UNIVERSITY OF
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FACULTY OF MATHEMATICS
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CENTRE FOR EDUCATION IN
MATHEMATICS AND COMPUTING

Grade 7/8 Math Circles
Math Contest
FALL 2012

INSTRUCTIONS

This contest is multiple choice, and is comprised of three parts: A, B, and C.

Part A questions are worth 3 points each.

Part B questions are worth 5 points each.

Part C questions are worth 8 points each.

Fill in all answers on the answer card provided.

There is no penalty for leaving a question blank.

Incorrect choices/guesses will result in 2 points deduction.

PRIZES AND MARKING

You have 30 minutes for this test.

DON'T FORGET TO FILL IN YOUR ANSWERS ON THE CARD PROVIDED.

When you are finished, please give it to one of the markers. We will mark these and tally the scores.

Everyone will get a CEMC magnet, and a notepad.

The top 10 scorers will receive a CEMC Pen.

The top 5 scorers will receive a special treat.

GOOD LUCK!

Part A - 3 points each

1. A box contains 1 grey ball, 2 white balls and 3 black balls. Without looking, John reaches in and chooses one ball at random. What is the probability that the ball *is not grey*?

   (a) 1   (b) $\frac{2}{6}$ (c) $\frac{3}{6}$ (d) $\frac{4}{6}$ (e) $\frac{5}{6}$

2. A movie theatre has eleven rows of seats. The rows are numbered from 1 to 11. Odd-numbered rows have 15 seats and even-numbered rows have 16 seats. How many seats are there in the theatre?

   (a) 176   (b) 186   (c) 165   (d) 170   (e) 171

3. Which of the following is a prime number?

   (a) 20   (b) 21   (c) 23   (d) 25   (e) 27

4. Kayla went for a walk every day last week. Each day, she walked half as far as she did the day before. If she walked 8 kilometres on Monday last week, how many kilometres did she walk on Friday last week?

   (a) 0.25   (b) 4   (c) 1   (d) 2   (e) 0.5

5. Max sold glasses of lemonade for 25 cents each. He sold 41 glasses on Saturday and 53 glasses on Sunday. What were his total sales for these two days?

   (a) $23.50   (b) $10.25   (c) $13.25   (d) $21.50   (e) $24.25

6. A large box of chocolates and a small box of chocolates together cost $15. If the large box costs $3 more than the small box, what is the price of the small box of chocolates?

   (a) $3   (b) $4   (c) $5   (d) $6   (e) $9

7. There are 2 red, 5 yellow and 4 blue balls in a bag. If a ball is chosen at random from the bag, without looking, the probability of choosing a yellow ball is

   (a) $\frac{2}{11}$ (b) $\frac{5}{11}$ (c) $\frac{4}{11}$ (d) $\frac{6}{11}$ (e) $\frac{7}{11}$

Part B - 5 points each

8. In the Fibonacci sequence 1, 1, 2, 3, 5, ..., each number beginning with the 2 is the sum of the two numbers before it. For example, the next number in the sequence is $3 + 5 = 8$. Which of the following numbers is in the sequence?

   (a) 20   (b) 21   (c) 22   (d) 23   (e) 24

9. What is the largest amount of postage in cents that *cannot* be made using only 3 cent and 5 cent stamps?

   (a) 7   (b) 13   (c) 4   (d) 8   (e) 9

10. Harry, Ron and Neville are having a race on their broomsticks. If there are no ties, in how many different possible orders can they finish?

   (a) 7   (b) 6   (c) 5   (d) 4   (e) 3

11. If x, y and z are positive integers with $xy = 18$, $xz = 3$ and $yz = 6$, what is the value of $x + y + z$?

    (a) 6   (b) 10   (c) 25   (d) 11   (e) 8

12. A bamboo plant grows at a rate of 105cm per day. On May 1st at noon it was 2m tall. Approximately how tall, in metres, was it on May 8th at noon?

    (a) 10.40   (b) 8.30   (c) 3.05   (d) 7.35   (e) 9.35
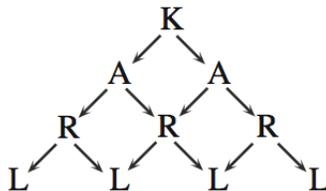
13. The numbers on opposite sides of a die total 7. What is the sum of the numbers on the unseen faces of the two dice shown?
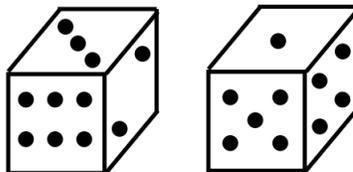
    (a) 14   (b) 20   (c) 21   (d) 24   (e) 30

Part C - 8 points each

14. In the diagram, how many paths can be taken to spell "KARL"?

   (a) 4   (b) 16   (c) 6   (d) 8   (e) 14

15. In the multiplication shown, P, Q and R are all different digits so that

$$\begin{array}{r} PPQ \\ \times\quad Q \\ \hline RQ5Q \end{array}$$

What is the value of $P + Q + R$?

   (a) 20   (b) 13   (c) 15   (d) 16   (e) 17

16. How many different combinations of pennies, nickels, dimes and quarters use 48 coins to total $1.00?

   (a) 3   (b) 4   (c) 5   (d) 6   (e) 8

END OF TEST

If you are finished early, hand your answer sheet to a helper and try these challenge problems (these are not part of the test):

1. 6 men and 3 boys take 5 days to finish a task. 6 women and 3 boys take 4 days to finish a task. How many days will it take 1 man, 1 woman, and 1 boy to finish a task?

2. A good runner can go 100 paces while a poor runner covers 60 paces. The poor runner has covered a distance of 100 paces before the good runner sets off in pursuit. How many paces does it take the good runner before he catches up the poor runner?

3. A number of pheasants and rabbits are placed together in the same cage. Thirty-five heads and ninety-four feet are counted. Find the number of pheasants and rabbits.

ANSWER CARD

NAME: _____

Part A

1. _____   2. _____   3. _____   4. _____   5. _____   6. _____   7. _____

Part B

1. _____   2. _____   3. _____   4. _____   5. _____   6. _____

Part C

1. _____   2. _____   3. _____

For Marker Use Only

Part A (# Correct = _____)   (# Wrong = _____)

Score: (# Correct $\times$ 3) - (# Wrong $\times$ 2) = _____

Part B (# Correct = _____)   (# Wrong = _____)

Score: (# Correct $\times$ 5) - (# Wrong $\times$ 2) = _____

Part C (# Correct = _____)   (# Wrong = _____)

Score: (# Correct $\times$ 8) - (# Wrong $\times$ 2) = _____

TOTAL SCORE:

ANSWER CARD

Part A

   1. E   2. D   3. C   4. E   5. A   6. D   7. B

Part B

   1. B   2. A   3. B   4. B   5. E   6. C

Part C

   1. D   2. E   3. B