➤ **Algebra exercises from Hall & Knight I** (continued from last class)

1. If $a = 7$, $b = 2$, $c = 0$, $x = 5$, $y = 3$, find the value of: (A) ab^3, (B) a^4b^y, (C) $a^5c^5y^x$, (D) 1^{x+3y}, (E) $abcxy$, (F) $2a + 5b +$
9c, (G) $3x^2 + 1$, (H) a^{b^c}, (I) $\left(a^b\right)^c$

2. If $a = 2$, $b = 3$, $c = 1$, $p = 0$, $q = 4$, $r = 6$, find the value of: (A) $\dfrac{3a^2 r}{8b}$, (B) $3a^2 b^c$, (C) $\dfrac{b^r}{r^b}$, (D) $\dfrac{64}{q^r}$,
  (E) $\dfrac{5a^r b^q}{64 r^a}$

3. If $a = 2$, $b = 3$, $c = 1$, $d = 0$, find the numerical value of: (A) $3bcd + 5cda - 7dab + abc$,
     (B) $2a^2 + 3b^3 - 4c^4$, (C) $a^2 + b^2 + c^2 + d^2$, (D) $a^4 + b^4 - c^4$

4. If $a = 2$, $b = 1$, $c = 3$, $x = 4$, $y = 6$, $z = 0$, find the value of:

     (A) $c^2(y - x) - b^2(c - a)$, (B) $(2a - c)(x + 2y - z)$, (C) $\dfrac{a^2}{b^2} + \dfrac{b^2}{a^2} - \dfrac{2y}{x^2}$,

     (D) $\dfrac{a^2 - b^2}{a^2 b^2} - \dfrac{(a + b + z)^2}{(b + c - z)^2}$, (E) $\dfrac{(a + b + c)^2}{c(y - z)} - \dfrac{4(c - a)^3}{3(a + y)}$

5. When x has the values 0, 3, 6, 8, 10, find the values of $x^2 - 9x + 20$.

6. Show that, if $a = 10$ and $b = 7$, then the following two expressions are equal:
$$4(a - b) + 3(a + b), \quad 5(a + b) + 2(a - 3b)$$
     Are these expressions equal *for all values of a and b?*

7. When $x = 5$, show that $4x^2 + 4x - 3$ is equal to $9(x + 8)$.

8. Show that $6x^3 - 11x^2 + 3x$ is equal to 0 when $x = 1/3$, and when $x = 3/2$. Find its value in the form of a decimal when $x = 1/10$.

Oral exercises (from Hall & Knight):

  (a) The quantity c is to be multiplied by the quantity x. How is this expressed?
      Give the product if $c = 7$ and $x = 3$.

  (b) If x *factors*, each equal to c, are to be multiplied together, express this algebraically.

      What is the value if $x = 2$ and the factor $c = 7$?

  (c) The quantities a, b, c are to be added together. Express this algebraically.

      What is the answer if $a = 5$, $b = 7$, $c = 11$?

  (d) The quantity r is to be taken from the quantity s. Give the algebraic expression that denotes this.

      What is the answer if $r = 27$ and $s = 41$?

  (e) Albertine starts playing with x marbles and wins y. Express the number she then has.

      If $x = 25$ and $y = 9$, what number has she?

  (f) Albertine plays with her increased number and loses z. Express the number she then has.

If z = 17, how many has she left?

(g) A farmer takes *f* sheep to market and sells *g* of them. How many has she left?

What is the *remainder* if f = 64 and g = 48?

(h) Another farmer takes *k* sheep to market and returns with *l* of them. How many has she sold?

If *k* = 75 and *l* = 32, what is the number she has sold?

(i) Give the sum and product of the three quantities *a, b, c*.

If a = 5, b = 7, c = 6, give the arithmetical value of each.

(j) If I walk *y* miles per hour for *y* hours, what is the algebraic expression for the length of my walk? If y = 4, what is the answer?

Terminology

1. Additive inverse
2. Multiplicative inverse
3. Additive identity
4. Multiplicative identity

Multiplying fractions — Created By Mr.Harrington
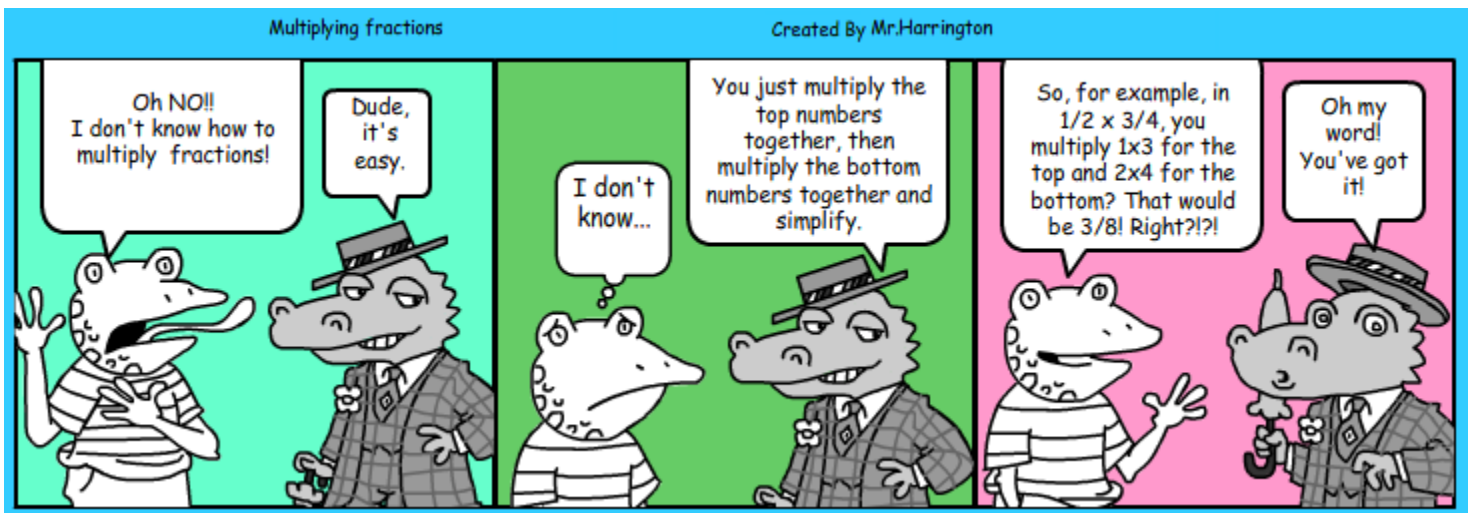
Complex Fractions

Simplify each of the following:

a. $7 - \dfrac{3}{7}$

b. $\dfrac{2}{5} - \dfrac{1}{10}$

c. $\dfrac{5}{12} - \dfrac{1}{6} + \dfrac{3}{4}$

d. $\dfrac{3/4}{5}$

e. $\dfrac{\frac{3}{4}+\frac{1}{8}}{5}$
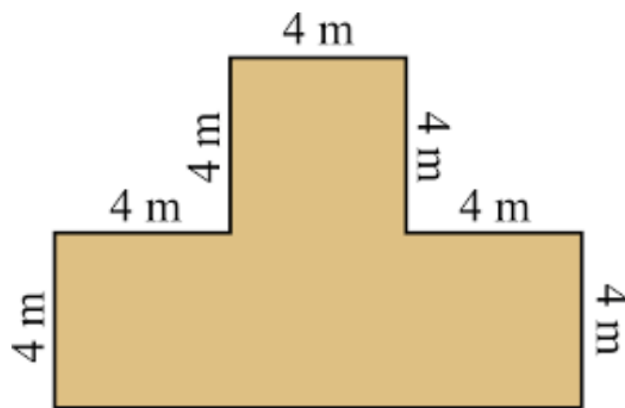
f. $\dfrac{7}{\frac{2}{5}+\frac{3}{10}}$

g. $\dfrac{3+\frac{3}{4}}{6}$

h. $\dfrac{3+\frac{3}{4}}{\frac{1}{2}-\frac{1}{9}}$

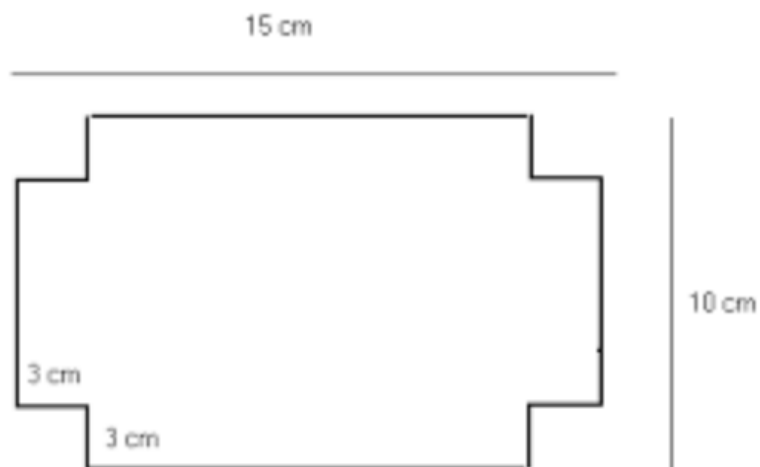i. $\dfrac{2+\frac{4}{5}}{2+\frac{3}{5}}$

Geometric problems

1. Find the área and the perimeter of the following figure.

4 m

4 m

4 m

4 m

4 m

4 m

4 m

2. Find the área and the perimeter of the following figure.

15 cm

10 cm

3 cm

3 cm

1. Place the correct inequality symbol ($<$ or $>$) between each pair of numbers.

   (a) $\frac{5}{2}$ ⬚ $|-3|$ (b) $-\frac{2}{3}$ ⬚ $-\frac{3}{2}$

2. Find the distance between -4.4 and 6.9.

In Exercises 3–10, evaluate the expression.

3. $-14 + 9 - 15$

4. $\frac{2}{3} + \left(-\frac{7}{6}\right)$

5. $-2(225 - 150)$

6. $(-3)(4)(-5)$

7. $\left(-\frac{7}{16}\right)\left(-\frac{8}{21}\right)$

8. $\frac{5}{18} \div \frac{15}{8}$

9. $\left(-\frac{3}{5}\right)^3$

10. $\frac{4^2 - 6}{5} + 13$

11. Identify the property of real numbers illustrated by each statement.

    (a) $(-3 \cdot 5) \cdot 6 = -3(5 \cdot 6)$

    (b) $3y \cdot \dfrac{1}{3y} = 1$

12. Rewrite the expression $-6(2x - 1)$ using the Distributive Property.

In Exercises 13–16, simplify the expression.

13. $3x^2 - 2x - 5x^2 + 7x - 1$

14. $x(x + 2) - 2(x^2 + x - 13)$

15. $a(5a - 4) - 2(2a^2 - 2a)$

16. $4t - [3t - (10t + 7)]$

17. Explain the meaning of "evaluating an algebraic expression." Evaluate the expression $7 + (x - 3)^2$ for each value of x.

    (a) $x = -1$ (b) $x = 3$

18. An electrician wants to divide 102 inches of wire into 17 pieces with equal lengths. How long should each piece be?

19. A *cord* of wood is a pile 4 feet high, 4 feet wide, and 8 feet long. The volume of a rectangular solid is its length times its width times its height. Find the number of cubic feet in 5 cords of wood.

20. Translate the phrase into an algebraic expression.

    "The product of a number n and 5, decreased by 8"

21. Write an algebraic expression for the sum of two consecutive even integers, the first of which is $2n$.

22. Write expressions for the perimeter and area of the rectangle shown at the left. Simplify the expressions and evaluate them when $l = 45$.

0.6*l*

l

Figure for 22