Math 3 Classwork 11

Warm-Up

1 Write the missing numbers to make the equations correct:

$12 \times$ ___= ___ $\times\ 10$ ___ $\times\ 15$= ___ $\times\ 10$

____ $\times\ 6$ = ___ $\times\ 3$ ___ $\times\ 8$ = ___ $\times\ 10$

___ $\times\ 2$ =___ $\times\ 4$ = __ $\times\ 8$ ___ $\times\ 3$ =___ $\times\ 6$ = __ $\times\ 9$

2 Complete the mixed addition and subtraction calculations (use the most optimal way)

51 – 42 + 49 = ___________________   77 – 63 – 7 = ________________

63 + 12 – 25 = ___________________   32 - 45 + 68 = ________________

3 Answer the questions (mental math):

a) How many threes should be subtracted from 15 so the result is 0?
b) How many forth should be subtracted from 24 so the result is 0?
c) Six tens are subtracted from the number and the result is 2. What is the number?
d) Eight threes are subtracted from the number and the result is 1. What is the number?

4 Solve the problems:

a) Dad works 8 hours a day, 5 days a week. How many hours a week does dad work?_________

b) Simon reads 6 pages of a book every day. He has been reading a book for 4 days. On the fifth day, Simon should start to read from a page __________ ?

Homework Review

5 Solve for *x:*

$(630 - x) + 210 = 500$ $(x + 190) - 370 = 330$

_________________________   _________________________

_________________________   _________________________

_________________________   _________________________

_________________________   _________________________

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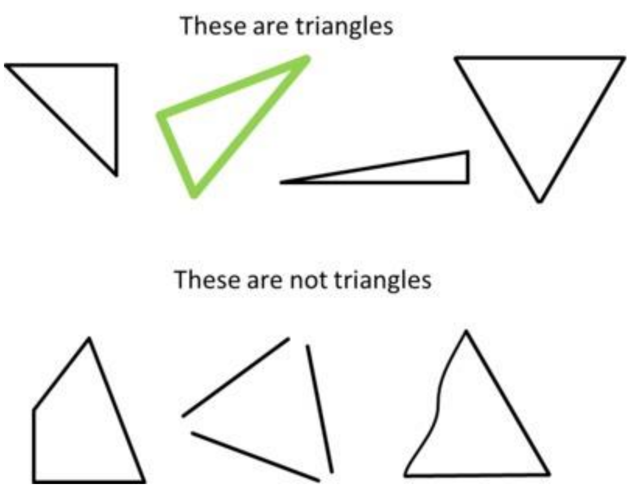
New Material

A triangle is *a closed shape with three straight sides that meet at three vertices. It is a polygon.*

Types of triangles:

By sides:
a) **Scalene triangle** – no equal angles and no equal sides
b) **Isosceles triangle** – 2 equal sides and 2 equal angles
c) **Equilateral triangle** – 3 equal sides and 3 equal angles

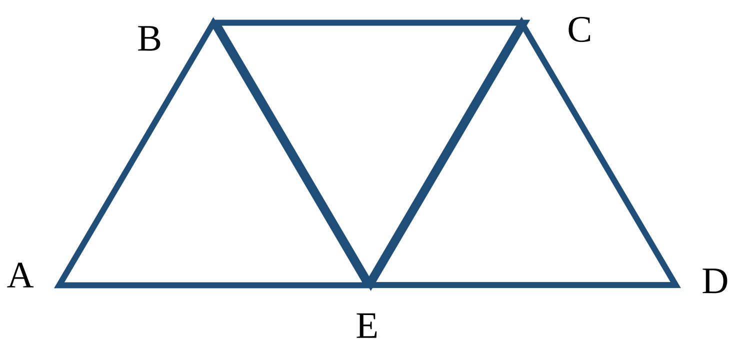
By angles:
a) **Right triangle**– has a right angle
b) **Obtuse triangle** – has an angle that larger than a right angle
c) **Acute triangle** – all angles are smaller than a right angle



6 The side of an equilateral triangle is 8 cm. Find a perimeter of this triangle.

P = ________________________

7 A quadrilateral consists of 3 equilateral triangles. The length of a side of each triangle is 6 cm. Find a perimeter of the quadrilateral. P = ___________________________



Why do we need parentheses?

When we have a math problem that involves more than one operation—for example, addition and subtraction, or subtraction and multiplication—which operation do you perform first?

Example: 8 – 4 + 1

If the operations are performed in the natural order:

1st - subtraction , then - addition, the answer will be 5.

In order to change the natural order, we use ***parentheses***. By inserting parentheses around the particular operation, we are saying that this particular operation should be performed first.

① ② 8 – 4 + 1 = 5

② ① 8 – (4 + 1) = 3

If there are several pairs of parentheses in the expression, we perform operations from the left to right.

① ③ ④ ②

Example: *(5 + 1) – 4 + (8 –5)*

How do we work with parentheses?

The part between two parentheses is treated like a SINGLE number.

Removing parentheses.

$a + (b + c) = a + b + c$

$a + (b – c) = a + b – c$

$a – (b – c) = a – b + c$

8 Open up the parentheses (be careful with a "–" sign in front of parentheses):

$(s + 3) + (4 + a) =$ ________________

$(f + 4) – (g + 64) =$ ________________

$(n + b – d) + 14 =$ ________________

$(20 – t) – (w + v) =$ ________________

$(d + 8) + (7 – a) =$ ________________

$(20 – z) – (7 + a) =$ ________________

9 Determine the order of operations in each expression (put the number of the operation above the operation sign):

a) a – (b + c) **b)** (a + b) – c **c)** a – (b – c) – d

d) 26 + (32 – 16) **e)** 93 + (12 + 16) – 35 **f)** a + (b – c + d)

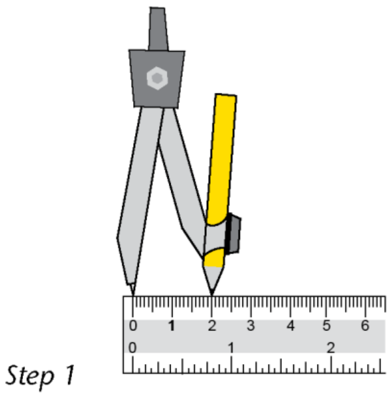
10 Connect the equivalent expressions:

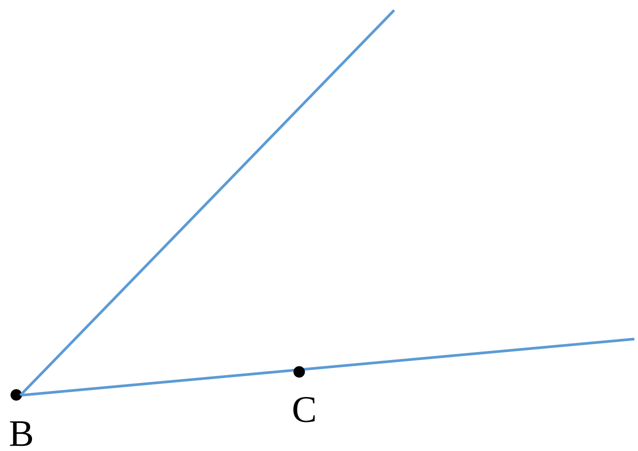
34 – (12 + 6 + 3)	34 – 12 – 6 + 3
34 + (12 + 6 + 3)	34 – 12 – 6 – 3
34 – (12 + 6 – 3)	34 + 12 + 6 + 3

Using a compass

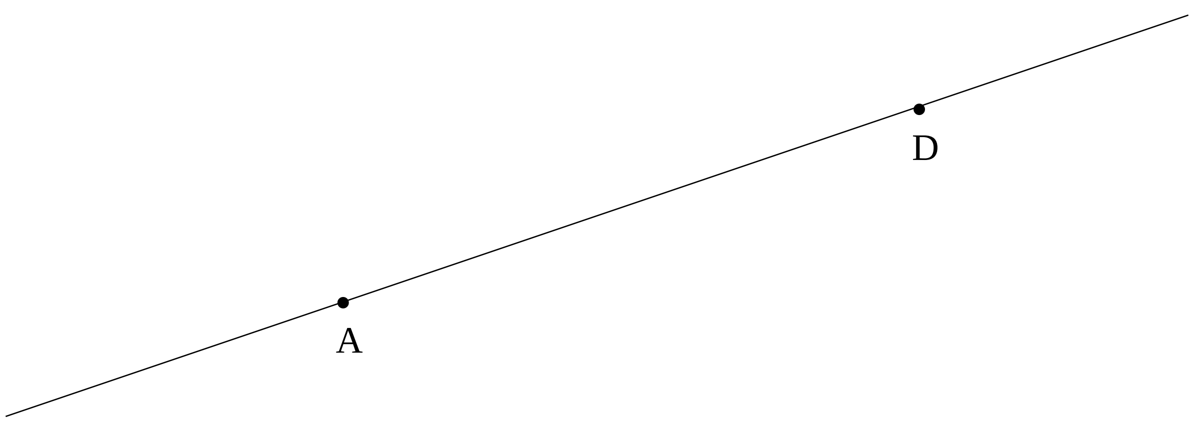
A compass is a handy drawing tool to have around. Use it to draw circles, make equal line segments or find the midpoint of a line.

11 Use a compass to find a point A on the other side of the angle so that point A will be on the same distance from the vertex of the angle – B, as point C is.





12 Use a compass and the ruler to find a midpoint between points A and D.



Multiplication 2 digit numbers by 1 digit numbers without regrouping.

One – Digit – One – Line method (using the column form)

The **column form** is the most common way to solve 2-digit by 1-digit multiplication problems. This is also called the **standard method**.
First, arrange the numbers in **column form**.

$$\begin{array}{r} 21 \\ \times\ 5 \\ \hline \end{array}$$

Write the **2-digit** number at the **top**, and the **1-digit** number at the **bottom.**

Also, remember to **align the place values** correctly.

Then start multiplying with the numbers on the right. $5 \times 1 = 5$

We write 5 in the ones place:

$$\begin{array}{r} 21 \\ \times\ 5 \\ \hline 5 \end{array}$$

Next, we multiply $5 \times 2 = 10$

$$\begin{array}{r} 21 \\ \times\ 5 \\ \hline 5 \end{array}$$

Last, we write 10 before 5:

$$\begin{array}{r} 21 \\ \times\ 5 \\ \hline 105 \end{array}$$

Our answer is 105! In this simple case, we can check our answer by performing an addition: 21 + 21 + 21 + 21 + 21 = 105.

Multiplying with regrouping.

$$\mathbf{8 \times 97} = ?$$

Explain each step

$$\begin{array}{r} 97 \\ \times\ 8 \\ \hline \end{array} \qquad \begin{array}{r} 5\ \ \\ 97 \\ \times\ 8 \\ \hline 6 \end{array} \qquad \begin{array}{r} 5\ \ \\ 97 \\ \times\ 8 \\ \hline 6 \end{array} \qquad \begin{array}{r} 72+5\ \ \\ 97 \\ \times\ 8 \\ \hline 6 \end{array} \qquad \begin{array}{r} 72+5\ \ \\ 97 \\ \times\ 8 \\ \hline 776 \end{array}$$

13 Calculate:

$19 \times 5 =$ $47 \times 4 =$ $63 \times 6 =$

REVIEW

14 Evaluate each expression below when $n = 20$

$15 + n =$ $33 - n =$ $n \times 4 =$ $2 \times 4 + n =$

15 The rectangle consists of the squares. The side of the small square is 1 cm.

Find a perimeter of the rectangle.

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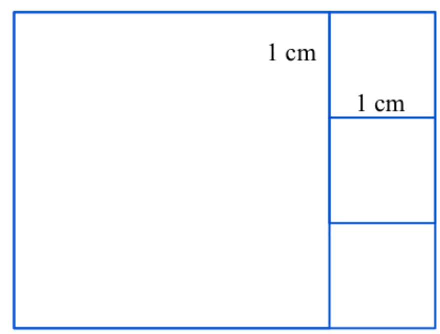


16 a) A rectangular swimming pool is 10 meters wide and 15 meters long. What is its perimeter?

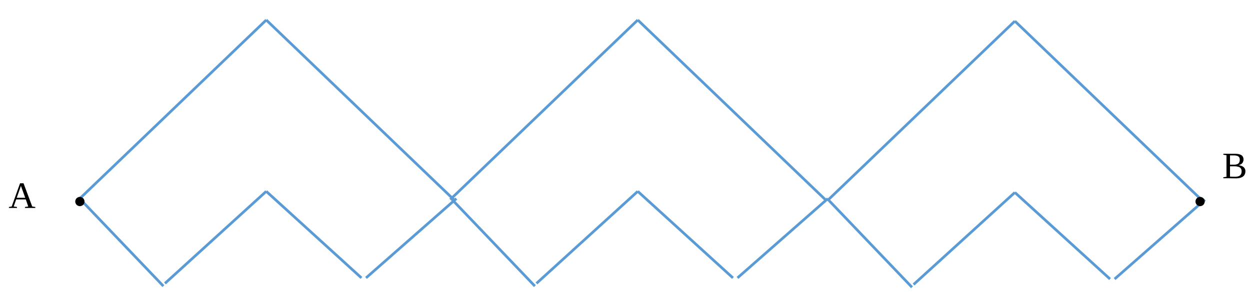
P = ______________________

b) Brook has a rectangular garden of length 12 meters and width 6 meters

She wants to fence the garden with a rope. How much rope will be required?

P = ______________________

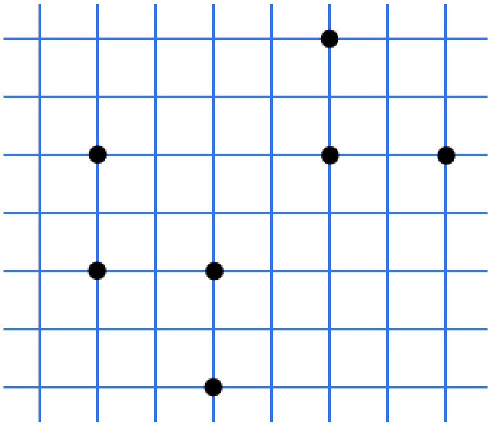
17 How many polygonal chains connect points A and B? Compare their lengths.



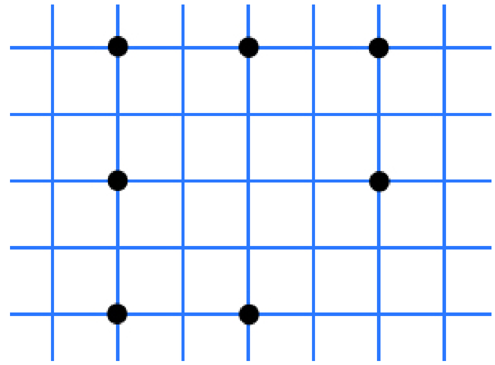
18

Connect exactly four points on the pictures below to make

a) a rectangle



b) a square



Did you know …

What's with all the Triangles? They seem to be everywhere. The Triangle has a rich and complex history and has, since early civilizations, been the symbol of the trilogy (or “triad”) that makes all existence possible.

Triangles are among the most important objects studied in mathematics owing to the rich mathematical theory built up around them in **Euclidean geometry** and **trigonometry**, and also to their applicability in such areas as astronomy, architecture, engineering, physics, navigation, and surveying.

The origins of right triangle geometry can be traced back to 3000 BC in Ancient Egypt. The Egyptians used special right triangles to survey land by measuring out 3-4-5 right triangles to make right angles. The Egyptians most studied specific examples of right triangles.

Ancient builders and surveyors needed to be able to construct right angles in the field on demand. The method employed by the Egyptians earned them the name “rope pullers” in Greece, apparently because they employed a rope for laying out their construction guidelines. One way that they could have employed a rope to construct right triangles was to mark a looped rope with knots so that, when held at the knots and pulled tight, the rope must form a right triangle. The simplest way to perform the trick is to take a rope that is 12 units long, make knot 3 units from one end and another 5 units from the other end, and then knot the ends together to form a loop. Try to make one yourself.