Modern Maths

Topic	Slot A	Slot B	Slot C	Slot D	Slot E	Average
Clocks&Calendars	5	2	3	1		2
Probability	3	4	2			2
PnC		1		2	5	2
Clocks&Calendars	5	2	3	1		2
Arithmetic Progression	3	1		1		1
Height & Distance	3			1	1	1
Inequalities				1		0
Coordinate				1		0
Set Theory				1		0
Total	19	10	8	9	6	10

1. DIRECTION for the question: Solve the following question and mark the best possible option.
A tailor has 48.5 meters of cloth and he has to make 8 pieces out of a metre of cloth. How many pieces can he make out of this cloth?
a. 388
b. 384
c. 380
d. 333
e. 374

2. What is the percentage of the number from 1 to 50 whose square end in one digit?
a. 20
b. 30
c. 10
d. 5
e. 7

3. What is the value of 129 x 3^3
a. 3333
b. 3483
c. 3345
d. 3453
e. 3554

4. A box contains 5 green, 4 yellow and 3 white marbles. three marbles are drawn at random. What is the probability that all they are not of the same colour?

A. 344
B. 355
C. 5255
D. 4144
E. 4444

5. An accurate clock shows 8 o'clock in the morning. Through how may degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?
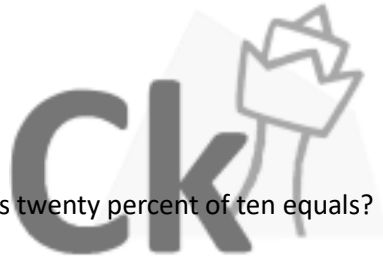a. 144°
b. 150°

c. 168°
d. 180°
e. 176

6. The reflex angle between the hands of a clock at 10.25 is:
a. 180°
b. 192.5
c. 195°
d. 197.5
e. 200

7. DIRECTION for the question: Solve the following question and mark the best possible option.
How many times are the hands of a clock at right angle in a day?
a. 48
b. 40
c. 44
d. 96
e. 24

8. Ten percent of twenty plus twenty percent of ten equals?
a. 10 percent of 20
b. 10 percent of 400
c. 20 percent of 100
d. 2 percent of 200
e. 10 percent of 10

9. From a pack of 52 cards, two are drawn at random. Find the chance that one is a Jack and the other a queen.
(a) 8/ 663
(b) 1/6
(c) 1/2
(d) 1/12
(e) 1/10

10. The difference between the ages of two men is 10 years. 15 years ago, the elder one was twice as old as the younger one. The present age of the elder man is?
a. 25
b. 35
c. 45
d. 55
e. 65

11. 8899 - 6644 - 3322 = ? - 1122
A. 55
B. 65
C. 75
D. 85
E. None of these

12. A man standing on top of a tower sees a car coming towards the tower. If it takes 20 minutes for the angle of depression to change from 30° to 60°, what is the time remaining for the car to reach the tower ?

a)12 minutes
b)5 min
c)10sqrt(3) min
d) 20sqrt(3) min
e)10 min

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Solutions

1
Solution :- A
1m = 8 pieces
48.5 = X
X = 48.5 x 8/1 = 388

2
Solution:- A
 We use cyclicity to do it easily all the number that end in 1 have squares that end in 1 then 9 ending also give as 1 in the ending (cyclicity) Making a set 1,11,21,31,41,9,19,29,39,49 total = 10
10/50 x 100 = 20

3.
Solution B
27 x 129 = 3483

4
Solution :-D
 Total cases =12C3
=12∗11∗103∗2∗1=220
Total cases of drawing same colour =
5C3 +4C3 + 3C3=
$\text{Probability of same color = \frac{15}{220}}$
=344
Probability of not same color
1−344=4144

5.
Solution :- D

Angle traced by the hour hand in 6 hours = $\left(\frac{360}{12} \times 6\right)° = 180°$.

6.
Solution D

Angle traced by hour hand in $\frac{125}{12}$ hrs = $\left(\frac{360}{12} \times \frac{125}{12}\right)° = 312\frac{1}{2}°$.

Angle traced by minute hand in 25 min = $\left(\frac{360}{60} \times 25\right)° = 150°$.

∴ Reflex angle = 360° - $\left(312\frac{1}{2} - 150\right)° = 360° - 162\frac{1}{2}° = 197\frac{1}{2}°$.

7.

Solution:- C

For each hour on the clock:

- There are two times when the hour and minute hands form a right angle.

That would give us $2 \times 12 = 24$ times for each 12-hour period (from 12:00 AM to 12:00 PM and from 12:00 PM to 12:00 AM the next day).

However, in the time between 12:00 PM and 12:00 AM, the hands of the clock form angles that are exactly opposite to the ones between 12:00 AM and 12:00 PM. Hence, we need to exclude the right angles formed between 12:00 PM and 12:00 AM.

So, 24 x 2 - 4 = 44 times.

8

Solution D

10% of 20 = 2

20% of 10 = 2

So 4

9.

Solution : - A

Jack and Queen or Queen and Jack → 4/52 x 4/51 + 4/52 × 4/51 = 8/663

10

Solution – B

Let's denote the present age of the elder man as E years and the present age of the younger man as Y years.

According to the given information:

1. The difference between their ages is 10 years, so we can write the equation:

$$E - Y = 10$$

2. Fifteen years ago, the elder one was twice as old as the younger one. So, we can set up another equation using their ages 15 years ago:

$$E - 15 = 2(Y - 15)$$

Now, let's solve this system of equations to find the values of E and Y.

From equation (1), we can express E in terms of Y:

$$E = Y + 10$$

Substitute this expression for E into equation (2):

$$Y + 10 - 15 = 2(Y - 15)$$
$$Y - 5 = 2Y - 30$$
$$2Y - Y = 30 - 5$$
$$Y = 25$$

Now that we have found the value of Y, we can find the value of E using equation (1):

$$E = Y + 10 = 25 + 10 = 35$$

So, the present age of the elder man (E) is 35 years.

11.

Solution - 8899 - 6644 - 3322 = x - 1122

⇒ 2255 - 3322 + 1122 = x

⇒ x = 3377 - 3322

⇒ x = 55

12. It takes 20 minutes for the angle of depression to change from 30° to 60°.

Concept Used:

Values of Trigonometric Ratios for Common Angles:

	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞

Let AB be the tower and C1, C2 be the positions of the car

In ΔABC_1, AB = BC_1 tan 30 deg = (B*C_{2} + C_{2}*C_{1}) * 1/(sqrt(3))

Also, in $\Delta ABC2$, AB = BC2 tan 60 deg = sqrt(3) * B*C_{2}

From (1) and (2), we get:

3B*C_{2} = B*C_{2} + C_{2}*C_{1}

C_{2}*C_{1} = 2B*C_{2}

C_{2}*C_{1} / B * C_{2} = 2/1

So, if the car takes 20 minutes to cover C_2C_1, it will take 10 minutes to cover BC2

    13.