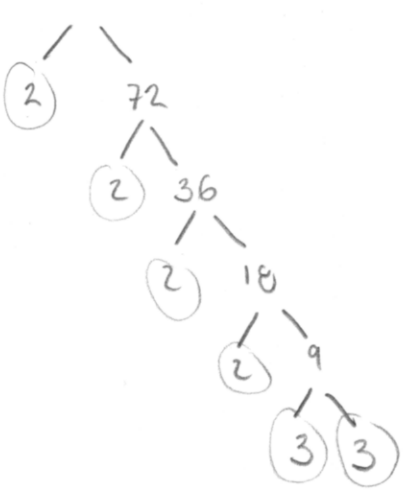
1. $72 = 2^3 \cdot 3^2$



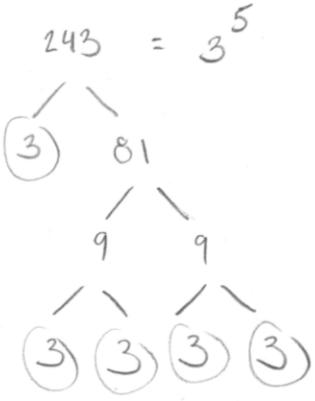
$108 = 2^2 \cdot 3^3$



$144 = 2^4 \cdot 3^2$



$243 = 3^5$



2. $GCF(72, 108) = 2^2 \cdot 3^2 = 36$

$GCF(108, 144) = 2^2 \cdot 3^2 = 36$

$GCF(72, 243) = 3^2 = 9$

3. (a) $\frac{3}{2}\left(\frac{1}{72} \cdot \frac{3}{3} - \frac{1}{108} \cdot \frac{2}{2}\right) + 1$

$\frac{3}{2}\left(\frac{1}{216}\right) + 1 = \frac{1}{144} + 1 = \frac{145}{144}$

(b) $\left(\sqrt{3\left(\frac{7}{108}\cdot\frac{4}{4}-\frac{1}{144}\cdot\frac{3}{3}\right)}-1\right)^2$

$=\left(\sqrt{3\left(\frac{25}{432}\right)}-1\right)^2=\left(\sqrt{\frac{25}{144}}-1\right)^2$

$=\left(\frac{5}{12}-1\right)^2=\left(\frac{-7}{12}\right)^2=\frac{49}{144}$

(c) $\frac{32}{243}\cdot\frac{3}{1}\cdot\frac{9}{8}-\frac{1}{3}=\frac{4}{9}-\frac{1}{3}=\frac{1}{9}$

4. (a) $\left(\frac{11}{5}\right)\left(\frac{11}{3}+\frac{3}{4}\right)=\frac{11}{5}\cdot\frac{53}{12}=\frac{583}{60}$

(b) $\left(\frac{11}{5}\right)\left(\frac{11}{3}-\frac{9}{16}\right)=\frac{11}{5}\cdot\frac{176-27}{48}=\frac{1639}{240}$

(c) $\left(\frac{11}{5}\right)\left(-\frac{11}{6}\right)-\left(\frac{11}{3}\right)\left(-\frac{3}{4}\right)=\frac{-121}{30}+\frac{33}{12}$

$=\frac{-121(2)+33(5)}{60}=-\frac{77}{60}$

(d) $\frac{\frac{11}{5}+\frac{3}{4}}{-\frac{11}{6}-\frac{11}{3}}=\frac{59}{20}\div\frac{-33}{6}=\frac{59}{20}\cdot\frac{-2}{11}=\frac{-59}{110}$

5. $\frac{\text{FLOUR}}{\text{COOKIES}} : \frac{6}{42} = \frac{f}{154} \rightarrow \frac{1}{7} = \frac{f}{154} \rightarrow 7f = 154$

$f = 22$

6. $\frac{114}{x} = \frac{120}{100} = \frac{6}{5} \rightarrow 570 = 6x$

$x = 95$

7.

BORN	100 LBS		
		$\times 1.5$	GAINED 50 LBS
1 MOS.	150 LBS		
		$\times 1.5$	GAINED 75 LBS
2 MOS.	225 LBS		
		$\times 1.5$	GAINED 112.5 LBS
3 MOS.	337.5 LBS		
		$\times 1.5$	GAINED 168.75 LBS
4 MOS.	506.25 LBS		

8. (a) $\frac{2^2 x^{-10} y^4}{3^{-2} x^{16} y^{-6}} = \frac{2^2 \cdot 3^2 y^4 y^6}{x^{10} x^{16}} = \frac{36 y^{10}}{x^{26}}$

(b) $\frac{(5a^2b^{-4}c)^{-3}}{(10a^{-2}b^7c^{-3})^{-6}} = \frac{5^{-3} a^{-6} b^{12} c^{-3}}{10^{-6} a^{12} b^{-42} c^{18}} = \frac{10^6 b^{12} b^{42}}{5^3 a^6 a^{12} c^3 c^{18}}$

$= \frac{8000 b^{54}}{a^{18} c^{21}}$

(c) $\dfrac{4^{-1}x^{-2}y^{-1}z^{3}}{2x^{3}yz^{-4}} \cdot \dfrac{16y^{12}}{x^{2}} = \dfrac{2y^{10}z^{7}}{x^{7}}$

9. (a) $\frac{9}{2}x^{3} - \frac{65}{12}x^{2} - \frac{33}{5}x + \frac{37}{6}$

(b) $x^{11} - 7x^{9} + 12x^{7} - 5x^{5} + 17x^{3} - 12x$

(c) $27x^{3} - 108x^{2} + 144x - 64$

(d) $6x^{2}y - 4xy^{2} + 2y^{3}$

10. (a) $2x(x+3)(x-12)$

(b) $(7x^{2} + 5y^{3})^{2}$

(c) $a^{10}b^{16}(8a + 9b^{4})^{2}$

(d) $x(x-1)(x+1)$

(e) $6z(2x-3y)(2x+3y)$

(f) $(6x-7)(x+3)$

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

(h) $(9a^{2}b^{4} + 4c^{4}d^{6})(3ab^{2} + 2c^{2}d^{3})(3ab^{2} - 2c^{2}d^{3})$

11. (a) $4x^2y^2\sqrt{3y}$

(b) $7\sqrt{2} + 3\sqrt{2} - 8\sqrt{2} = 2\sqrt{2}$

(c) $\sqrt{3}$

(d) $\frac{2\sqrt{3}}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{6}}{6} = \frac{\sqrt{6}}{3}$

12. (a) $2x = 4$

$x = 2$

(b) $2 - 6x = -1$

$-6x = -3$

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

(c) $5(12 - x) = 3(x + 3)$

$60 - 5x = 3x + 9$

$51 = 8x$

$x = \frac{51}{8}$

13. (a) $2x^2 - x - 21 = 0$

$(2x - 7)(x + 3) = 0$

$2x - 7 = 0$ $\quad$ $x + 3 = 0$

$x = \frac{7}{2}$ $\quad$ $x = -3$

(b) $3x^2 + 5x - 2 = 0$

$(3x - 1)(x + 2) = 0$

$x = \frac{1}{3}$ $\quad$ $x = -2$

(c) $2x^2 - 9x + 4 = 0$

$(2x - 1)(x - 4) = 0$

$x = \frac{1}{2}$ $\quad$ $x = 4$

(d) $6x^2 - 6x = 21 - x$

$6x^2 - 5x - 21 = 0$

$6x^2 + 9x - 14x - 21 = 0$

$3x(2x + 3) - 7(2x + 3) = 0$

$(3x - 7)(2x + 3)$

$3x - 7 = 0$ $\quad$ $2x + 3 = 0$

$x = \frac{7}{3}$ $\quad$ $x = -\frac{3}{2}$