UNIVERSITY OF WATERLOO
Faculty of Mathematics
Waterloo, Ontario

Centre for Education in
Mathematics and Computing

Grade 7/8 Math Circles

Fall 2014 - Nov. 25/26

Gauss Preparation Test

General Information

The Gauss contest is an opportunity for grade 7/8 students to have fun and challenge their mathematical problem solving skills

---

Date and Registration

Registration Deadline: April 22, 2015

Test Writing Date: May 13, 2015

Format and Marking Scheme

- 60 minutes
- 25 multiple choice questions
- 150 marks:
  - Part A: 10 questions - 5 marks each
  - Part B: 10 questions - 6 marks each
  - Part C: 5 questions - 8 marks each
  - Unanswered Questions: 2 marks each (for up to 10 questions)

Contest Success Strategies

- **ELIMINATE** - choices that aren't sensible answers, making it easier to guess
- **DRAW** - diagrams representing your scenario to help clear up misconceptions
- **MOVE ON** - from questions you are stuck on to get as many marks as possible
- **FOCUS** - on Part B and Part C questions as Part A shouldn't pose a challenge
- **PRACTICE** - by studying from the contest bank on the CEMC website
- **LEARN** - techniques and short-cuts from past contest solutions

Mock Gauss Contest

Note that these are a combination of questions from the Grade 8 Gauss contests. Although the grades are listed for reference, all questions are applicable for both grades.

Part A - 5 marks each

1. **Gauss Grade 8, 2007 (#1)**

   The value of $(2 \times 12) - (2 + 12)$

   (A) 34 **(B)** 44 **(C)** 10 **(D)** -4 **(E)** 32

2. **Gauss Grade 8, 2010 (#8)**

   The time on a digital clock is 10:25. In minutes, what is the shortest length of time until all the digits on the clock will be equal to one another.

   (A) 36 **(B)** 107 **(C)** 86 **(D)** 46 **(E)** 187

3. **Gauss Grade 8, 2006 (#3)**

   Jamie sells a camera for \$200.00 and earns a commission rate of 25% on the sale. How much commission does he earn?

   (A) \$25.00 **(B)** \$50.00 **(C)** \$250.00 **(D)** \$75.00 **(E)** \$100.00

4. **Gauss Grade 8, 2008 (#4)**

   The value of $(2 + 3)^2 - (2^2 + 1^2)$

   (A) 20 **(B)** 6 **(C)** 22 **(D)** 8 **(E)** 16

5. **Gauss Grade 8, 2013 (#7)**

   Each letter of the English alphabet is written on a separate tile and placed in a bag. Alonso draws one letter at random from the bag. What is the probability that Alonso draws a letter that is in his name?

   (A) $\frac{1}{26}$ **(B)** $\frac{4}{26}$ **(C)** $\frac{5}{26}$ **(D)** $\frac{2}{26}$ **(E)** $\frac{3}{26}$

6. **Gauss Grade 8, 2013 (#6)**

What number goes in the box so that $10 \times 20 \times 30 \times 40 \times 50 = 100 \times 2 \times 300 \times 4 \times \square$?

(A) 0.5 **(B)** 5 **(C)** 50 **(D)** 500 **(E)** 5000

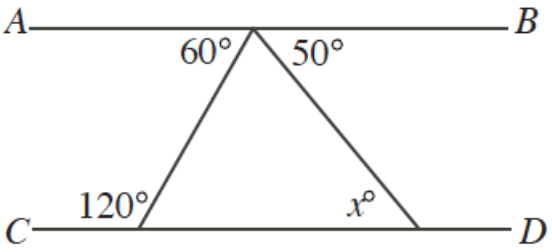
7. **Gauss Grade 8, 2011 (#9)**

If $x = 4$ and $y = x + 2$ and $z = 3y + -3$, the value of z is?

(A) 8 **(B)** 21 **(C)** 30 **(D)** 15 **(E)** 12

8. **Gauss Grade 8, 2006 (#9)**

In the diagram, AB and CD are straight lines. The value of x is



(A) 50 **(B)** 60 **(C)** 70

(D) 130 **(E)** 230

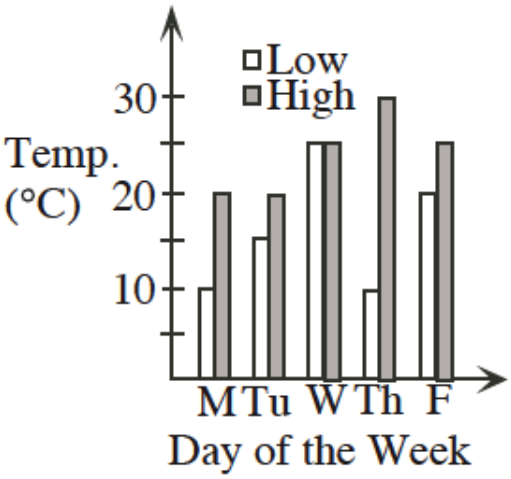
9. **Gauss Grade 8, 2006 (#7)**

The volume of a rectangular block is 120 cm^3. If the area of its base is 24 cm^2, what is its height?

(A) 5 cm **(B)** 15 cm **(C)** 0.2 cm **(D)** 0.6 cm **(E)** 1 cm

10. **Gauss Grade 8, 2007 (#3)**

The graph shows the daily high and low temperatures last week in Waterloo. On which day of the week was the difference between the high and low temperatures the greatest?



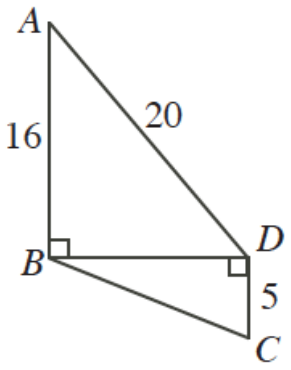
(A) Monday **(B)** Tuesday

(C) Wednesday **(D)** Thursday

(E) Friday

Part B - 6 marks each

11. **Gauss Grade 8, 2006 (#16)**



In the diagram, what is the length of BC?

(A) 13 **(B)** 12 **(C)** 20

(D) 16 **(E)** 17

12. **Gauss Grade 8, 2012 (#14)**

Half of the square root of a number is 1. The number is

(A) 2 **(B)** 4 **(C)** 8 **(D)** 9 **(E)** 16

13. **Gauss Grade 8, 2007 (#11)**

Lily is 90 cm tall. If Anika is $\frac{4}{3}$ of the height of Lily, and Sadaf is $\frac{5}{4}$ of the height of Anika, how tall is Sadaf?

(A) 180 cm **(B)** 70 cm **(C)** 96 cm **(D)** 120 cm **(E)** 150 cm

14. **Gauss Grade 8, 2007 (#18)**

The number n is doubled and then has y added to it. The result is then divided by 2 and has the original number n subtracted from it. The final result is

(A) n **(B)** y **(C)** $n+y$ **(D)** $\frac{n+y}{2}$ **(E)** $\frac{y}{2}$

15. **Gauss Grade 8, 2007 (#20)**

Lori took a 240 km trip to Waterloo. On her way there, her average speed was 120km/h. She was stopped for speeding, so on her way home her average speed was 80km/h. What was her average speed, in km/h, for the entire round-trip?

(A) 90 **(B)** 96 **(C)** 108 **(D)** 102 **(E)** 110

16. **Gauss Grade 8, 2008 (#17)**

The decimal expansion of $\frac{2}{13}$ is the repeating decimal $0.\overline{153846}$. What digit occurs in the 64th place after the decimal point? ($\frac{2}{13} = 0.153846153846153846153846...$)

(A) 8 **(B)** 6 **(C)** 5 **(D)** 4 **(E)** 3

17. **Gauss Grade 8, 2010 (#14)**

Gina plays 5 games as a hockey goalie. The table shows the number of shots on her net and her saves for each game. What percentage of the total shots did she save?

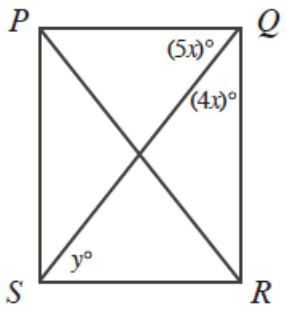
Game	Shots	Saves
1	10	7
2	13	9
3	7	6
4	11	9
5	24	21

(A) 52 **(B)** 65 **(C)** 80

(D) 82 **(E)** 85

18. **Gauss Grade 8, 2013 (#17)**

$PQRS$ is a rectangle with diagonals PR and QS, as shown. The value of y is



(A) 30 **(B)** 40 **(C)** 45

(D) 50 **(E)** 60

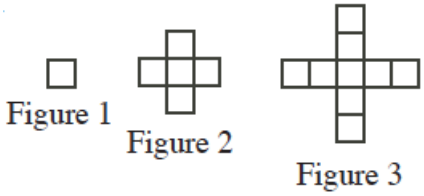
19. **Gauss Grade 8, 2012 (#13)**

Three numbers have a mean (average) of 9. The mode of these three numbers is 12. What is the smallest of these three numbers.

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 5

20. **Gauss Grade 8, 2010 (#19)**

In the sequence shown, each figure after the first is formed by adding 4 squares to the previous figure. How many squares form Figure 2010?



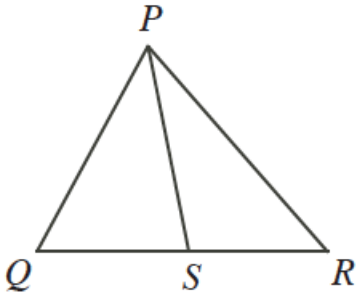
(A) 8037 **(B)** 8040 **(C)** 8043

(D) 6030 **(E)** 6026

Part C - 8 marks each

21. **Gauss Grade 8, 2010 (#20)**

In $\triangle PQR$, a line segment is drawn from P to point S on side QR. If $\triangle PQS$ and $\triangle PRS$ have the same area, which of the following statements *must* be true?



(A) $PQ = PR$ **(B)** $PS = PQ$ **(C)** $QR = PS$

(D) $QS = SR$ **(E)** $PQ = QR$

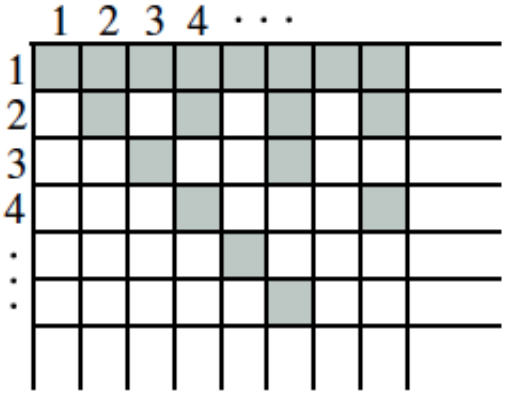
22. **Gauss Grade 8, 2010 (#22)**

The values r, s, t, and u are 2, 3, 4, 5, but not necessarily in that order. What is the largest possible value of $r \times s + u \times r + t \times r$?

(A) 24 **(B)** 45 **(C)** 33 **(D)** 40 **(E)** 49

23. **Gauss Grade 8, 2006 (#24)**

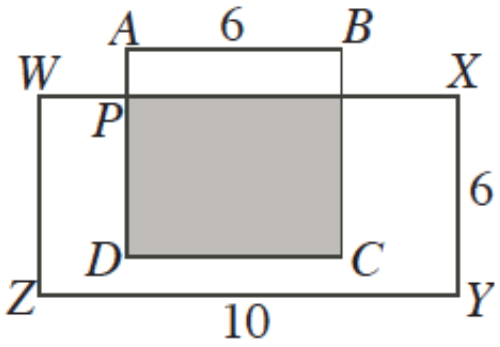
In the diagram, the grid has 150 rows and 150 columns, numbered from 1 to 150. In row 1, every box is shaded. In row 2, every second box is shaded. In row 3, every third box is shaded. The shading continues this way, so that every nth box in row n is shaded. Which *column* has the greatest number of shaded boxes?



(A) 20 **(B)** 36 **(C)** 64

(D) 85 **(E)** 88

24. **Gauss Grade 8, 2007 (#21)** In the diagram, $ABCD$ is a square with side length 6, and $WXYZ$ is a rectangle with $ZY = 10$ and $XY = 6$. Also, AD and WX are perpendicular. If the shaded area is equal to half of the area of $WXYZ$, the length of AP is

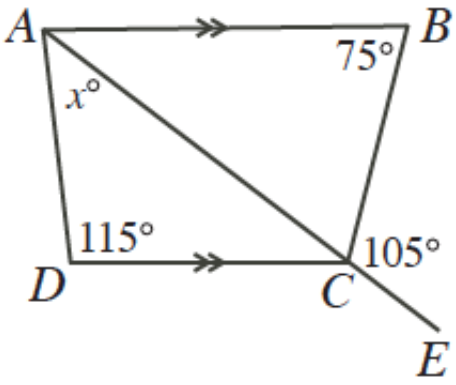


(A) 1 **(B)** 1.5 **(C)** 4

(D) 2 **(E)** 2.5

25. **Gauss Grade 8, 2010 (#21)**

In the diagram, AB is parallel to DC and ACE is a straight line. The value of x is



(A) 35 **(B)** 30 **(C)** 40

(D) 45 **(E)** 50