The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

cemc.uwaterloo.ca

Topic Generator - Problem Set
Problems

1. $4.1 + 1.05 + 2.005$ equals
   (A) 7.155 (B) 7.2 (C) 8.1 (D) 7.605 (E) 8.63

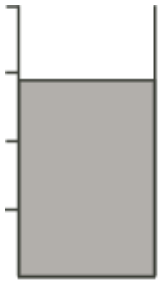
2. Rounded to 2 decimal places, $\frac{7}{9}$ is
   (A) 0.7 (B) 0.77 (C) 0.78 (D) 0.79 (E) 0.8

3. $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ equals
   (A) $3\frac{1}{3}$ (B) $7 + \frac{1}{3}$ (C) $\frac{3}{7}$ (D) $7 + 3$ (E) $7 \times \frac{1}{3}$

4. The largest fraction in the set $\left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}\right\}$ is
   (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) $\frac{1}{5}$ (E) $\frac{1}{10}$

5. Which of the following is *not equal* to a whole number?
   (A) $\frac{60}{12}$ (B) $\frac{60}{8}$ (C) $\frac{60}{5}$ (D) $\frac{60}{4}$ (E) $\frac{60}{3}$

6. A large cylinder can hold 50 L of chocolate milk when full. The tick marks show the division of the cylinder into four parts of equal volume. Which of the following is the best estimate for the volume of chocolate milk in the cylinder as shown?



   (A) 24 L (B) 28 L (C) 30 L (D) 36 L (E) 40 L

7. 30% of 200 equals
(A) 0.06 (B) 0.6 (C) 6 (D) 60 (E) 600

8. Three thousandths is equal to
(A) 300 (B) 0.3 (C) 0.03 (D) 30 (E) 0.003

9. The expression $\frac{3}{10} + \frac{3}{100} + \frac{3}{1000}$ is equal to
(A) 0.333 (B) 0.9 (C) 0.963 (D) 0.369 (E) 0.30303

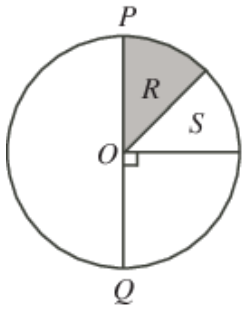
10. A package of 8 greeting cards comes with 10 envelopes. Kirra has 7 cards but no envelopes. What is the smallest number of packages that Kirra needs to buy to have more envelopes than cards?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

11. When the numbers $5.07\overline{6}$, $5.0\overline{76}$, 5.07, 5.076, $5.\overline{076}$ are arranged in increasing order, the number in the middle is
(A) $5.07\overline{6}$ (B) $5.0\overline{76}$ (C) 5.07 (D) 5.076 (E) $5.\overline{076}$

12. The distance from Coe Hill to Calabogie is 150 kilometres. Pat leaves Coe Hill at 1:00 p.m. and drives at a speed of 80 km/h for the first 60 km. How fast must he travel for the remainder of the trip to reach Calabogie at 3:00 p.m.?
(A) 65 km/h (B) 70 km/h (C) 72 km/h (D) 75 km/h (E) 90 km/h

13. A survey of 400 students at Cayley University found that the ratio of students who commute to students who live on campus is 3 : 2. A survey of 600 students at Fermat University found that the ratio of students who commute to students who live on campus is 2 : 3. When considering all the surveyed students from both universities, what is the ratio of students who commute to students who live on campus?
(A) 2 : 3 (B) 12 : 13 (C) 1 : 1 (D) 6 : 5 (E) 3 : 2

14. On the spinner shown, PQ passes through centre O. If areas labelled R and S are equal, then what percentage of the time will a spin stop on the shaded region?



(A) 50% (B) 22.5% (C) 25% (D) 45% (E) 12.5%

15. The ratio of junior kindergarteners to senior kindergarteners at Gauss Public School is 8 : 5. If there are 128 junior kindergarteners at the school, then how many kindergarteners are there at the school?
(A) 218 (B) 253 (C) 208 (D) 133 (E) 198

16. A bicycle at Store P costs \$200. The regular price of the same bicycle at Store Q is 15% more than it is at Store P. The bicycle is on sale at Store Q for 10% off of the regular price. What is the sale price of the bicycle at Store Q?
(A) \$230.00 (B) \$201.50 (C) \$199.00 (D) \$207.00 (E) \$210.00

17. Chris received a mark of 50% on a recent test. Chris answered 13 of the first 20 questions correctly. Chris also answered 25% of the remaining questions on the test correctly. If each question on the test was worth one mark, how many questions in total were on the test?
(A) 23 (B) 38 (C) 32 (D) 24 (E) 40

18. On Monday, Mukesh travelled x km at a constant speed of 90 km/h. On Tuesday, he travelled on the same route at a constant speed of 120 km/h. His trip on Tuesday took 16 minutes less than his trip on Monday. The value of x is
(A) 90 (B) 112 (C) 100 (D) 96 (E) 92

19. Jeff and Ursula each run 30 km. Ursula runs at a constant speed of 10 km/h. Jeff also runs at a constant speed. If Jeff's time to complete the 30 km is 1 hour less than Ursula's time to complete the 30 km, at what speed does Jeff run?
(A) 6 km/h (B) 11 km/h (C) 12 km/h (D) 15 km/h (E) 22.5 km/h

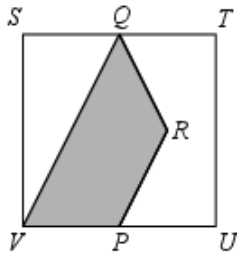
20. Jiwei and Hari entered a race. Hari finished the race in $\frac{4}{5}$ of the time it took Jiwei to finish. The next time that they raced the same distance, Jiwei increased his average speed from the first race by x%, while Hari maintained the same average speed as in the first race. In this second race, Hari finished the race in the same amount of time that it took Jiwei to finish. The value of x is
(A) 20 (B) 25 (C) 35 (D) 40 (E) 50

21. Integers m and n are each greater than 100. If $m + n = 300$, then $m : n$ could be equal to
(A) 9 : 1 (B) 17 : 8 (C) 5 : 3 (D) 4 : 1 (E) 3 : 2

22. Each time Kim pours water from a jug into a glass, exactly 10% of the water remaining in the jug is used. What is the minimum number of times that she must pour water into a glass so that less than half the water remains in the jug?
(A) 5 (B) 6 (C) 7 (D) 8 (E) 9

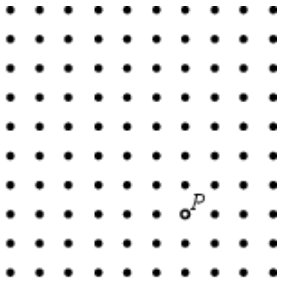
23. In the diagram shown,
    - $STUV$ is a square,
    - Q and P are the midpoints of ST and UV,
    - $PR = QR$, and
    - VQ is parallel to PR.

    What is the ratio of the shaded area to the unshaded area?



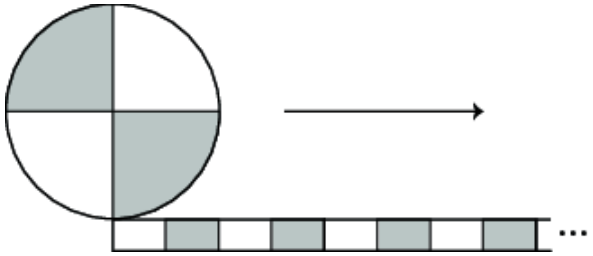
(A) 2 : 3 (B) 3 : 5 (C) 1 : 1 (D) 7 : 9 (E) 5 : 7

24. A 10 by 10 grid is created using 100 points, as shown. Point P is given. One of the other 99 points is randomly chosen to be Q. What is the probability that the line segment PQ is vertical or horizontal?



(A) $\frac{2}{11}$ (B) $\frac{1}{5}$ (C) $\frac{1}{10}$ (D) $\frac{4}{25}$ (E) $\frac{5}{33}$

25. A path of length 38 m consists of 19 unshaded stripes, each of length 1 m, alternating with 19 shaded stripes, each of length 1 m. A circular wheel of radius 2 m is divided into four quarters which are alternately shaded and unshaded. The wheel rolls at a constant speed along the path from the starting position shown.



The wheel makes exactly 3 complete revolutions. The percentage of time during which a shaded section of the wheel is touching a shaded part of the path is closest to

(A) 20% (B) 18% (C) 24% (D) 22% (E) 26%