PRACTICE EXAMPLES

1. As a decimal number 6.28% is equal to

(A) 0.0628 (B) 0.628 (C) 6.28 (D) 62.8 (E) 628

2. The value of $1 + \dfrac{1}{3 + \dfrac{1}{2}}$ is

(A) $\frac{6}{5}$ (B) $\frac{7}{6}$ (C) $\frac{9}{2}$ (D) $\frac{6}{7}$ (E) $\frac{9}{7}$

3. The tens digit of the product $1 \times 2 \times 3 \times \cdots \times 98 \times 99$ is

(A) 0 (B) 1 (C) 2 (D) 4 (E) 9

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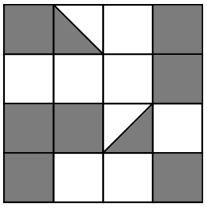
1. The large square in the figure is made up of 16 smaller identical squares. What fraction of the large square is shaded?



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

2. There are five soccer squads in a tournament. Each squad has fifteen players and two coaches. In the tournament, how many more players are there than coaches?

(A) 80 (B) 70 (C) 65 (D) 10 (E) 60

3. Five cards are numbered from 1 to 5, as shown. A "swap" is when two cards are interchanged. What is the smallest number of swaps needed to arrange them in increasing order?

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

4. Betsie has a torch that requires three batteries to operate. Three new batteries run flat after six hours' use. What is the minimum number of packs, of four batteries each, that she must buy to be able to run her torch for 30 hours during an excursion?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

5. How many numbers between 10 and 99 have digits that differ by exactly 3?

(A) 9 (B) 10 (C) 11 (D) 13 (E) 14

6. The real valued solution x of the equation $(x^2+1)(2-x)=0$ is

(A) 2 (B) -1 (C) -1 or 2 (D) 1 or 2 (E) -1 or -2

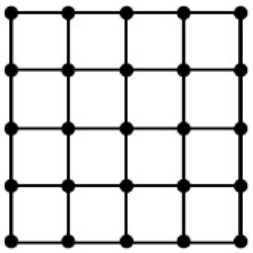
7. The braking distance (the distance needed to come to a complete standstill) of a car travelling at speed v is given by the formula

$$\frac{v^2}{2a}.$$

If $a = 5\,\text{m/s}^2$, what is the braking distance, in m, for a car travelling at $30\,\text{m/s}$ (just under $120\,\text{km/h}$)?

(A) 15 (B) 25 (C) 50 (D) 70 (E) 90

8. The four by four grid shown is formed using 40 identical sticks. How many sticks are needed to form a ten by ten grid?



(A) 100 (B) 120 (C) 160 (D) 200 (E) 220

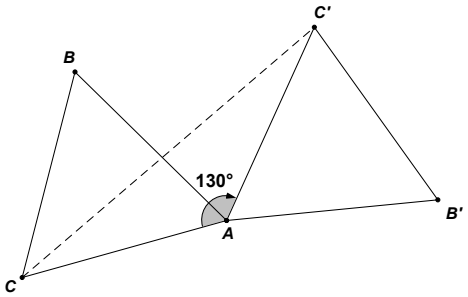
9. A rectangle has length x and breadth y, where x and y are integers. If the value of the perimeter is equal to the value of the area, then a possible value of $x+y$ is

(A) 6 (B) 7 (C) 5 (D) 9 (E) 10

10. Lonwabo Tsotsobe has taken 16 ODI (One Day International) wickets at an average of 21.625 runs per wicket. If his average improves to 20 runs per wicket by the time he has taken 14 more wickets, how many *more* runs were scored off his bowling?

(A) 280 (B) 254 (C) 212 (D) 260 (E) 240

11. Triangle $C'B'A$ is the image of equilateral triangle CBA upon rotation by 130° clockwise around A. The size of angle BCC' in degrees is

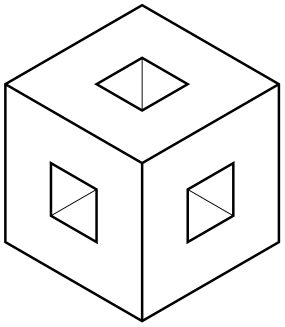


(A) 20 (B) 25 (C) 30 (D) 35 (E) 40

12. World Formula One racing champion, Sebastian Vettel, completes one lap in exactly one minute at 270 km/h. One lap is

(A) 4.5 km (B) 2.5 km (C) 3 km (D) 4 km (E) 2.7 km

13. The mass of a solid $3 \times 3 \times 3$ cube is 810 g. Three shafts, each $1 \times 1 \times 3$, are made as shown in the sketch. The mass of the remaining solid is



(A) 210 g (B) 630 g (C) 570 g (D) 600 g (E) 500 g

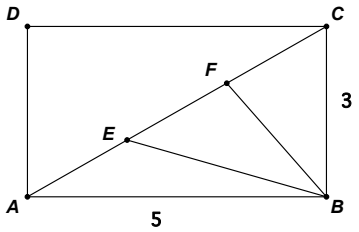
14. A four-digit even number $\overline{ABCD}$ is formed by using four of the digits 1, 2, 3, 4, 5, 6 and 7 without repetition. How many even numbers less than 2014 can be formed in this way?

(A) 60 (B) 90 (C) 120 (D) 150 (E) 180

15. Three standard dice are rolled and the numbers thrown are added. The probability of getting a sum of 15 is

(A) $\frac{15}{36}$ (B) $\frac{5}{6}$ (C) $\frac{15}{216}$ (D) $\frac{5}{108}$ (E) $\frac{15}{18}$

16. Rectangle $ABCD$ has sides of length 5 and 3 and the diagonal AC is divided into 3 equal segments as shown. The area of triangle BEF is



(A) $\frac{3}{2}$ (B) $\frac{5}{8}$ (C) $\frac{5}{2}$ (D) $\frac{1}{2}\sqrt{34}$ (E) $\frac{1}{3}\sqrt{68}$

17. The numbers 2^{21}, 3^{15}, 5^9, 6^9 and 11^6 are arranged from smallest to largest. Which number will be in the middle?

(A) 2^{21} (B) 3^{15} (C) 5^9 (D) 6^9 (E) 11^6

18. A right-angled triangle has an area of 5. The altitude perpendicular to the hypotenuse has a length of 2. The perimeter of the triangle is

(A) $5\sqrt{5}+5$ (B) $\sqrt[3]{3}+3$ (C) $5\sqrt{3}+3$ (D) $3\sqrt{5}+5\sqrt{3}$ (E) $3\sqrt{5}+5$

19. Points P and Q are on line segment AB on the same side of the midpoint of AB. Point P divides AB in the ratio $2:3$ and Q divides AB in the ratio $3:4$. If $PQ=2$, then the length of segment AB is

(A) 12 (B) 28 (C) 70 (D) 75 (E) 105

20. When the tens digit of a three-digit number $\overline{abc}$ is deleted, a two-digit number $\overline{ac}$ is formed. How many numbers $\overline{abc}$ are there such tha $\overline{abc} = 9 \times \overline{ac} + 4 \times c$? For example, $245 = 9 \times 25 + 4 \times 5$.

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