

Problem #1

a.) $\frac{52}{9} \quad 9 \overline{)52}$
 $\frac{52}{9}$

$\boxed{\frac{52}{9}}$

b.) $\frac{-111}{20} \quad 20 \overline{)111}$
 $\frac{-111}{20}$

$\boxed{\frac{-511}{20}}$

Problem #2

a.) $13 \frac{2}{5} = \frac{67}{5}$

b.) $-15 \frac{5}{6} = -\frac{95}{6}$

Problem #3

a.) $\frac{66 \div 22}{88 \div 22} = \frac{3}{4}$

b.) $\frac{-196 \div 7}{210 \div 7} = \frac{-28 \div 2}{30 \div 2} = \frac{-14}{15}$

c.) $\frac{10x^2}{32x^2} = \frac{5x}{16}$

d.) $\frac{30h^2k}{18h^4k} = \frac{5h^2k}{3h^4k}$
 $= \frac{5k}{3h^2k} = \frac{5}{3h^2}$

e.) $\frac{-38a^4b^5c^2d^4}{95a^{10}bc^7}$
 $= \frac{-2a^4b^5c^2d^4}{5a^6bc^5}$
 $= \frac{-2b^4d^4}{5a^2c^5}$

Problem #4

a.) $\frac{24 \div 6}{32 \div 6} \cdot \frac{26}{30 \div 6}$

$\frac{4}{32 \div 2} \cdot \frac{26 \div 2}{5}$

$\frac{4 \div 4}{16 \div 4} \cdot \frac{13}{5}$

$\frac{1}{4} \cdot \frac{13}{5} = \frac{13}{20}$

b.) $\frac{60 \div 12}{-81} \cdot \frac{45}{72 \div 12}$

$\frac{5}{-81 \div 9} \cdot \frac{45 \div 9}{6}$

$\frac{5}{-9} \cdot \frac{5}{6}$

$\boxed{\frac{-25}{54}}$

c.) $4 \frac{5}{8} \cdot 16$

$\frac{37}{8} \cdot \frac{16 \div 8}{1}$

$\frac{37}{1} \cdot \frac{2}{1} = \boxed{74}$

d.) $2 \frac{2}{10} \cdot -8 \frac{1}{3}$

$\frac{27}{10} \cdot \frac{-25}{3 \div 3}$

$\frac{9}{10 \div 5} \cdot \frac{25 \div 5}{1}$

$\frac{9}{2} \cdot \frac{-5}{1} = \boxed{\frac{-45}{2}}$

e.) $\frac{-10x^4y}{11z} \cdot \frac{22z^2}{14x^2}$

$\frac{-10x^4y}{1z} \cdot \frac{2z}{14x^2}$

$\frac{-5x^4y}{1z} \cdot \frac{2z}{7x^2}$

$\boxed{\frac{-10x^2y}{7}}$

f.) $\frac{9m^3}{25n^4p} \cdot \frac{-15n}{18m^2p}$

$\frac{1m^3}{25n^4p} \cdot \frac{-15n}{2m^2p}$

$\frac{1m^3}{5n^4p} \cdot \frac{-3n}{2m^2p}$

$\frac{1m}{5n^3p} \cdot \frac{-3}{2p}$

$\boxed{\frac{-3m}{10n^3p^2}}$

g.) $\left(\frac{t^4}{4u}\right)^3$

$\left(\frac{t^4}{4u}\right)\left(\frac{t^4}{4u}\right)\left(\frac{t^4}{4u}\right) = \frac{t^{12}}{64u^3}$

h.) $\frac{14}{15} \div \frac{-7}{12}$

$\frac{14 \div 7}{15} \cdot \frac{-12}{7 \div 7}$

$\frac{2}{15 \div 3} \cdot \frac{-12 \div 3}{1}$

$\frac{2}{5} \cdot \frac{-4}{1} = \boxed{\frac{-8}{5}}$

i.) $-\frac{3}{4} \div 6$

$\frac{-3 \div 3}{4} \cdot \frac{1}{6 \div 3}$

$\frac{-1}{4} \cdot \frac{1}{2} = \boxed{\frac{-1}{8}}$

j.) $\frac{12}{-\frac{2}{3}}$

$12 \div \left(-\frac{2}{3}\right)$

$12 \cdot \left(-\frac{3}{2}\right)$

$6 \cdot (-3) = \boxed{-18}$

Problem #4 continued

k) $\frac{t^2 u^4}{18v^3} \div \frac{-10t^5}{12v}$

$\frac{t^2 u^4}{18v^3} \cdot \frac{12v}{-10t^5}$

$\frac{t^2 u^4}{3v^3} \cdot \frac{2v}{-10t^5}$

$\frac{t^2 u^4}{3v^3} \cdot \frac{1v}{-5t^5}$

$\frac{u^4}{3v^2} \cdot \frac{1}{-5t^3} = \boxed{\frac{u^4}{-15v^2 t^3}}$

l) $\sqrt{\frac{81}{16}} = \boxed{\frac{9}{4}}$

Problem #5

a) 16 and 20
 $\begin{matrix} \wedge & & \wedge \\ 4 & & 4 \\ \wedge & \wedge & \wedge \\ 2 & 2 & 2 & 2 \end{matrix}$

$16 = 2^4$

$20 = 2^2 \cdot 5$

$LCM = 2^4 \cdot 5 = 16 \cdot 5 = \boxed{80}$

b) 63 and 28
 $\begin{matrix} \wedge & & \wedge \\ 9 & & 7 \\ \wedge & \wedge & \wedge \\ 3 & 3 & 2 \end{matrix}$

$63 = 3^2 \cdot 7$

$28 = 2^2 \cdot 7$

$LCM = 2^2 \cdot 3^2 \cdot 7$

$4 \cdot 9 \cdot 7 = \boxed{252}$

c) 26, 30 and 39
 $\begin{matrix} \wedge & & \wedge & & \wedge \\ 2 & 13 & 3 & 10 & 3 & 13 \\ & & & \wedge & & \\ & & & 2 & & \end{matrix}$

$26 = 2 \cdot 13$

$30 = 2 \cdot 3 \cdot 5$

$39 = 3 \cdot 13$

$LCM = 2 \cdot 3 \cdot 5 \cdot 13 = \boxed{390}$

d) 9ab and 3b
 $LCM = \boxed{9ab}$

e) $20h^5k$ and $15h^2k^3$
 $LCM = \boxed{60h^5k^3}$

Problem #6

a) $\frac{2}{5 \cdot 15}$ and $\frac{4 \cdot 5}{9 \cdot 5}$
 $LCM = 45$

$\boxed{\frac{6}{45} \text{ and } \frac{20}{45}}$

b) $\frac{3}{5 \cdot 16}$ and $\frac{9 \cdot 4}{20 \cdot 4}$
 $LCM = 80$

$\boxed{\frac{15}{80} \text{ and } \frac{36}{80}}$

c) $\frac{3}{9 \cdot 4}$, $\frac{1}{6 \cdot 6}$, and $\frac{7 \cdot 4}{9 \cdot 4}$
 $LCM = 36$

$\boxed{\frac{27}{36}, \frac{6}{36}, \frac{28}{36}}$

d) $\frac{5}{9ab}$ and $\frac{2 \cdot 3a}{3b \cdot 3a}$
 $LCD = 9ab$

$\boxed{\frac{5}{9ab} \text{ and } \frac{6a}{9ab}}$

e) $\frac{-13}{3k^2 \cdot 20h^5k}$ and $\frac{4}{15h^2k^3 \cdot 4h^3}$

$LCD = 60h^5k^3$

$\boxed{\frac{-39k^2}{60h^5k^3} \text{ and } \frac{16h^3}{60h^5k^3}}$

Problem #7

a) $\frac{1}{6} - 5 \cdot \frac{7}{10}$

$\frac{1}{6} - \frac{7}{2}$

$\boxed{\frac{-10}{3}}$

$\frac{5 \cdot 7}{1 \cdot 10 \cdot 2}$

$\frac{1 \cdot 7}{1 \cdot 2} = \frac{7}{2}$

$\frac{1}{6} - \frac{7 \cdot 3}{2 \cdot 3}$
 $LCD = 6$

$\frac{1}{6} - \frac{21}{6} = \frac{-20}{6} = \frac{-10}{3}$

b) $5\frac{1}{3} + \frac{3}{4} \div \frac{5}{12}$

$\frac{16}{3} + \frac{9}{5}$

$\boxed{\frac{107}{15}}$

$\frac{3}{4} \div \frac{5}{12}$

$\frac{3 \cdot 12}{4 \cdot 5} = \frac{9}{5}$

$\frac{3 \cdot 3}{1 \cdot 5} = \frac{9}{5}$

$\frac{5 \cdot 16}{5 \cdot 3} + \frac{9 \cdot 3}{5 \cdot 3}$
 $LCD = 15$

$\frac{80}{15} + \frac{27}{15} = \frac{107}{15}$

Problem #7 continued

c) $7\frac{1}{4} + \frac{3}{4}\sqrt{\frac{4}{9}}$

$\frac{29}{4} + \frac{3}{4} \cdot \frac{2}{3}$ $\frac{3 \cdot 2}{4 \cdot 3} = \frac{2}{3}$

$\frac{29}{4} + \frac{1}{2}$ $\frac{1 \cdot 2}{4 \cdot 2} = \frac{2}{4}$

$\frac{29}{4} + \frac{1}{2}$

LCD = 4
 $\frac{29}{4} + \frac{2}{4}$

$\frac{31}{4}$

d) $(\frac{1}{2})^3 + \frac{9}{4} - 5(\frac{3}{10} + \frac{1}{5})$

$\frac{3}{10} + \frac{1}{5}$
LCD = 10
 $\frac{3}{10} + \frac{2}{10} = \frac{5}{10} = \frac{1}{2}$

$(\frac{1}{2})^3 + \frac{9}{4} - \frac{5}{1} \cdot \frac{1}{2}$

$(\frac{1}{2})^3 = \frac{1}{8}$

$\frac{1}{8} + \frac{9}{4} - \frac{5}{1} \cdot \frac{1}{2}$

$\frac{1}{8} + \frac{9}{4} - \frac{5}{2}$

LCD = 8

$\frac{1}{8} + \frac{18}{8} - \frac{20}{8} = \frac{-1}{8}$

e) $5(\frac{1}{2} - 3\frac{4}{5}) - 2(\frac{1}{6} + 4)$

$\frac{1}{2} - \frac{19}{5}$
LCD = 10
 $\frac{5}{10} - \frac{38}{10}$

$\frac{5}{1}(-\frac{33}{10})$
 $-\frac{33}{2}$

$5(-\frac{33}{10}) - 2(\frac{1}{6} + 4)$

$\frac{5}{10} - \frac{38}{10}$

$2(\frac{25}{6})$
 $\frac{25}{3}$

$5(-\frac{33}{10}) - 2(\frac{25}{6})$

$-\frac{33}{2} - \frac{25}{3}$

LCD = 6

$-\frac{99}{6} - \frac{50}{6} = \frac{-149}{6}$

$\frac{1}{6} + \frac{4}{1}$
 $\frac{1}{6} + \frac{24}{6} = \frac{25}{6}$

Problem #8

a) $(\frac{a^4 + \frac{1}{4}a^2 - a - 1}{6}) + (\frac{\frac{3}{10}a^3 + a^2 - \frac{2}{3}a + 4}{6})$

$a^4 + \frac{3}{10}a^3 + \frac{5}{4}a^2 - \frac{5}{3}a + \frac{23}{6}$

b) $(2x^4 + \frac{3}{5}x^2 - \frac{1}{8}x + 1) - (6x^4 + \frac{1}{4}x^2 - \frac{1}{2}x - \frac{1}{3})$

$(2x^4 + \frac{3}{5}x^2 - \frac{1}{8}x + 1) + (-6x^4 - \frac{1}{4}x^2 + \frac{1}{2}x + \frac{1}{3})$

$-4x^4 + \frac{2}{20}x^2 + \frac{3}{8}x + \frac{4}{3}$

$\frac{3}{8} - \frac{1}{4}$ $-\frac{1}{8} + \frac{1}{2}$

$\frac{12}{20} - \frac{5}{20} = \frac{7}{20}$ $-\frac{1}{8} + \frac{4}{8} = \frac{3}{8}$

c) $(-\frac{1}{6}m^3n^5)(\frac{3}{5}m^7n^2)$

$-\frac{1 \cdot 3}{6 \cdot 5} = \frac{1}{10}$

$-\frac{1}{10}m^{10}n^7$

d) $-\frac{5}{8}(\frac{4}{5}t^2 - \frac{2}{3}t - \frac{1}{10})$

$-\frac{5}{8} \cdot \frac{4}{5} = -\frac{1}{2}$

$-\frac{1}{2}t^2 + \frac{5}{12}t + \frac{1}{16}$

$\frac{5}{8} \cdot \frac{2}{3} = \frac{5}{12}$

$\frac{5}{8} \cdot \frac{1}{10} = \frac{1}{16}$

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

$\frac{1}{8}u^2 + \frac{1}{6}u - \frac{1}{6}u - \frac{2}{9}$

$\frac{1}{8}u^2 - \frac{2}{9}$

Problem #9

a.) $\frac{2}{3}y - 8 = \frac{1}{6}$

LCD = 6

$6(\frac{2}{3}y - 8) = 6(\frac{1}{6})$

$6 \cdot \frac{2}{3}y - 6 \cdot 8 = 6 \cdot \frac{1}{6}$

$4y - 48 = 1$

$4y - 48 + 48 = 1 + 48$

$\frac{4y}{4} = \frac{49}{4}$

$y = \frac{49}{4}$

b.) $\frac{1}{8} + n = \frac{5}{6}n - \frac{2}{3}$

LCD = 24

$24(\frac{1}{8} + n) = 24(\frac{5}{6}n - \frac{2}{3})$

$24 \cdot \frac{1}{8} + 24 \cdot n = 24 \cdot \frac{5}{6}n - 24 \cdot \frac{2}{3}$

$3 + 24n = 20n - 16$

$3 + 24n - 20n = 20n - 16 - 20n$

$3 + 4n = -16$

$3 + 4n - 3 = -16 - 3$

$\frac{4n}{4} = \frac{-19}{4}$

$n = \frac{-19}{4}$

c.) $\frac{5}{6}(x-8) = \frac{1}{5}x - \frac{1}{3}$

$\frac{5}{6}x - \frac{20}{3} = \frac{1}{5}x - \frac{1}{3}$

LCD = 30

$30(\frac{5}{6}x - \frac{20}{3}) = 30(\frac{1}{5}x - \frac{1}{3})$

$30 \cdot \frac{5}{6}x - 30 \cdot \frac{20}{3} = 30 \cdot \frac{1}{5}x - 30 \cdot \frac{1}{3}$

$25x - 200 = 6x - 10$

$25x - 200 - 6x = 6x - 10 - 6x$

$19x - 200 = -10$

$19x - 200 + 200 = -10 + 200$

$\frac{19x}{19} = \frac{190}{19}$

$x = 10$

d.) $\frac{2x}{4x} = \frac{x}{6}$

LCD = 42

$42(\frac{2x}{4x}) = 42(\frac{x}{6})$

$\frac{28}{7} = \frac{7x}{3}$

$x = 4$

e.) $\frac{2}{5}a = 10$

LCD = 5

$\frac{1}{5}(\frac{2}{5}a) = 5(10)$

$\frac{2a}{5} = 50$

$a = 25$

f.) $\frac{7}{10} = \frac{1}{5}x$

LCD = 10

$10(\frac{7}{10}) = 10(\frac{1}{5}x)$

$\frac{7}{1} = \frac{2x}{1}$

$x = \frac{7}{2}$

g.) $\frac{n}{10} = -\frac{3}{20}$

LCD = 60

$60(\frac{n}{10}) = 60(-\frac{3}{20})$

$5n = -9$

$n = \frac{-9}{5}$

h.) $-\frac{5m}{6} = -\frac{5}{21}$

LCD = 42

$42(-\frac{5m}{6}) = 42(-\frac{5}{21})$

$\frac{-35m}{-35} = \frac{-10}{-35}$

$m = \frac{10}{35} \div 5$

$m = \frac{2}{7}$

Problem #12

a.) $9.28 - 0.56(12)$
 $9.28 - 6.72$
 2.56

b.) $(0.4)^2 - 2.8 \div 0.2(1.6)$
 $0.16 - 2.8 \div 0.2(1.6)$
 $0.16 - 14(1.6)$
 $0.16 - 22.4$
 -22.24

c.) $7.5 + 2.2\sqrt{0.25} - 36.8 \div 8$
 $7.5 + 2.2(0.5) - 36.8 \div 8$
 $7.5 + 1.1 - 36.8 \div 8$
 $7.5 + 1.1 - 4.6$
 $8.6 - 4.6$
 4

d.) $40.1 - 6.9 \div 4.6(1.4)^2 + \sqrt{0.36}$
 $40.1 - 6.9 \div 4.6(1.4)^2 + 0.6$
 $40.1 - 6.9 \div 4.6(1.96) + 0.6$
 $40.1 - 1.5(1.96) + 0.6$
 $40.1 - 2.94 + 0.6$
 $37.16 + 0.6$
 37.76

e.) $\frac{7}{10}(12.88 - 43.8)$
 $\frac{7}{10}(8.5)$
 $\frac{7}{10}(8\frac{5}{10})$
 $\frac{7}{10}(8\frac{1}{2})$
 $\frac{7}{10}(17)$
 $\frac{119}{10}$

f.) $\frac{2}{5} \div (-0.8) + (\frac{1}{3})^2$
 $\frac{2}{5} \div (-\frac{8}{10}) + \frac{1}{9}$
 $-\frac{1}{2} + \frac{1}{9}$
 $-\frac{9}{18} + \frac{2}{18}$
 $-\frac{7}{18}$
 $\frac{2}{5} \div (-\frac{8}{10})$
 $\frac{2}{5} \cdot (-\frac{10}{8})$
 $\frac{1}{2} \cdot (-\frac{5}{2})$
 $\frac{1}{2} \cdot (-\frac{5}{2})$

Problem #13

a.) $-6.8(0.02a^3 - ab + 1.9b)$
 $-0.136a^3 + 6.8ab - 12.92b$

b.) $(6.1y + 2)(0.8y - 5)$
 $4.88y^2 - 30.5y + 1.6y - 10$
 $4.88y^2 - 28.9y - 10$

Problem #14

a.) $12.1x + 5.6 = 10.924$

$12.1x + 5.6 - 5.6 = 10.924 - 5.6$

$\frac{12.1x}{12.1} = \frac{5.324}{12.1}$

$x = 0.44$

b.) $0.8n + 1.22 = 0.408 - 0.6n$

$0.8n + 1.22 + 0.6n = 0.408 - 0.6n + 0.6n$

$1.4n + 1.22 = 0.408$

$1.4n + 1.22 - 1.22 = 0.408 - 1.22$

$\frac{1.4n}{1.4} = \frac{-0.812}{1.4}$

$n = -0.58$

c.) $4(2.55 - x) - 5.8x = 12.2 - (8 + 11.4x)$

$10.2 - 4x - 5.8x = 12.2 - 8 - 11.4x$

$10.2 - 9.8x = 4.2 - 11.4x$

$10.2 - 9.8x + 11.4x = 4.2 - 11.4x + 11.4x$

$10.2 + 1.6x = 4.2$

$10.2 + 1.6x - 10.2 = 4.2 - 10.2$

$\frac{1.6x}{1.6} = \frac{-6}{1.6}$

$x = -3.75$

Problem #15

a.) 18.75 more than 3.5 times t is equal to 1.5 minus t

$18.75 + 3.5t = 1.5 - t$

$18.75 + 3.5t + t = 1.5 - t + t$

$18.75 + 4.5t = 1.5$

$18.75 + 4.5t - 18.75 = 1.5 - 18.75$

$\frac{4.5t}{4.5} = \frac{-17.25}{4.5}$

$t = -3.8\bar{3}$

b.) 0.6 times the sum of k and 1.5 is equal to 0.42 plus the product of 1.2 and k

$0.6(k + 1.5) = 0.42 + 1.2k$

$0.6k + 0.9 = 0.42 + 1.2k$

$0.6k + 0.9 - 0.6k = 0.42 + 1.2k - 0.6k$

$0.9 = 0.42 + 0.6k$

$0.9 - 0.42 = 0.42 + 0.6k - 0.42$

$\frac{0.48}{0.6} = \frac{0.6k}{0.6}$

$0.8 = k$

Problem #16

a.) $56.482 + 43.9327$

$$\begin{array}{r} 56.4820 \\ + 43.9327 \\ \hline 100.4147 \end{array}$$

b.) $72.462 - 94.5234$

$$\begin{array}{r} 94.5234 \\ - 72.4620 \\ \hline 22.0614 \end{array}$$

c.) $(5.62)(3.4)$

$$\begin{array}{r} 5.62 \\ \times 3.4 \\ \hline 2248 \\ 1686 \\ \hline 19108 \end{array}$$

d.) $93.96 \div 10.8$

$$\begin{array}{r} 8.7 \\ 108 \overline{) 939.6} \\ \underline{-864} \\ 756 \\ \underline{-756} \\ 0 \end{array}$$

Problem #16 continued

d.) $19.6 \div 0.11$

$178.\overline{18}$

$$\begin{array}{r} 178.181 \\ 11 \overline{) 1960.000} \\ \underline{-11} \\ 86 \\ \underline{-77} \\ 90 \\ \underline{-88} \\ 20 \\ \underline{-11} \\ 90 \\ \underline{-88} \\ 20 \\ \underline{-11} \end{array}$$

Problem #18

Problems #25-32 not on exam #3

a.) $b = 6 \text{ cm}, h = 4 \text{ cm}$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(6)(4) = 12 \text{ cm}^2$

b.) $r = 6 \text{ m}$

$A = \pi r^2$

$A \approx (3.14)(6)^2$

$A \approx (3.14)(36)$

$A \approx 113.04 \text{ m}^2$

Problem #17

a.) $\frac{9}{20} = 0.45$

$$\begin{array}{r} .45 \\ 20 \overline{) 9.00} \\ \underline{-80} \\ 100 \\ \underline{-100} \\ 0 \end{array}$$

b.) $-\frac{5}{32} = -0.15625$

$$\begin{array}{r} .15625 \\ 32 \overline{) 5.00000} \\ \underline{-32} \\ 180 \\ \underline{-160} \\ 200 \\ \underline{-192} \\ 80 \\ \underline{-64} \\ 160 \\ \underline{-160} \end{array}$$

c.) $5\frac{5}{9} = 5.\overline{5}$

$$\begin{array}{r} 5.\overline{5} \\ 9 \overline{) 5.00} \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 5 \end{array}$$

Problem #19-20

Not on exam #3

Problem #21

$(4.75)(0.75) = 3.7525$

The cost is \$3.75

Problem #22

$4 \text{ yrs} = 48 \text{ months}$

$1734.72 \div 48 = 36.14$

Each payment is \$36.14

Problem #23

$d = rt$

$\frac{600}{350} = \frac{350t}{350}$

$t = 1.714285$

It will take about 1.7 hrs

Problem #24

Not on exam #3