Math 10 – Unit 3 – 3.1 to 3.6; 4.1 to 4.6

To the Test – be sure to bring:

(1) your personally-prepared 8 ½ " by 11" study guide for this test
(2) your simple, non-graphing calculator and
(3) your pencils
(4) your BluGold ID

PRIME

1. Prime or Composite: Which of the following are COMPOSITE numbers? 5 (8) 31 (45) (99) 101

2. Write **150** as a product of prime factors. Your answer: 2 x 3 x 5 x 5

150 could start 5 · 30 will get same answer

15 · 10 6 · 5

3 · 5 2 · 5 2 · 3

Write **196** as a product of prime factors. Your answer: 2 x 2 x 7 x 7

196 IF you don't know how to begin try the 1st few primes: 2, 3, 5, 7, 11

2 · 98

2 · 49

7 · 7

3. Find the Greatest Common Factor (GCF) of **42** and **70** and find the GCF of **36** and **126**.

42 70 36 126

6 · 7 7 · 10 6 · 6 6 · 21

2 · 3 · 7 2 · 5 2 · 3 2 · 3 2 · 3 3 · 7

42: 2 · 3 · 7 36: 2 · 2 · 3 · 3

70: 2 · · 7 · 5 126: 2 · · 3 · 3 · 7

GCF: 2 · · 7 GCF: 2 · 3 · 3

: (14) : (18)

4. Write these fractions in simplest form: $\frac{42}{70}$ and $\frac{36}{126}$ and $\frac{84}{210}$.

$\frac{42}{70} \div \frac{7}{7} = \frac{6}{10} \div \frac{2}{2} = \frac{3}{5}$ could have used 14's the GCF $\frac{42}{70} \div \frac{14}{14} = \frac{3}{5}$

$\frac{36}{126} \div \frac{18}{18} = \frac{2}{7}$

$\frac{84}{210} \div \frac{7}{7} = \frac{12}{30} \div \frac{3}{3} = \frac{4}{10} \div \frac{2}{2} = \frac{2}{5}$

IF you don't know, Keep reducing by primes!

5. Find the product. Simplify.

$\frac{\cancel{2}^{1}}{\cancel{5}_{1}} \cdot \frac{\cancel{5}^{1}}{\cancel{8}_{\cancel{4}^{1}}} \cdot \frac{\cancel{16}^{4}}{49}$ and $\frac{\cancel{4}^{1}}{\cancel{5}_{1}} \cdot \frac{\cancel{15}^{3}}{\cancel{24}_{\cancel{8}}} \cdot \frac{\cancel{6}^{1}}{7} = \frac{3}{7}$

$\frac{4}{49}$

6. Find the quotient. Simplify. $\frac{5}{7} \div \frac{15}{28}$ and $\frac{9}{16} \div \frac{27}{36}$

$\frac{\cancel{5}^{1}}{\cancel{7}_{1}} \cdot \frac{\cancel{28}^{4}}{\cancel{15}_{3}} = \frac{4}{3}$

$\frac{\cancel{9}^{1}}{\cancel{16}_{4}} \cdot \frac{\cancel{36}^{\cancel{9}^{3}}}{\cancel{27}_{\cancel{9}_{1}}} = \frac{3}{4}$

7. Solve the equation for the value of x: $\frac{12x}{12} = \frac{144}{12}$ and $\frac{-9x}{-9} = \frac{63}{-9}$

$x = 12$ $\quad$ $x = -7$

$\{12\}$ $\quad$ $\{-7\}$

8. Solve the equation for the value of x:

$7x - 27 = 2x - 2$

$+27 \quad = \quad +27$

$7x = 2x + 25$

$-2x \quad = \quad -2x$

$\frac{5x}{5} = \frac{25}{5}$

$x = 5$

$\{5\}$

and

$3x + 7 = 6x - 2$

$+2 \quad + 2$

$3x + 9 = 6x$

$-3x \quad = \quad -3x$

$\frac{9}{3} = \frac{3x}{3}$

$3 = x$

$\{3\}$

larger number of x so keep here

9. Solve the equation for the value of x: DISTRIBUTE FIRST

$9(x-4)-5x=x+6$ and $7(x-9)=7x-18$

$9x-36-5x=x+6$

combine $4x-36=x+6$

$+36 \quad +36$

$4x=x+42$

$-x \quad -x$

$3x=42$

$\frac{3x}{3}=\frac{42}{3}$

$x=14$

$\{14\}$

$7x-63=7x-18$

$+63 \quad +63$

$7x=7x+45$

$-7x \quad -7x$

$0=45$

FALSE statement

NO Solution

$\varnothing$ ← empty set symbol

10. Find the difference. $\frac{-2}{17}-\frac{9}{17}$ and $\frac{2}{15}-\frac{4}{15}+\frac{7}{15}$

$-\frac{2}{17}-\frac{9}{17}=\frac{-11}{17}$

$\frac{2}{15}-\frac{4}{15}+\frac{7}{15}$

$-\frac{2}{15}+\frac{7}{15}=\frac{5}{15}=\frac{1}{3}$

11. Add the fractions $\frac{2}{9}+\frac{5}{27}$ and $\frac{4}{15}+\frac{3}{10}$ LCD of 15 and 10 is 30

Find common denominator

LCD of 9 + 27 is 27

$\frac{2}{9}\cdot\frac{3}{3}$

$\frac{6}{27}+\frac{5}{27}=\frac{11}{27}$

$\frac{4}{15}\cdot\frac{2}{2}+\frac{3}{10}\cdot\frac{3}{3}$

$\frac{8}{30}+\frac{9}{30}=\frac{17}{30}$

12. Multiply and simplify if necessary. $2\frac{3}{4}\bullet 3\frac{4}{5}$ and $\frac{2}{3}\bullet 1\frac{4}{5}\bullet\frac{5}{8}$

convert to improper

$\frac{2\cdot 4+3}{4}=\frac{11}{4}$ $\frac{3\cdot 5+4}{5}=\frac{19}{5}$

$\frac{11}{4}\cdot\frac{19}{5}=\frac{209}{20}$

$\frac{\cancel{2}^{1}}{\cancel{3}_{1}}\cdot\frac{\cancel{9}^{3}}{\cancel{5}_{1}}\cdot\frac{\cancel{5}^{1}}{\cancel{8}_{4}}=\frac{3}{4}$

13. Divide and simplify if necessary. $3\frac{1}{5} \div 2\frac{2}{5}$ and $6 \div 4\frac{4}{5}$

$\frac{16}{5} \div \frac{12}{5}$ ← $\frac{3 \cdot 5+1}{5} \div \frac{2 \cdot 5+2}{5}$ $\quad \frac{4 \cdot 5+4}{5}$

$\frac{6}{1} \div \frac{24}{5}$

$\frac{\cancel{16}^{4}}{\cancel{5}_{1}} \cdot \frac{5}{\cancel{12}_{3}} = \boxed{\frac{4}{3}}$

$\frac{\cancel{6}}{1} \cdot \frac{5}{\cancel{24}_{4}} = \boxed{\frac{5}{4}}$

14. Add or Subtract. $-3\frac{4}{15} + 4\frac{3}{20}$ and $5\frac{5}{13} - 2\frac{11}{13}$ and $5\frac{11}{12} - 2\frac{3}{8}$

Need common denominators

LCD = 60

$15 \cdot 4 = 60$ $\quad 20 \cdot 3 = 60$

$-3\frac{16}{60} + 4\frac{9}{60}$

$34\frac{9}{60} = 69/60$

$-3\frac{16}{60}$

$\boxed{\frac{53}{60}}$

$4\cancel{5}^{13+} \frac{5}{13} = \frac{18}{13}$

$-2\frac{11}{13}$

$\boxed{2\frac{7}{13}}$

LCD = 24

$5\frac{22}{24}$

$-2\frac{9}{24}$

$\boxed{3\frac{13}{24}}$

15. Divide and simplify if necessary. $\dfrac{\frac{5}{8}}{\frac{3}{4}}$ and $\dfrac{5+\frac{1}{5}}{17-\frac{3}{10}}$ } must be single fractions

$5+\frac{1}{5} = \frac{25}{5} + \frac{1}{5} = \frac{26}{5}$

$17 - \frac{3}{10} = \frac{170}{10} - \frac{3}{10} = \frac{167}{10}$

$\frac{5}{8} \div \frac{3}{4}$

$\frac{5}{\cancel{8}_{2}} \cdot \frac{\cancel{4}^{1}}{3} = \boxed{\frac{5}{6}}$

$\dfrac{\frac{26}{5}}{\frac{167}{10}} \Rightarrow \frac{26}{\cancel{5}_{1}} \cdot \frac{\cancel{10}^{2}}{167} = \boxed{\frac{52}{167}}$

16. You have $\frac{7}{8}$ yards (yd) of material. You want to make **one** placemat. The instructions say $\frac{5}{6}$ yd of material is needed to make **one** placemat. After you make the **one** placemat, how much material will be left?

$\frac{7}{8} - \frac{5}{6}$ $\quad$ LCD = 24

$\frac{7}{8} \cdot \frac{3}{3}$ $\quad \frac{5}{6} \cdot \frac{4}{4}$ $\quad \frac{21}{24} - \frac{20}{24} = \boxed{\frac{1}{24} \text{ yard}}$

17. If a meat plant packages hamburger in $1\frac{3}{8}$ pound packages and the batch of beef to package weighs $9\frac{5}{8}$ pounds, how many packages can be made?

$$\frac{9\frac{5}{8}}{1\frac{3}{8}} \Rightarrow \frac{\frac{9\cdot 8+5}{8}}{\frac{1\cdot 8+3}{8}} \Rightarrow \frac{\frac{77}{8}}{\frac{11}{8}} = \frac{77}{8} \div \frac{11}{8}$$

$$\frac{\cancel{77}^{7}}{\cancel{8}} \cdot \frac{8}{\cancel{11}_{1}} = 7 \text{ packages}$$

Chuck needs three shelves, one $10\frac{3}{8}$ inches long and the other <u>two</u> each $16\frac{1}{4}$ inches long. If he cuts the shelves out of a piece of lumber that is 48 inches long, approximately how much wood will he have left?

$10\frac{3}{8} + 16\frac{1}{4} + 16\frac{1}{4} =$

$10\frac{3}{8} + 16\frac{2}{8} + 16\frac{2}{8} = 42\frac{7}{8}$

$$\begin{array}{r} \overset{7}{\cancel{48}}\ {}^{8}/_{8} \\ -\ 42\ 7/8 \\ \hline 5\ 1/8 \text{ ft} \end{array}$$

18. Solve the equation for the value of x: $\frac{x}{8} = -7$ and $\frac{3x}{5} = \frac{3}{10}$

$8(-7) = x$

$-56 = x$

$\{-56\}$

$(3x)(10) = 3(5)$

$\frac{30x}{30} = \frac{15}{30}$

$x = \frac{15}{30} = \frac{1}{2}$ $\left\{\frac{1}{2}\right\}$

19. Solve the equation for the value of x: $\frac{x}{5} - \frac{1}{15} = \frac{6x+13}{75}$

To Eliminate denominators multiply all fractions by the LCD which is 75

IF the correct LCD is selected, ALL denominators are eliminated.

$$\frac{x}{\cancel{5}}\cdot\overset{15}{\cancel{75}} - \frac{1}{\cancel{15}}\cdot\overset{5}{\cancel{75}} = \frac{6x+13}{\cancel{75}}\cdot\overset{1}{\cancel{75}}$$

$15x - 5 = 6x + 13$

$+5 \quad = \quad +5$

$15x = 6x + 18$

$-6x \quad -6x$

$\frac{9x}{9} = \frac{18}{9}$

$x = 2$

$\{2\}$

And $\frac{x}{20}-\frac{1}{10}=\frac{2}{5}$ and $\frac{x}{4}-\frac{1}{6}=\frac{4x-5}{12}$ and $\frac{3}{4}x-2=7$

LCD = 20

$\frac{x}{20}\cdot 20-\frac{1}{10}\cdot\frac{2}{20}=\frac{2}{5}\cdot\frac{4}{20}$

$x-2=8$

$+2 \quad +2$

$x=10$ {10}

LCD = 12

$\frac{x}{4}\cdot\frac{3}{12}-\frac{1}{6}\cdot\frac{2}{12}=\frac{4x-5}{12}\cdot 12$

$3x-2=4x-5$

$+5 \quad =\quad +5$

$3x+3=4x$

$-3x \quad =-3x$

$3=x$ {3}

LCD = 4

$\frac{3}{4}x\cdot 4-2\cdot 4=7\cdot 4$

must multiply whole numbers too!

$3x-8=28$

$+8 \quad =+8$

$\frac{3x}{3}=\frac{36}{3}$

$x=12$ {12}

20. The sum of two consecutive odd integers is 72. Find the two integers.

$x, x+2$

$x+(x+2)=72$

$2x+2=72$

$-2 \quad =-2$

$2x=70$

$\frac{2x}{2}=\frac{70}{2}$

$x=35$

$x+2=37$

The integers are 35 and 37.

Larry is 4 years older than Susan, and Nathan is twice as old as Susan. If the sum of their ages is 32 years, find each of their ages.

Susan = S

Larry = S + 4

Nathan = 2S

$S+(S+4)+2S=32$

$4S+4=32$

$4S+4=32$

$-4 \quad =-4$

$\frac{4S}{4}=\frac{28}{4}$

$S=7$

$S+4=11$

$2S=14$

Susan is 7
Larry is 11
Nathan is 14

Fran worked twice as many hours as Jerry. Marcia worked 7 more hours than Jerry.
If they worked a total of 27 hours, find out how many hours each worked.

Let J represent the number of hours Jerry worked. Jerry = J

What **expression**, in terms of J, represents the number of hours Fran worked?

Fran = 2J

What **expression**, in terms of J, represents the number of hours Marcia worked?

Marcia = J+7

What **equation** represents this problem? J + 2J + J+7 = 27

$4J+7=27$

$-7 \quad =-7$

$\frac{4J}{4}=\frac{20}{4}$

$J=5$

Jerry worked 5 hours.
Fran worked 10 hours.
Marcia worked 12 hours.
27