Name:

Group 1

Result:

1. [3]

Place the following numbers in appropriate regions of the diagram below:

$$\dfrac{-30}{5} \qquad \sqrt[3]{-8} \qquad (-2)^{24} \qquad \dfrac{66666666666666666665}{3} \qquad 3^{-1}$$

2. [2]

Calculate:

$$\gcd(2100, 378) = \qquad\qquad \mathrm{lcm}(72, 60) =$$

3. Expand (if possible) and simplify: [3]

(a) $2\sqrt{50} - 3\sqrt{72} + 4\sqrt{18}$

(b) $(3 + \sqrt{2})^2 - 2(\sqrt{2} - 1)^2 - (\sqrt{2} + 4)(\sqrt{2} - 4) =$

4. Rationalize the denominators in the following expressions: [3]

(a) $\dfrac{8}{\sqrt{3}} =$

(b) $\dfrac{5 - \sqrt{3}}{5 + \sqrt{3}} =$

5. Solve the following equations: [4]

(a) $\dfrac{x-5}{3} - \dfrac{2x+1}{4} = \dfrac{3-x}{2}$

(b) $(3x-2)^2 - (2x+1)^2 = 5(x-3)(x+3)$

6. Write without the absolute value and simplify: [1]

$$|5 - \sqrt{7}| + |\sqrt{7} - 3| - |2\sqrt{7} - 8| =$$

7. Solve the following equation: [4]

(a) $2|3x + 2| + 11 = 8$

(b) $\dfrac{|x - 3| + 2}{3} - \dfrac{|3 - x| - 1}{2} = 5$

8. Write the following expressions as a single power of 2 (part (a)) or 5 (part (b)):   [4]

(a) $\dfrac{\left(\frac{1}{4}\right)^{-2} \cdot 8^4 \cdot \frac{1}{16}}{(\sqrt{2})^{10} \cdot (0.25)^{-3}}$

(b) $\dfrac{(0.2)^{-1} \cdot 125^{-2} \cdot \frac{1}{25}}{(0.04)^3 \cdot (\sqrt[3]{25})^6}$

9.   [2]
The price of an item has been increased by 17% and then decreased by 9%. Find the initial price, if after the two changes the final price is 1277.64 PLN.

10. [2]

An item cost 900. After the price was increased by $p\%$ **twice**, the price changed to 1296. Calculate p.

11. [2]

An item cost 1500. The price was increased by $p\%$ and then decreased by $p\%$. As a result of these two changes the price is now 1497.6. Calculate p.

12. [2]

Calculate

$$\frac{(2.53 \cdot 10^9) \cdot (3.11 \cdot 10^{-3})}{(9.33 \cdot 10^{15}) \cdot (8.91 \cdot 10^{11})} =$$

Write your answer in standard form and rounded to 3 significant figures.

13. [3]

Round the following numbers as required:

	2 decimal places	2 significant figures	nearest integer
0.040251			
519.673			
35202.2212			

14. [2]

A rectangular field is 184 metres long and 23 metres wide. Round these measurements to 1 significant figure to approximate the area of the field and calculate the percentage error of your approximation.

15.   [3]

The distance from Warsaw to Kraków is 300 km rounded to 2 s.f. If a car is travelling at an average velocity of 80 km per hour (rounded to 1 s. f.), estimate the time of the journey and calculate the maximum percentage error of your estimate.