Math 40 – Elementary Algebra

AMBER BUNTIN • FALL 2015

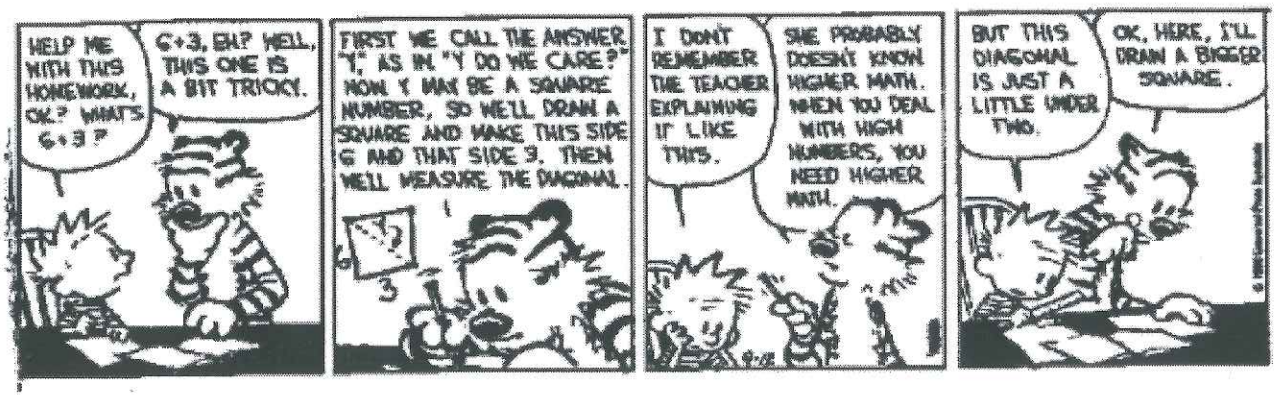
Exam#1

Name: Key Date: 9.25.15

Instructions

- ✓ You have 50 minutes to complete the exam. Please read ALL instructions carefully;
- ✓ You may NOT use a calculator;
- ✓ Use **proper mathematical notation** on ALL problems
- ✓ You may NOT use any notes, book, or neighbors during the exam;
- ✓ Use only pencil and indicate answers by BOXING, CIRCLING, or HIGHLIGHTING;
- ✓ Be sure to show your work **NEATLY** and **CLEANLY** for each problem;
- ✓ You must show work to receive full credit and simplify all answers completely;
- ✓ Leave fractions as improper fractions if necessary (no mixed numbers);

CALVIN AND HOBBES By Bill Watterson



GOOD LUCK!!

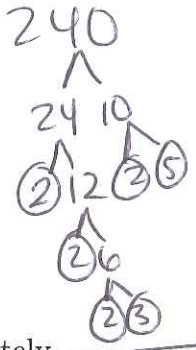
Exam#1: (100 points) Show your work and clearly mark your answer **use proper mathematical notation**. No calculators allowed.

(5pts) **1.** Determine the value of each expression.

a) $-(-36) = \boxed{36}$

b) $-|-28| = -(28) = \boxed{-28}$

(5pts) **2.** Write the prime factorization of 240. Show work using a prime factor tree or some other method.



$240 = \boxed{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5}$ OR

$= \boxed{2^4 \cdot 3 \cdot 5}$

(5pts) **3.** Simplify completely.

$$-\frac{240}{26} \div \frac{36}{13} = -\frac{240}{26} \cdot \frac{13}{36} = \frac{-2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 \cdot 13}{2 \cdot 13 \cdot 2 \cdot 2 \cdot 3 \cdot 3}$$

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

(5pts) **4.** Simplify the given expressions. If the answer does not exist or is undefined, write "undefined."

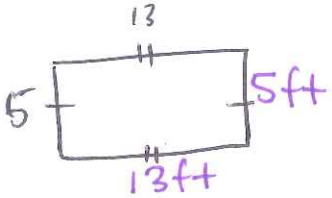
a) $0 \div -5 = \frac{0}{-5} = \boxed{0}$

b) $\frac{21}{0} = \boxed{\text{UND}}$

c) $0 \cdot 29 = \boxed{0}$

d) $-15 \div 0 = \frac{-15}{0} = \boxed{\text{UND}}$

(5pts) **5.** Find the PERIMETER and AREA of a rectangle with a length of 13 feet and a width of 5 feet. Be sure to answer in a complete sentence using proper units.



Perimeter $= 13 + 5 + 13 + 5$

$= 18 + 18$

$= 36\text{ft}$

Area $= l \cdot w$

$= (13)(5)$

$= 65\text{ft}^2$

The perimeter is 36ft & the area is 65ft^2.

(10pts) **6.** Use order of operations to simplify the expressions:

a) $15 + 3(4 - 10)$ mult. 1st!

$= 15 + 3(-6)$

$= 15 - 18$

$= \boxed{-3}$

b) $4 + 6(7 - 5)^3 - 20$

$= 4 + 6(2)^3 - 20$

$= 4 + 6(8) - 20$

$= 4 + 48 - 20$

$= 52 - 20$

$= \boxed{32}$

(10pts) **7.** Use order of operations to compute the exact value of each expression:

a) $48 \div 12 \cdot 2$

$= 4 \cdot 2$

$= \boxed{8}$

12 × 4 = 48

b) $20 - 4|-30 + (-5)^2|$

$= 20 - 4|-30 + 25|$

$= 20 - 4 \cdot |-5|$

$= 20 - 4 \cdot (5)$

$= 20 - 20$

$= \boxed{0}$

c) $\dfrac{4 - 2[(2^2 - 5) - 6]}{8 - 26}$

$= \dfrac{4 - 2[(4-5) - 6]}{-18}$

$= \dfrac{4 - 2[-1 - 6]}{-18}$

$= \dfrac{4 - 2[-7]}{-18}$

$= \dfrac{4 - 2(-7)}{-18}$

$= \dfrac{4 + 14}{-18}$

$= \dfrac{18}{-18}$

$= \boxed{-1}$

26 − 8 = 18

(10pts) **8.** Combine like terms and simplify completely:

a) $-7(6x-8y)-12(-2y+3x)$

$= -42x + 56y + 24y - 36x$

$36 + 42 = 78$ $\quad 56 + 24 = 80$

$= -78x + 80y$ or $80y - 78x$

b) $-18\left(\frac{2}{9}a - \frac{5}{2}b\right) = -\frac{18}{1}\left(\frac{2}{9}a - \frac{5}{2}b\right) = -\frac{18^2}{1}\cdot\frac{2}{9}a + \frac{18^9}{1}\cdot\frac{5}{2}b$

$= -4a + 45b$

or

$45b - 4a$

(10pts) **9.** Evaluate the following expressions at the given value(s):

a) $x^2 - 3x + 16$ at $x = -2$

$= (-2)^2 - 3(-2) + 16$

$= 4 + 6 + 16$

$= 10 + 16$

$= 26$

b) $2x^2 - 3xy - 4y^2$ at $x = -4$ and $y = -3$

$= 2(-4)^2 - 3(-4)(-3) - 4(-3)^2$

$3 \cdot 4 \cdot 3$
$12 \cdot 3$
36

$= 2(16) - 36 - 4(9)$

$= 32 - 36 - 36$

$= -4 - 36$

$= -40$

(10pts) **10.** Use the following options to identify the property that justifies each statement and WRITE ONE LETTER NEXT TO EACH IDENTITY.

a) Commutative property of addition
b) Commutative property of multiplication
c) Associative property of addition
d) Associative property of multiplication
e) Additive Identity
f) Distributive property

$8 \cdot (-2) = -2 \cdot 8$ Letter: b
$-3(6 \cdot 7) = (-3 \cdot 6) \cdot 7$ Letter: d
$0 + 23 = 23$ Letter: e
$7 + (-2) = -2 + 7$ Letter: a
$8(2y - 4) = 16y - 32$ Letter: f

(15pts) **11.** Solve the following equations for x and show CHECK of your answers BY HAND:

a) $-10x - 3 = -12x - 5$

$-10x - 3 + 12x = -12x - 5 + 12x$
$2x - 3 = -5$
$2x - 3 + 3 = -5 + 3$
$2x = -2$
$x = \frac{-2}{2}$
$x = -1$

Check: $x = -1$
$-10(-1) - 3 \stackrel{?}{=} -12(-1) - 5$
$10 - 3 \stackrel{?}{=} 12 - 5$
$7 = 7$ ✓

b) $-\frac{9}{4}x = \frac{15}{8}$

mult. by reciprocal!

$\left(-\frac{4}{9}\right)\left(-\frac{9}{4}x\right) = \frac{15}{8}\left(-\frac{4}{9}\right)$
$x = \frac{15}{8}\left(-\frac{4}{9}\right)$
$x = \frac{-3 \cdot 5 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{-5}{6}$
$x = -\frac{5}{6}$

Check: $x = \frac{5}{6}$
$-\frac{3}{4}\left(-\frac{5}{2}\right) \stackrel{?}{=} \frac{15}{8}$
$\frac{15}{8} = \frac{15}{8}$ ✓

c) $6.9 + 2x = -3.3$

mult. by 10!

$10(6.9) + 10(2x) = 10(-3.3)$
$69 + 20x = -33$
$69 + 20x - 69 = -33 - 69$
$20x = -102$
$x = -\frac{102}{20} = -\frac{51}{10}$

$\frac{69}{33}$
102

$x = -\frac{51}{10}$

or

$x = -5.1$

Check:
$6.9 + 2\left(-\frac{51}{10}\right) = -3.3$
$6.9 + \left(-\frac{51}{5}\right) = -3.3$
$\frac{69}{10} - \frac{51}{5}\left(\frac{2}{2}\right) = -3.3$
$\frac{69 - 102}{10} = -3.3$
$\frac{-33}{10} = -3.3$ ✓
$-3.3 = -3.3$ ✓

(10pts) **12.** Solve the following equations for x CHECK IS NOT REQUIRED:

a) $16x + 8 = 4x - 10$

$16x + 8 - 4x = 4x - 10 - 4x$

$12x + 8 = -10$

$12x + 8 - 8 = -10 - 8$

$12x = -18$

$x = \frac{-18}{12}$

$\boxed{x = -\frac{3}{2}}$

b) $\frac{3}{2}x + \frac{1}{3} = -\frac{1}{5}x - \frac{2}{3}$ LCD $= \frac{30}{1}$

51 = 3 · 17

$15 \cdot \frac{30}{1}\frac{3}{2}x + \frac{30^{10}}{1}\frac{1}{3} = \frac{30^{6}}{1}\left(-\frac{1}{5}x\right) - \frac{30^{10}}{1}\cdot\frac{2}{3}$

$45x + 10 = -6x - 20$

$45x + 6x = -20 - 10$

$51x = -30$

$x = -\frac{30}{51} = \frac{2 \cdot 3 \cdot 5}{3 \cdot 17} = -\frac{10}{17}$ ← reduced!

$\boxed{x = -\frac{10}{17}}$

(3pts) **13.** Extra Credit (No partial credit given): Solve the following equation and check answer IF YOU HAVE TIME. Answer as a decimal if needed and simplify answer completely.

$-4.8 + 6.3 = 7x - 2.7 - 4x$

$1.5 = 3x - 2.7$

$1.5 + 2.7 = 3x$

$4.2 = 3x$

$\boxed{1.4 = x}$

$3x = 4.2$

$x = \frac{4.3}{3}$

$6.3 - 4.8 = 1.5$

$1.5 + 2.7 = 4.2$

$3 \overline{)4.2}$ → 1.4

$3 \downarrow$

12

-12

0