

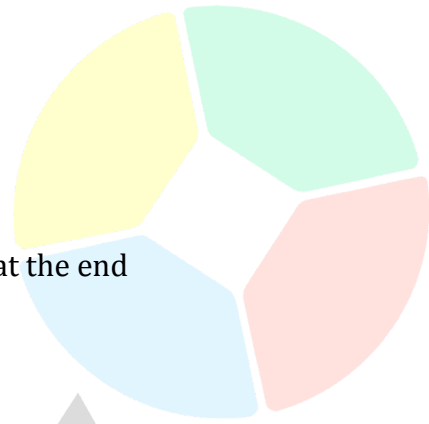
ANSWER KEY

QUESTION	CORRECT ANSWER
1	B Given: 2:00 PM = 80 people 10:00 AM = ? Solution: 10:00 AM - 2:00 PM = 4 hours $80 / 2 = 40$ people ← 1 hour $40 / 2 = 20$ people ← 2 hours $20 / 2 = 10$ people ← 3 hours $10 / 2 = 5$ people ← 4 hours or $80 / 2^4 = 5$ people Therefore the answer is 5 people



ScholarKey

2	C Given: Start = 9:30 AM doubles every 30 mins 1500 % greater Solution: Let X = number of bacteria 1500% greater can be written as $X + 15X$ $X + (15)(X) = 16X$ ← Total number of bacteria at the end X doubles every 30 mins $2X$ ← 1st 30 mins $4X$ ← 2nd 30 mins $8X$ ← 3rd 30 mins $16X$ ← 4th 30 mins Therefore there will be 4 set/times to be double to reach $16X$ bacterias $4 (30) = 120$ mins $120/60 = 2$ hours $9:30 + 2$ hours = 11:30 AM Other Solution: $X(2^x) = 16X$ ← cancel out X $2^x = 16$ $x = 4$ times $4 (30 \text{ mins}) = 2$ hours $9:30 + 2$ hours = 11:30 AM
3	E Given: inlet = 3 hours outlet = 6 hours 10:00 AM Solution: $\frac{1}{T} = \frac{1}{3} - \frac{1}{6}$ $\frac{1}{T} = \frac{1}{6}$ $T = 6$ hours $10:00 + 6$ hours = 4:00 PM



4	A Given: George - Peter = 145 km George Start = 2:30 PM 20 km per hour Peter Start = 3:00 PM 25 km per hour Solution: $20(0.5) = 10 \text{ km}$ ← George started 30 mins early $145 - 10 = 135 \text{ km}$ $X/20 = (135 - X) / 25$ $X = 60 \text{ km}$ $60/20 = 3 \text{ hours}$ $3:00 + 3 \text{ hours} = \mathbf{6:00 \text{ PM}}$
5	B Given: March 31, 2016 = Thursday January 1, 2013 Solution: January 1, 2013 to December 31, 2013 = 365 days January 1, 2014 to December 31, 2014 = 365 days January 1, 2015 to December 31, 2015 = 365 days January 1, 2016 to January 31, 2016 = 31 days February 1, 2016 to February 29, 2016 = 29 days ← leap year March 1, 2016 to March 31, 2016 = 31 days $1095 + 31 + 29 + 31 = 1186$ $1186/7 = 169 \text{ remainder } 3$ Friday - 3 days = Tuesday ← Use friday (day after thursday) because March 31, 2016 is included Other way: $1095 + 31 + 29 + 30 = 1185$ $1185/7 = 169 \text{ remainder } 2$ Thursday - 2 days = Tuesday ← Use Thursday because March 31, 2016 is not included

6	D Given: doubles every 2 hours 1 bacterium = 60 hours 2 bacteria = ? Solution: $2(2^X) = 1 (2^{60/2})$ $X = 29$ $29 \times 2 = \mathbf{58 \text{ hours}}$
7	D Given: Start = 10:30 AM 1:10 = $\frac{1}{3}$ (Task) Solution: $1:10 - 10:30 = 2 \text{ hours } 40 \text{ mins}$ $2 \frac{2}{3} \text{ hours} / T = \frac{1}{3}$ $T = 8 \text{ hours}$ $10:30 + 8 \text{ hours} = \mathbf{6:30 \text{ PM}}$
8	E Given: 2 seconds loss every 5 mins Correct time = 7:00 AM 5:00 PM Solution: $7:00 \text{ AM} - 5:00 \text{ PM} = 10 \text{ hours}$ $10 \times 60 = 600 \text{ mins}$ $600/5 = 120 \text{ sets}$ $120 (2) = 240 \text{ seconds} \leftarrow \text{loss}$ $240/60 = 4 \text{ mins}$ $5:00 - 4 \text{ mins} = \mathbf{4:56 \text{ PM}}$

9	D Given: 1st inlet pipe = $\frac{1}{3} P = 3$ hours 2nd inlet pipe = $\frac{3}{4} P = 4 \frac{1}{2}$ hours Solution: 1st inlet pipe $3(3) = 9$ hours to fill up 2nd inlet pipe = $4 \frac{1}{2} (4) / 3 = 6$ hours to fill up $\frac{1}{T} = \frac{1}{9} + \frac{1}{6}$ $\frac{1}{T} = \frac{5}{18}$ $T = 3.6$ hours or 3 hours 36 mins 7:00 + 3 hours 36 mins = 10:36 AM
10	E Given: October 1, 1982 = Friday October 1, 1987 = ? Solution: $1987 - 1982 = 5$ years $4(365) + 366 = 1826$ days $1826/7 = 260$ remainder 6 Friday + 6 days = Thursday



11	C Given: Gene = 2 hours Jeremy = 1 hour and 15 mins or $1\frac{1}{4}$ hours Gene = 8:30 AM Jeremy = 9:00 Solution: $\frac{1}{T} = \frac{1}{2} + \frac{1}{1\frac{1}{4}}$ $\frac{1}{T} = \frac{13}{10}$ $T = \frac{10}{13}$ hours ← Together 30 mins: $\frac{30}{120} = \frac{1}{4}$ of the wall is done by Gene $\frac{3}{4} (\frac{10}{13}) = \frac{15}{26}$ hours or 34.62 mins 9:00 + 34.6 mins = 9:35 AM ← rounded off
12	C Given: Start = 3:20 PM 4:20 PM = $\frac{3}{4} C$ Solution: $4:20 - 3:20 = 1 \text{ hour} = \frac{3}{4} C$ $C = \frac{4}{3}$ hours or 1 hour and 20 mins 3:20 + 1 hour and 20 mins = 4:40 PM



13

C
Given:
Cory:
50 widgets = 8:00 AM - 8:30 AM = 30 mins

Cory and Mathew
50 widgets = 9:00 AM - 9:20 AM = 20 mins

Mathew = 10:00 AM ← Start

Solution:
C = 30 mins
T = 20 mins

$\frac{1}{T} = \frac{1}{C} + \frac{1}{M}$
 $\frac{1}{20} = \frac{1}{30} + \frac{1}{M}$
 $\frac{1}{20} - \frac{1}{30} = \frac{1}{M}$
 $\frac{1}{M} = \frac{1}{60}$
M = 60 mins or 1 hour
10:00 + 1 hour = **11:00 AM**



14

B

Given:

Plane 1

Leaves = 10:30 AM ← Tinseltown

Arrived = 2:30 AM ← Greenville

16 hours

Plane 2

Leaves = 4:30 PM ← Greenville

Arrived = 4:30 AM ← Tinseltown

12 hours

Solution:

Let X = time difference

 $(2:30\text{AM}) - (10:30\text{AM} + X) = 16 - X \leftarrow 10:30\text{ AM to } 2:30\text{ AM} = 16\text{ hours} \leftarrow \text{eqn 1}$ $(4:30\text{AM} + X) - (4:30\text{PM}) = 12 + X \leftarrow 4:30\text{ PM} - 4:30\text{ AM} = 12\text{ hours} \leftarrow \text{eqn 2}$

Equate both because they take the same route, the same speed and time.
therefore they are equal

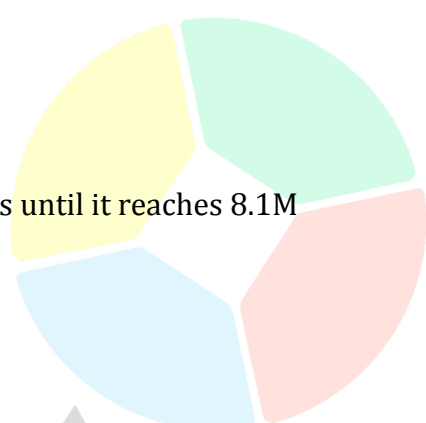
$$16 - X = 12 + X$$

$$2X = 4$$

X = 2 hours, since on the equation we added X on Tinseltown
therefore Greenville is ahead of 2 hours than Tinseltown

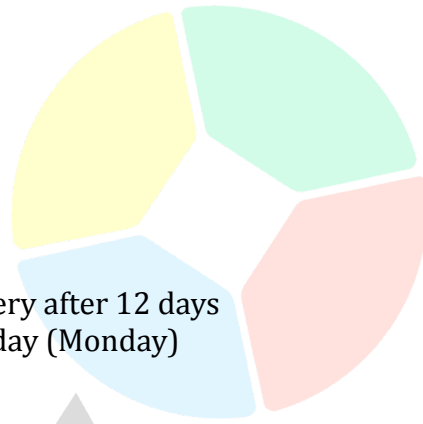
Therefore the answer is **2 hours**



15	C Given: 50% increase every 50 years 8.1M = 2000 1.6 Million Solution: Start increasing the 1.6M by 50% every 50 years until it reaches 8.1M $1.6M + 1.6M(0.5) = 2.4M \leftarrow 50 \text{ years}$ $2.4M + 2.4M(0.5) = 3.6M \leftarrow 100 \text{ years}$ $3.6M + 3.6M(0.5) = 5.4M \leftarrow 150 \text{ years}$ $5.4M + 5.4M(0.5) = 8.1M \leftarrow 200 \text{ years}$ from 1.6M we need 200 years for it to reach 8.1M so, 2000 - 200 = 1800 It is year 1800 when the population is 1.6M 
16	E Given: October 31 2001 = Wednesday 2014 = ? Solution: 2001 - 2014 = 13 years $\leftarrow$ 3 leap year $10(365) + 3(366) = 4748 \text{ days}$ $4748/7 = 678 \text{ remainder } 2$ Wednesday + 2 days = Friday
17	A Given: $\frac{1}{3} T = 12:00 \text{ Noon}$ $\frac{3}{4} T = 1:15 \text{ PM}$ Solution: $\frac{3}{4} T - \frac{1}{3} T = 1.25$ $(\frac{5}{12})T = 1.25$ $T = 3 \text{ hours}$ $\frac{1}{4} (3) = 0.75 \text{ hours or } 45 \text{ mins}$ 1:15 + 45 mins = 2:00 PM

18	A Given: 6:55 - 7:19 Solution: 7:19 - 6:55 = 24 mins 24/60 = $\frac{2}{5}$
19	D Given: Red light = every 9 mins Yellow = every 24 mins Flashes both = 7:00 AM Solution: Choice A 7:35 - 7:00 = 35 mins 35/ 24 = 1.458 ← Wrong 35/9 = 3.8889 ← Wrong Choice B 8:16 - 7:00 = 1 hour and 16 mins or 76 mins 76/ 9 = 8.444 ← Wrong Choice C 9:36 - 7:00 = 2 ng Choice D 11:48 - 7:00 = 4 hours and 48 mins 288 mins / 24 = 12 ← Correct 288/9 = 32 ← Correct Choice E 12:00 - 7:00 = 5 hours 300 / 24 = 12.5 ← Wrong The time should be divisible by both 9 and 24 so that both red and yellow will flash at the same time Therefore the answer is choice D hours and 36 mins 156/24 = 6.5 ← Wrong

20	D Given: Joan = 3 days Nina = 4 days Monday both of them Solution: Get the LCM of 3 and 4 LCM = 12 therefore they'll both go to the supermarket every after 12 days 12 - 7 = 5 days ← 7 days will land on the same day (Monday) Therefore we only count the remaining 5 days Monday + 5 days = Saturday
21	C Given: Launch = June 18, 2032 = Friday Arrived = 919 days Solution: $919/7 = 131$ remainder 2 ← every 7 days will land on the same day it started Therefore we only count the 2 remaining days Friday + 2 = Sunday
22	E Given: Yesterday = Sunday 347 days Solution: Today = Monday ← if yesterday was Sunday therefore today is Monday $347/7 = 49$ remainder 4 ← every 7 days will land on the same day it started Therefore we only count the 4 remaining days Monday + 4 days = Friday



23	E Given: Caroline = 50 km per hour at 10:00 AM Jessica = 70 km per hour at 12:00 PM Solution: 880 km $V = d/t$ X = Time traveling when both started Caroline start at 10:00 AM Jessica starts at 12:00 PM therefore there is 2 hours difference $2(50) = 100 \text{ km} \leftarrow$ Traveled by Caroline before Jessica starts $880 - 100 = 780 \text{ km} \leftarrow$ only to travel by both $50(X) + 70(X) = 780$ $X = 6.5 \text{ hours} \leftarrow$ When both are starting 12:00 + 6 hours and 30 mins = 6:30 PM If we add using 10:00 10:00 + 6 hours and 30 mins + 2 hours = 6:30 PM
24	A Given: 1 min lose every 3 hours gains 1% next 6 days Solution: 8:00 AM , Monday 10 days First 4 days: $4(24) / 3 = 32 \text{ sets} \leftarrow$ losses 32 mins during the 1st 4 days 4 days = 5760 mins $5760 - 32 = 5728 \text{ mins}$ $5728 / 60 = \mathbf{95.46667 \text{ hours}}$ next 6 days: $6(24) + 6(24)(0.01) = \mathbf{145.44 \text{ hours}}$ $95.46667 + 145.44 = 18068 / 75 \text{ hours or } 10 \text{ days } 54.4 \text{ mins}$ 10 days will land on the same time (8:00) 8:00 + 10 days and 54.4 mins = 8:54 AM

25

D

Given:

January 1, 2012 = Sunday

Leap year

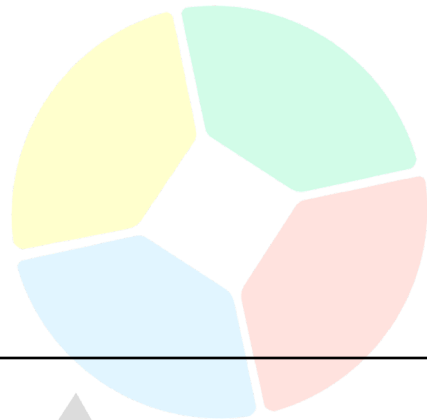
Solution:

 $366/7 = 52$ weeks and 2 days

Sunday = 53 ← start that's why plus 1

Saturday = 52

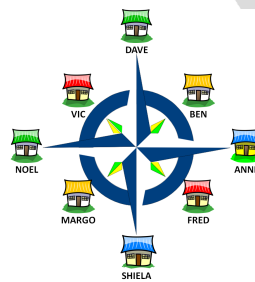
Monday = 53 ← end that's why plus 1

 $53 + 52 + 53 = \mathbf{158 \text{ days}}$ 

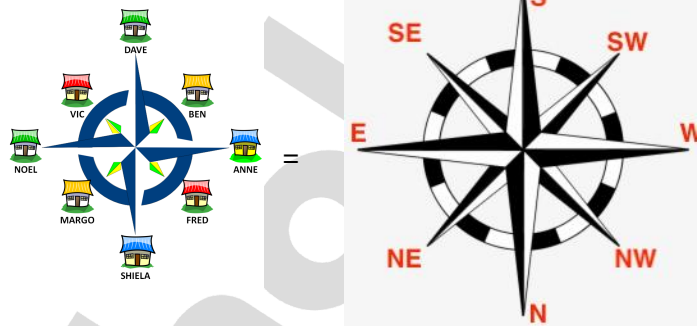
26

B

Given:



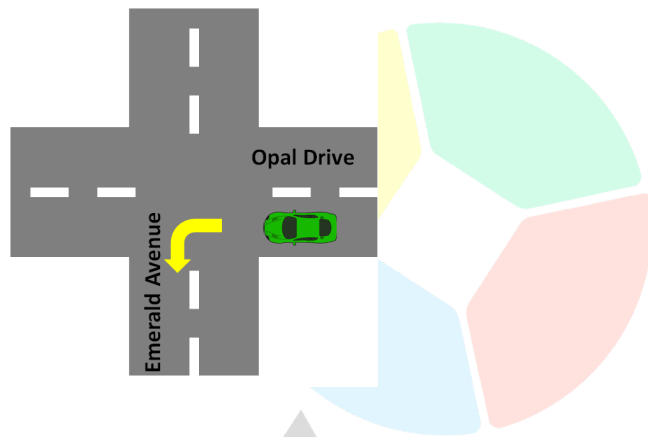
Solution:



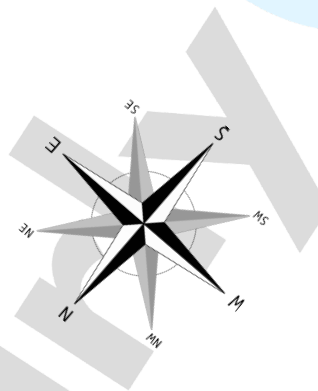
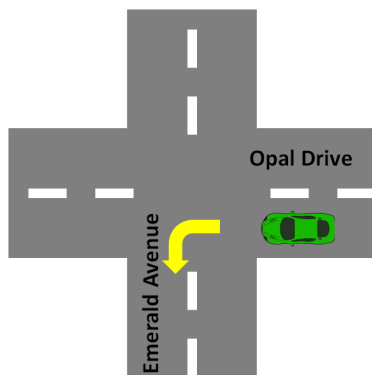
Following the compass above, Shiela will be in the North direction.
Therefore the answer is **Choice B**

27

E
Given:



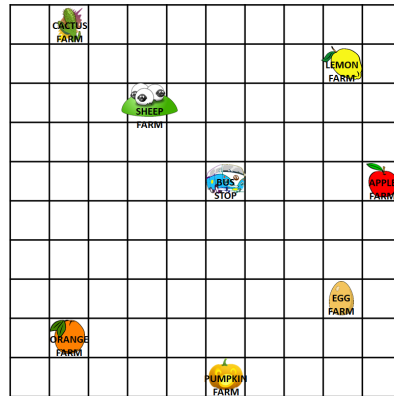
Solution:



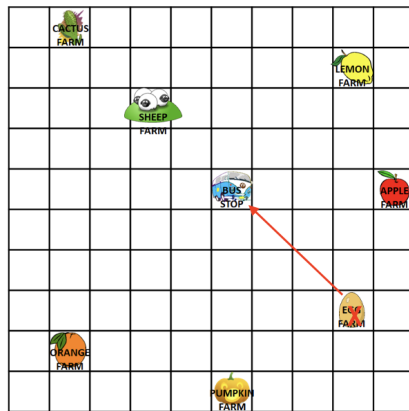
Following the compass above, the car will be heading at **North-West**.
Therefore the answer is **choice E**

28

D
Given:

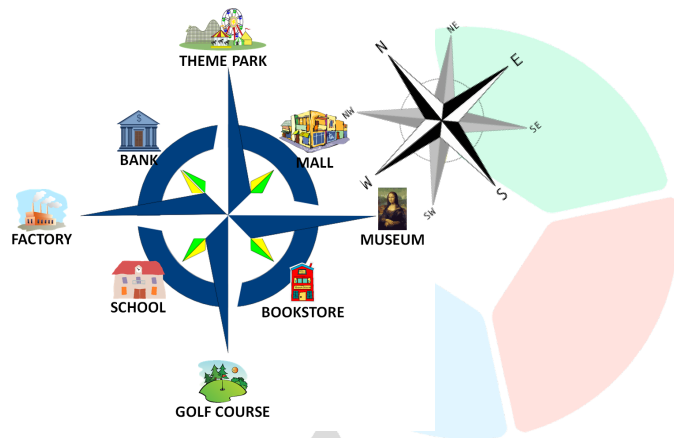


Solution:



O
The worker should go to **North-West** direction

A
Given:

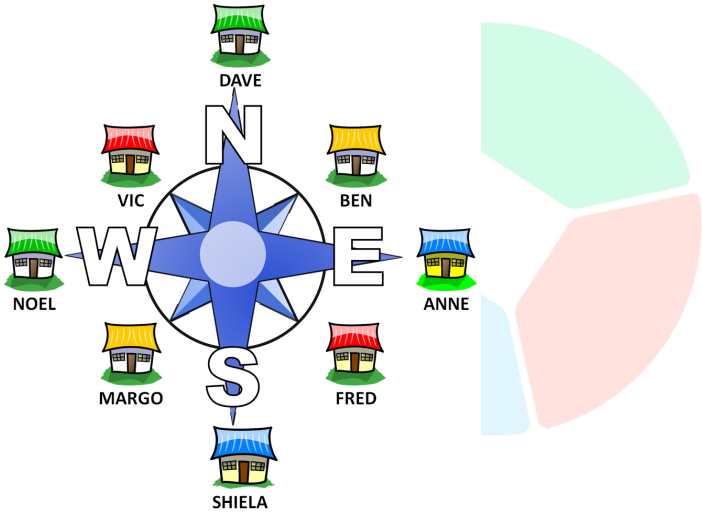


Solution:

Mall = East

Following the compass above, the **Bank** will be at North.

29

30	C Given:  Solution: Margo's house = SW ← 225 degrees $\frac{3}{4}$ turn = anticlockwise = $360(\frac{3}{4}) = 270$ degrees $\frac{1}{2}$ turn = clockwise = 180 degrees $225 - 270 = -45$ degree $-45 + 180$ degree = 135 degree $135/45 = 3$ direction Therefore Caroline will be facing Fred's house or South-East
31	B Given: Left = 8:53 AM 240 km @ 50 km/hour Solution: $t = d/V$ $V = 50$ km per hour $d = 240$ km $240/50 = 4.8$ hours or 4 hours 48 mins $8:53 + 4 \text{ hours} + 48 \text{ mins} = \mathbf{1:41 \text{ PM}}$

32	A Given: Leave = 2:20 PM Andrea = 30 km per hour Jane = 40 km per hour ← 6 hours Solution: $40(6) = 240 \text{ km} \leftarrow \text{distance until the gas station}$ $t = d/V$ $240/30 = 8 \text{ hours}$ $2:20 + 8 \text{ hours} = \mathbf{10:20 \text{ PM}}$
33	E Given: Start = 9:30 AM 12 napkins per hour ½ hour later Beth helped ← 15 napkins Solution: Let X = time after Beth help Amy time = X + 0.5 $12(X+0.5) = 15X \leftarrow \text{Amy is half hour ahead}$ X = 2 hours $9:30 + 30 \text{ mins} + 2 \text{ hours} = \mathbf{12:00 \text{ PM}}$
34	C Train 1 = 1:00 PM , 40 km per hour Train 2 = 30 mins later = 1:30 PM , 50 km per hour Solution: Train 2 = Faster $40(X + 0.5) = 50(X) + 40 \leftarrow \text{half hour ahead (Train 1)}$ X = 2 hours ← will catch up V2 - V1 = Distance ahead per hour $50 - 40 = 10 \text{ km ahead per hour}$ $40/10 = 4 \text{ hours} \leftarrow \text{Time to be 40 km ahead}$ Time to catch up + Time until 40 km lead = Total time until 40 km ahead $4 + 2 = 6 \text{ hours} \leftarrow \text{for the faster train to be ahead of 40 km}$ $1:00 + 30 \text{ mins} + 6 \text{ hours} = \mathbf{7:30 \text{ PM}}$

35

D
Given:
Ruby = 10 km per hour
5:30 PM

15 km per hour
3:30 PM

Solution:
 $5:30 - 3:30 = 2$ hours difference
therefore on 15 km per hour is 2 hours faster than 10 km per hour

Let X = time when ruby walks 10kmph

$d = V(t)$

$10X = 15(X - 2)$

$X = 6$ hours

Start time = $5:30 \text{ PM} - 6 \text{ hours} = \mathbf{11:30 \text{ AM}}$ ← start time

$d = V(t) = 6(10) = 60 \text{ km}$ ← distance Ruby walks

@ 12 km per hour:

$t = d/V$

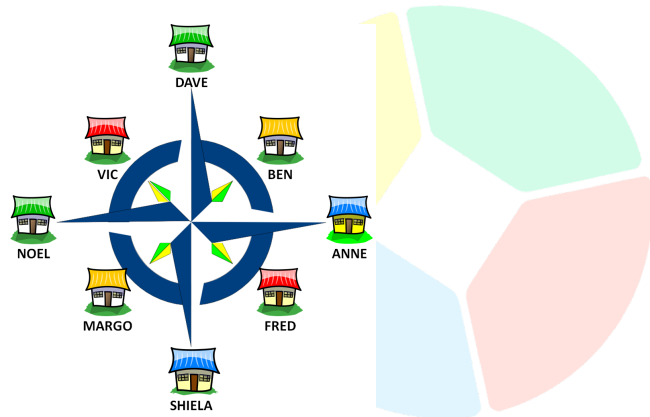
$60/12 = 5$ hours

$11:30 + 5 \text{ hours} = \mathbf{4:30 \text{ PM}}$

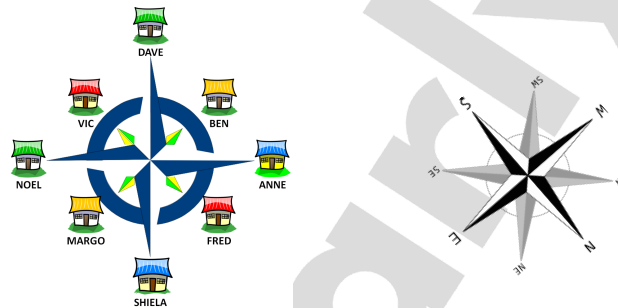


36

D
Given:



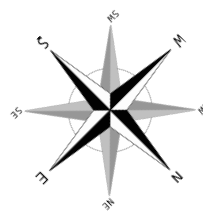
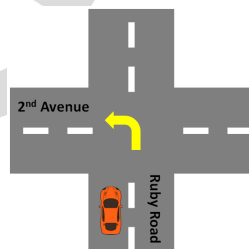
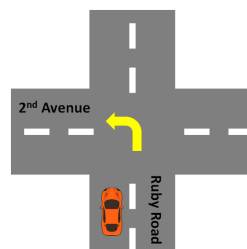
Solution:
Noel = SE



Following the compass above, the **Ben's house** will be at West

37

A
Given:

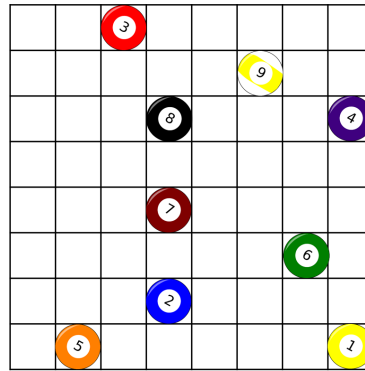


Solution:

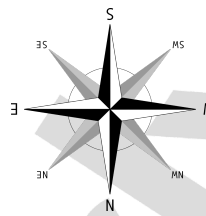
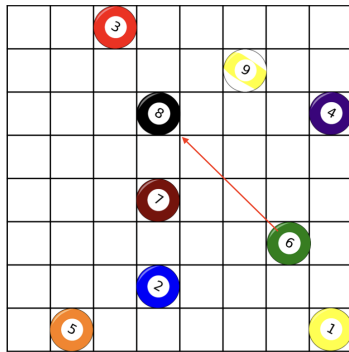
Following the compass above, the car is traveling at **South-West**.

38

D
Given:



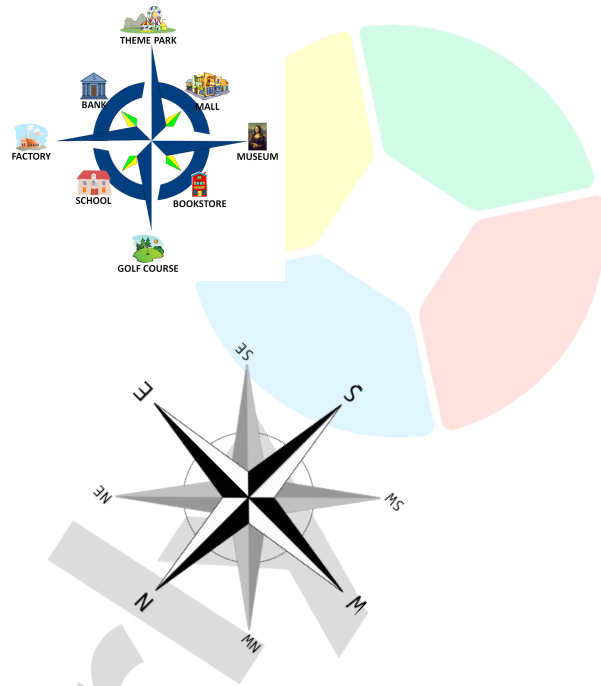
Solution:



Following the compass above, the 8 ball's location is **South-East** from the direction of the number 6 ball.

39

C
Given:



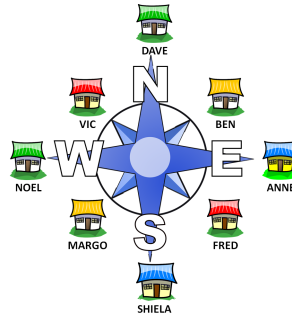
Solution:



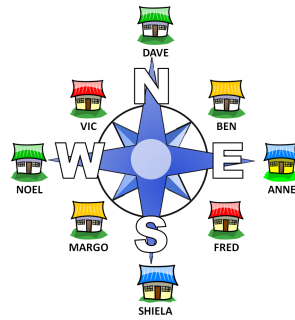
Following the compass above, the **Factory** is located in the North-East.

40

C
Given:



Solution:



$\frac{1}{4}$ = Clockwise

$\frac{1}{2}$ = Anti-clockwise

$\frac{3}{4}$ = Clockwise

Vic's house = 315 degrees

$315 - \frac{3}{4} (360) - \frac{1}{4} (360) + \frac{1}{2} (360) = 135$ degrees

135 degrees = **Fred's house**