MAT 050 – Prerequisite Material

Show all work for credit. Perform all these calculations without a calculator.

1. Divide. Give your answer in three forms:
   a. In remainder form.
   b. As a mixed number in reduced form.
   c. As a decimal, rounded to the nearest hundredth.

$$250 \div 14$$

rounds up

$$
14\overline{)\,250} \\
17 \\
\underline{-14} \\
110 \\
\underline{-98} \\
12
$$

$$
\overset{3}{14} \quad \overset{2}{14} \\
\times 8 \qquad \times 7 \\
\overline{112} \quad \overline{98}
$$

$$
14\overline{)\,250.000\,} \\
17.857 \\
120 \\
-112 \\
80 \\
-70 \\
100
$$

$$
\overset{2}{14} \\
\times 5 \\
\overline{70}
$$

a) $\boxed{17 \ r. \ 12}$

b) $17\frac{12}{14} = \boxed{17\frac{6}{7}}$

c) $\boxed{17.86}$

2. Simplify: $2^3 \cdot 5^2$

$= (2 \cdot 2 \cdot 2)(5 \cdot 5)$

$= 8 \times 25 = \boxed{200}$

3. Simplify: $45 - 4(5-2)^2 + 3 \cdot 2$

$= 45 - 4(3)^2 + 3 \cdot 2$

$= 45 - 4(9) + 3 \cdot 2$

$= 45 - 36 + 6$

$= 9 + 6 = \boxed{15}$

*Please
Excuse
My Dear
Aunt Sally*

4. Find the least common multiple (LCM) of 12 and 40.

$$40: \quad 40, \quad 80, \quad \boxed{120}$$
$$\qquad \text{no} \quad \text{no}$$

$$12\overline{)80} \atop -72 \qquad \overset{6}{}$$

$$12\overline{)120} \quad \overset{10}{} \checkmark$$

5. Find the greatest common factor (GCF) of 12 and 40.

$$12: \; 1, \; 12, \; 2, \; 6, \; 3, \; 4$$
$$40: \; 1, \; 40, \; 2, \; 20, \; 4, \; 10, \; 5, \; 8$$

$$\uparrow \qquad GCF = \boxed{4}$$

6. Find the numerator to form an equivalent fraction with the given denominator: $\dfrac{3}{8} = \dfrac{?}{56}$

$$\frac{3}{8} \cdot \frac{7}{7} = \boxed{\frac{21}{56}}$$

$$8 \cdot 7 = 56$$

7. Find the sum and give your result as a reduced fraction: $\dfrac{5}{8} + \dfrac{7}{12} + \dfrac{1}{9}$

$$LCD: \qquad 12: \; 12, \; 24, \; 36, \; 48, \; 60, \; 72$$
$$\qquad\qquad\qquad \text{no} \quad \text{no} \quad \text{no} \quad \text{no} \quad \text{no} \quad \text{yes}$$

$$\frac{5}{8} \cdot \frac{9}{9} + \frac{7}{12} \cdot \frac{6}{6} + \frac{1}{9} \cdot \frac{8}{8}$$

$$= \frac{45}{72} + \frac{42}{72} + \frac{8}{72} = \frac{45 + 42 + 8}{72}$$

$$= \boxed{\frac{95}{72}} \qquad \text{cannot be reduced}$$

8. What is $\frac{9}{16}$ decreased by $\frac{5}{24}$?

$$\frac{9}{16} - \frac{5}{24} = \frac{9}{16} \cdot \frac{3}{3} - \frac{5}{24} \cdot \frac{2}{2} = \frac{27-10}{48}$$

$$= \boxed{\frac{17}{48}}$$

LCD = 24 ; 24, 48
          no   yes

9. Find the product of $\frac{12}{35}$ and $\frac{14}{9}$

$$\frac{12}{35} \times \frac{14}{9} = \frac{\overset{4}{\cancel{12}}^{\div 3} \times \overset{2}{\cancel{14}}^{\div 7}}{\underset{5}{\cancel{35}}^{\div 7} \times \underset{3}{\cancel{9}}^{\div 3}} = \frac{4 \times 2}{5 \times 3} = \boxed{\frac{8}{15}}$$

10. What is $\frac{25}{24}$ divided by $\frac{35}{9}$?

$$\frac{25}{24} \div \frac{35}{9} = \frac{25}{24} \times \frac{9}{35} = \frac{\overset{5}{\cancel{25}}^{\div 5} \times \overset{3}{\cancel{9}}^{\div 3}}{\underset{8}{\cancel{24}}^{\div 3} \times \underset{7}{\cancel{35}}^{\div 5}}$$

$$= \frac{5 \times 3}{8 \times 7} = \boxed{\frac{15}{56}}$$

11. Simplify: $\left(\frac{1}{2}\right)^2 \cdot \left(\frac{1}{3}\right)^3$

$$= \left(\frac{1}{2} \times \frac{1}{2}\right)\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right)$$

$$= \left(\frac{1 \times 1}{2 \times 2}\right)\left(\frac{1 \times 1 \times 1}{3 \times 3 \times 3}\right) = \frac{1}{4} \times \frac{1}{27}$$

$$\begin{array}{r} \overset{2}{2}7 \\ \times\, 4 \\ \hline 108 \end{array}$$

$$= \boxed{\frac{1}{108}}$$

12. Simplify: $\frac{7}{5} - \frac{3}{2} \cdot \frac{4}{5} + \frac{4}{9}$ = $\frac{7}{5} - \frac{6}{5} + \frac{4}{9}$

$\frac{\cancel{3}}{\cancel{2}} \times \frac{\cancel{4}^{2}}{5} = \frac{6}{5}$

= $\frac{1}{5} + \frac{4}{9}$ = $\frac{1}{5} \times \frac{9}{9} + \frac{4}{9} \times \frac{5}{5}$

LCD = 45

$= \frac{9+20}{45} = \boxed{\frac{29}{45}}$
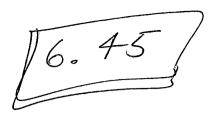
13. Find the total of   2.24, 6.5, 19.0005

$$\begin{array}{r} 19.0005 \\ 2.2400 \\ + 6.5000 \\ \hline \boxed{27.7405} \end{array}$$

14. Find the difference between   10   and   1.65

$$\begin{array}{r} \overset{9}{1}\overset{9}{0}.\overset{9}{\cancel{0}}\,{}^{1}0 \\ - 1.65 \\ \hline \boxed{8.35} \end{array}$$

15. If you have a $10 bill and buy a candy bar for $1.65 (including tax), how much change will you receive?

$\boxed{\$8.35 \text{ is your change}}$ (see above)

16. Subtract: $15.2 - 8.75$

$$
\begin{array}{r}
15.\overset{4}{\cancel{2}}\overset{1}{0} \\
- 8.75 \\
\hline
6.45
\end{array}
$$

$$\boxed{6.45}$$

17. Multiply: 4.56×0.0003

$$
\begin{array}{r}
4.56 \\
\times 0.0003 \\
\hline
0.001368
\end{array}
$$

2 decimal places
+4 decimal places
———————
6 decimal places

18. Divide and give your result as a decimal rounded to the nearest tenth:

$5.3 \div 0.007$

$$
\begin{array}{r}
757.14 \\
0.007\overline{)5.300\,00}
\end{array}
$$
rounds down

-49
40
-35
50
-49
10

10
-7
30
-28
2

$= \boxed{757.1}$

19. Convert $\frac{7}{9}$ to a decimal. Do not round. Use "bar" notation if needed.

$$
\begin{array}{r}
.77 \\
9\overline{)7.00} \\
\end{array}
$$
-63
70
-63
7

$= \boxed{0.\overline{7}}$

20. Convert $\frac{4}{7}$ to a decimal rounded to the nearest tenth.

$$
\begin{array}{r}
.5\,|7 \\
7\,\overline{)4.00} \\
-35\,\downarrow \\
\overline{50} \\
-49 \\
\overline{1}
\end{array}
$$

rounds up

$$\boxed{0.6}$$

21. Convert 0.025 to a reduced fraction.

three digits

$= \dfrac{25 \div 25}{1000 \div 25}$ three zeros

$= \boxed{\dfrac{1}{40}}$

22. Place the correct symbol $(<, =, or\ >)$ between the two numbers:

$\frac{2}{3}$ $\boxed{<}$ 0.67

$.666 \ < \ 0.670$

$$
\begin{array}{r}
.666 \\
3\,\overline{)2.000} \\
-1\,8\,\downarrow \\
\overline{2\,0} \\
-1\,8\,\downarrow \\
\overline{2\,0}
\end{array}
$$

23. Perform the following calculations:

a. $-10 + 2 \ = \boxed{-8}$

b. $-7 - 5 = \boxed{-12}$

c. $3 - 9 = \boxed{-6}$

d. $-5 + (-3) = \boxed{-8}$

e. $9 + (+4) \ = \boxed{13}$

f. $-3 + (+7) = \boxed{4}$

24. Perform the following calculation: $-125 - 7865$

$$
\begin{array}{r}
-7865 \\
-\ 125 \\
\hline
-7990
\end{array}
$$

add ; negative

25. Perform the following calculation: $-485 + 122$

$$
\begin{array}{r}
-485 \\
+\ 122 \\
\hline
\end{array}
$$

subtract ; result is negative

26. Perform the following calculation: $(-252) \times 14$

$$
\begin{array}{r}
-252 \\
\times\ 14 \\
\hline
1008 \\
+252 \\
\hline
-3528
\end{array}
$$

multiply ; result is negative

27. Perform the following calculation: $(-500)(-0.08)$

$$
\begin{array}{r}
500 \\
\times\ 0.08 \quad \leftarrow two \\
\hline
40.00 \quad \leftarrow two
\end{array}
$$

$$= \boxed{40}$$

multiply ; result is positive

28. Perform the following calculation: $36 \div (-4) = \boxed{-9}$

29. Perform the following calculation: $\dfrac{-15}{-3} = +\boxed{5}$

30. A car can be purchased for $1800 down and 36 monthly payments of $249.99. What is the total price of the car?

$$\begin{array}{r} 249.99 \\ \times 36 \\ \hline 149994 \\ + 74997 \\ \hline \$8999.64 \\ + 1800.00 \\ \hline \end{array}$$

estimate:
250 × 36
(250 × 4) × 9
1000 × 9
9000

payments
+ down payment

$10,799.64 is the total price of the car

31. A landscaper earns $150 for taking a job, plus $75 per day that he works. What are his earnings if he works $7\frac{1}{2}$ days?

150 + wages for $7\frac{1}{2}$ days
for taking the job

= 150 + 562.5

$$\begin{array}{r} + 150 \\ \hline \$712.50 \end{array}$$ are his total earnings for taking the job ; working $7\frac{1}{2}$ days

$75 \times 7\frac{1}{2}$
$= 75 \times 7.5$

$$\begin{array}{r} 75 \quad \leftarrow zero \\ \times 7.5 \quad \leftarrow one \\ \hline 375 \quad \leftarrow one \\ + 525 \\ \hline 562.5 \end{array}$$

32. Sally is $100 overdrawn on her checking account. She deposits $250. What is her balance?

−100 + 250 = $150 is her balance after depositing $250

33. Joe is buying ice cream for the preschool class he runs. He plans to give
   servings of ¾ cup to each student. He buys a 12-cup container of ice cream.
   a. How many ¾ cup servings will the 12-cup container provide?
   b. If there are 20 students, did Joe buy enough ice cream?

a) $12 \div \dfrac{3}{4} = \dfrac{\cancel{12}^{\,4}}{1} \times \dfrac{4}{\cancel{3}} = $

$\dfrac{4}{1}$

16 servings of ¾ cup
are in the 12-cup
container

b) no, Joe did not buy
enough ice cream

16 < 20