GRADE 8 LESSON 1
SIMPLIFYING EXPRESSIONS

1. Simplify these expressions:

   a) $2\frac{1}{5} \times \frac{15}{22} a$;

   b) $-0.4x \times (-50)$;

   c) $-\frac{11}{12} \times (-6x)$.

2. Expand (distribute):

   a) $0.1 \times (x - 100)$;

   b) $20 \times (x + 8)$;

   c) $-5 \times (12 - x)$;

   d) $-0.3 \times (x - 1.2)$.

3. Common factor and evaluate:

   a) $45 \times 12 + 55 \times 12$;

   b) $15 \times 0.8 + 15 \times 0.2$;

   c) $\frac{2}{3} \times \frac{5}{11} + \frac{2}{3} \times \frac{6}{11}$.

4. Common factor:

   a) $5x+30$;

   b) $-10-100a$;

   c) $0.5x-2.5$.

5. Expand and simplify:

   a) $-(2y-7)+(20y-7)$;

   b) $-15a-(1-3a)$;

   c) $-10(2a+5b-1)+20$.

6. Simplify the expression $-6\times(5a-4)+2\times(15a+7)$.

7. Solve each equation:

   a) $(5x-3)-(2x+5)=4$;

   b) $6(x-3)+2(x+2)=10$;

   c) $9(3y-8)=18-3y$.

Answers: 1 a) $1\frac{1}{2}a$ b) 20x c) $5\frac{1}{2}x$

2 a) $0.1x - 10$ b) $20x + 60$ c) $-60 + 5x$ d) $-0.3x + 0.36$

3 a) 1200 b) 15 c) $\frac{2}{3}$

4 a) $5(x + 6)$ b) $-10(1 + 10a)$ c) $0.5(x - 5)$

5 a) 18y b) $-12a - 1$ c) $-20a - 50b + 30$

6 38

7 a) $x = 4$ b) $x = 3$ c) $y = 3$

GRADE 8 LESSON 2
PROPORTIONS

1. Determine each ratio:

a) $72 : 18$;

b) $1.4 : 3.5$;

c) $\frac{2}{5} : \frac{3}{10}$;

d) $1.2 \text{ km} : 0.3 \text{ km}$.

2. Do these ratios make sense?

a) $3.6 : 1.2 = 2.4 : 0.8$;

b) $2.5 : 0.05 = 1 : 0.2$.

3. Given the numbers 5, 4, 25, 20 create two equivalent proportions.

4. Find the unknown number in each proportion:

a) $\frac{21}{x} = \frac{36}{12}$;

b) $x : 3.5 = 2.4 : 0.8$;

c) $\frac{1}{8} : \frac{1}{3} = \frac{3}{7} : x$.

5. 21 кg of sunflower seeds produced 5.1 kg of oil. How much oil can be produced with 7 kg of seeds?

Answers: 1 a) 4 b) 2.5 c) $1\frac{1}{3}$ d) 4

2 a) yes b) no

3 4:5 = 20:25

4 a) $x = 7$ b) $x = 10.5$ c) $x = 1\frac{1}{7}$

5 $x = 1.7\ kg$

GRADE 8 LESSON 3
SCIENTIFIC NOTATION.
CIRCUMFERENCE AND AREA OF A CIRCLE.
VOLUME OF A CYLINDER.

1. Record using a scientific notation:
    a) 3,615; 45,000; 243,700.
    b) 5 thousand; 12 million; 7 billion.
2. Find the diameter of a circle, given the radius:
    a) 13 m; b) 10.5 m; c) 3.25 cm.
3. Determine the circumference of a circle with a radius of 50 cm.
4. The students have organized a figure skating competition. One of the tasks is to skate 5 times around a circle with a radius of 4 m. What is the total distance to be covered by the figure skaters? (Round the answer to the nearest whole number).
5. What is the diameter of a circle if its circumference is 13.4 m? What is the area of this circle?
6. Find the volume of a cylindrical cup, if the radius of its base is 6 cm and its height is 15 cm. Round answer to the nearest tenths.

Answers: 1 a) 3.615×10^3 ; 45×10^3 ; 243.7×10^3 b) 5×10^3 ; 12×10^6 ; 7×10^9

2 a) 26 m b) 21 m c) 6.5 cm

3 C = 314.159 cm

4 Distance is 126 m

5 d = 4.265 m, A = 13.399 m^2

6 V = 1,696.5 cm^3

GRADE 8 LESSON 4
SOLVING LINEAR EQUATIONS. PYTHAGOREAN THEOREM.

1. Check if:

   a) number 4 is the root of the equation $3x-2=x+6$;

   b) number 0 is the root of the equation $3(x-2)=x+1$;

   c) number 7 is the root of the equation $x-7(2x-3)=0$.

2. $\frac{2}{3}$ is the root of which one(s) of the following equations ?

   a) $3\frac{1}{3}x=1$

   b) $\frac{3}{2}x=1$

   c) $3x=2$.

3. Which ones of the following equations have no solutions and which ones have an infinite number of solutions (zeros on both sides at the end):

   a) $2x+1=x-(3-x)$;

   b) $5(x-3)=5x-15$;

   c) $4(x-1)-3(x+1)=x-7$.

4. Create an equation the root of which is 10.

5. Solve each equation:

   a) $0.12 + 0.8x = -0.08$;

   b) $1\frac{1}{4}x - 5\frac{3}{8} = -6\frac{1}{2}$;

   c) $5x - 7 = x + 9$.

6. Solve each equation:

   a) $(5x - 3) - (2x + 5) = 4$;

   b) $6(x - 3) + 2(x + 2) = 10$;

   c) $9(3y - 8) = 18 - 3y$.

7. Determine the length of the hypotenuse of a right-angle triangle, if its legs are 10 cm and 15 cm (round to the nearest whole). Find the perimeter of this triangle.
8. Determine one of the legs of a right-angle triangle, if its hypotenuse is 13 cm and the other leg is 12 cm.

Answers: 1 a) Yes b) No c) No

2 b) and c)

3 a) No b) Infinite c) No

4 $10x = 100$, answers may vary

5 a) $x = -0.25$ b) $x = -\frac{9}{10}$ c) $x = 4$

6 a) $x = 12$ b) $x = 3$ c) $y = 3$

7 c = 18cm, P = 43cm

8 the other leg (a or b) = 5cm

GRADE 8 LESSON 5

SQUARE ROOT. PERCENT.

1. Is each equality correct?

   a) $\sqrt{49} = 7$;

   b) $\sqrt{20} = 5$;

   c) $\sqrt{1.6} = 0.4$.

2. Take the square root of a number:

   a) $\sqrt{900}$;

   b) $\sqrt{0.01}$;

   c) $\sqrt{0}$.

3. Solve each equation:

   a) $x^2 = 25$;

   b) $x^2 = 2,500$;

   c) $x^2 = 0.25$.

4. Covert into a fraction: 0.8%, 14.7%, 325%.
5. Convert into percent: 0.007, 0.03, 1.15.
6. Find 150% of 60.
7. An item costs $33.50. The tax is 13% of the price.

   What is the total price of an item?

Answers: 1 a) Yes b) No c) No

2 a) 30 and -30 b) 0.1 and -0.1 c) 0

3 a) $x = 5, -5$ b) $x = 50, -50$ c) $x = 0.5, -0.5$

4 $\frac{8}{1000}$; $\frac{147}{1000}$; $3\frac{1}{4}$.

5 0.7%; 3%; 115%.

6 91.5

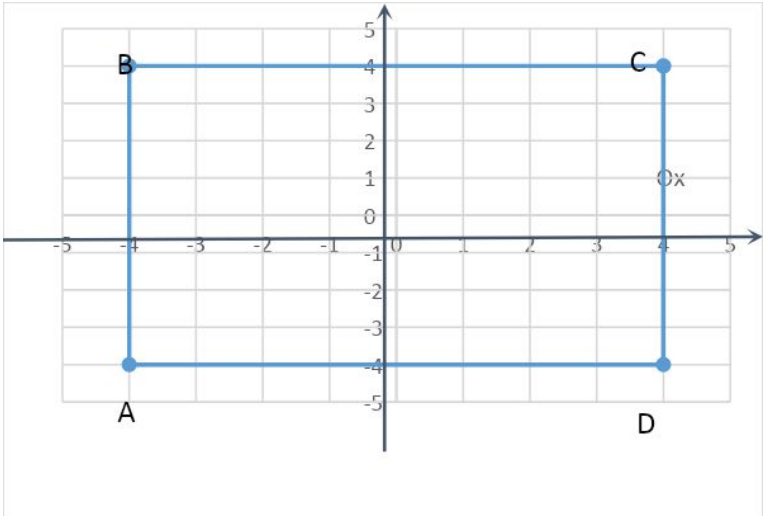
7 $37.86

GRADE 8 LESSON 6

A COORDINATE PLANE. COORDINATE OF A POINT. GRAPHS. SLOPE OF A LINE.

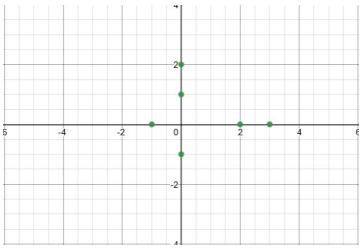
1. Which quadrants the following points are located in: $A(-3;5)$, $B(13;45)$, $C(-30;-15)$, $D(5;-6)$?
2. Which axis all the points whose x-coordinate is 0 are located on? Which axis all the points whose y-coordinate is 0 are located on? On a coordinate plane, plot 3 points in each situation.
3. Construct a quadrilateral $EFKN$ with coordinates of its vertices: $E(4;7)$, $F(-1;9)$, $K(-2;-1)$, $N(3;-3)$. What are the coordinates of a point of intersection of the line segment FN with x and y axes?
4. What are the coordinates of the vertices of the quadrilateral $ABCD$?

   Is the quadrilateral a square?

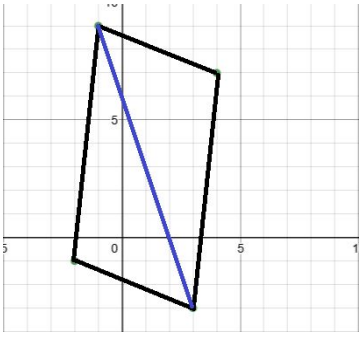


Answers: 1 II, I, III, IV

2 y-axis, x-axis,



3 (0,6), (2,0)



4 A(-4,-4), B(-4,4), C(4,4), D(4,-4).

It is a square, even though in the image provided it does not look like one.

This is due to the difference in scale on the x and y axes.

GRADE 8 LESSON 7

CALCULATING THE MEAN. PIE GRAPH. BAR GRAPH.

1. Calculate the mean of the following numbers: 2.88; 3.16; 1.98; 4.06.
2. The temperature was measured several times during the day. The following results were obtained: -2; 0; 2; 4; 1. Calculate the average temperature.
3. The mean of three numbers is 3.5. The first two numbers are 3.2 and 3.3. What is the third number?
4. The circle is split into four sectors. The angle of one sector is 120°, second – 60°, third – 45°. Determine the angle of the fourth sector. Construct these sectors using a protractor or technology.
5. The doctors are recommending to split the daily meal intake into 4 parts: breakfast – 25%, lunch – 15 %, dinner – 45%, light supper – 15%. Represent this data in form of both the pie graph and the bar graph.
6. The monkeys at the zoo have consumed 100 kg of bananas, 200 kg of apples and 150 kg of carrots in one month. Create a pie graph and a bar graph showing the distribution of fruits and vegetables in monkeys' ration (you are welcome to use Google Sheets or Word Excel).

Answers: 1 Mean = 3.02

2 The average temperature is 1 degree

3 The third number is 4

4 The fourth angle is 135°

5