Working Rate Problems

1.	Working, independently X takes 12 hours to finish a certain work. He finishes 2/3 of the work. The rest of the work is finished by Y whose rate is 1/10 th of X. In how much time does Y finish his work?
	x finishes certain work in 12 hours then y will take 120 hours to finish the work. to finish 1/3 of work y needs 40hours.
2.	Running at their respective constant rates, machine X takes 2 days longer to produce w widgets than machine Y. At these rates, if the two machines together produce 5/4 w widgets in 3 days, how many days would it take machine X alone to produce 2w widgets? A. 4 B. 6 C. 8 D. 10 E. 12
	Let T total number of days taken by machine X to produce W widgets. Then Work done by x is 1 day is W/T Work done by machine y in 1 day = W/(T - 2). Combined work done in 3 days = 3(W/T + W/(t-2)) = 3W(2T-1) / (T- 2) which is equal to 5W/4 So equating the two equations we get 12(2T - 1) = 5T(T - 2) 24T - 12 = 5T2 - 10T 5T2 - 32T + 12 = 0 (T-6) (5T+2) = 0. Which gives T = 6. So no. of days to produce 2W widgets = 2T = 12. Ans: E
3.	Working together, printer A and printer B would finish the task in 24 minutes. Printer A alone would finish the task in 60 minutes. How many pages does the task contain if printer B prints 5 pages a minute more than printer A ? 1:600 2:800 3:1000 4:1200 5:1500
	The answer should be : A A+B = x/24 pages/min A = x/60 pages/min

	B = (x/60 + 5) pages/min x/24 = x/60 + (x/60 + 5) x/24 - 2x/60 = 5 Solve for X , X = 600
4.	25 men reap a field in 20 days . when should 15 men leave the work.if the whole field is to be reaped in 37-1/2 days after they leave the work? A 5 days B 10 days C 7 days D 7-1/2 days
	25 men reap a field in 20 days, so total man-days needed = 20 X 25 = 500. If the whole field is to be reaped in 37-1/2 days by 10 men, man-days reqd. = 37.5 X 10 = 375 man-days. Remaining man-days reqd = 500 - 375 = 125. 25 men can finish this in = 125/25 = 5days. http://gmatclub.com/forum/25-men-reap-a-field-in-20-days-when-should-15-men-leave-71416.html
5.	
6.	When a certain tree was first planted, it was 4 feet tall, and the height of the tree increased by a constant amount each year for the next 6 years. At the end of the 6th year, the tree was 1/5 taller than it was at the end of the 4th year. By how many feet did the height of the tree increase each year? 3/10 2/5 1/2 2/3 6/5
	Ans - 2/3 solution: Let x be the constant rate of increment so 6th yr the tree will be ------> 4 + 6x 4th yr the tree will be ------> 4 + 4x Now the tree was 1/5 taller than it was at the end of the 4th year. so we can denote it as 4 + 6x = 1/5* (4+4x) + (4+4x) Solving for X ----> 2/3

7.	If Jim earns x dollars per hour, it will take him 4 hours to earn exactly enough money to purchase a particular jacket. If Tom earns y dollars per hour, it will take him exactly 5 hours to earn enough money to purchase the same jacket. How much does the jacket cost? (1) Tom makes 20% less per hour than Jim does. (2) x + y = $43.75
	4x = 5y 1) 0.8x =y 4x=5y Not sufficient 2) x+y =43.75 We have two equations in 2 variables, solvable... Sufficient Hence B
8.	A pool can be filled in 4 hours and drained in 5 hours. The valve that fills the pool was opened at 1:00 pm and some time later the drain that empties the pool was also opened. If the pool was filled by 11:00 pm and not earlier, when was the drain opened? * at 2:00 pm * at 2:30 pm * at 3:00 pm * at 3:30 pm * at 4:00 pm
	My solution is similar to h2polo's: Filling rate : ¼ Draining rate: 1/5 From 1.00 pm to 11 pm → 10 hours Let's say X is the hours that Draining valve works → 10/4 – 1/5 * X = 1 (pool is filled) → X = 7,5 → The filling valve works 10-7,5 = 2,5 hours before the draining valve is started 1.00 pm + 2.5 = 3.30 pm → D http://gmatclub.com/forum/ps-pool-77282.html
9.	With both valves open, the pool will be filled with water in 48 minutes. The first valve alone would fill the pool in 2 hours. What is the capacity of the pool if every minute the second valve admits 50 cubic meters of water more than the first? (A) 9000 cubic meters (B) 10500 cubic meters (C) 11750 cubic meters (D) 12000 cubic meters

	(E) 12500 cubic meters
	Total Volume = x First valve and second valve take 48 minutes to fill the pool The both valves filled x/48 in 1 minute First valve filled x/120 part in 1 minute So, Second valve filled in 1 minute = x/48 - x/120 = 3x/240 part Given that 3x/240 - x/120 = 50 x =12000 Ans. D
10.	It takes printer A 4 more minutes than printer B to print 40 pages. Working together, the two printers can print 50 pages in 6 minutes. How long will it take printer A to print 80 pages? A. 12 B. 18 C. 20 D. 24 E. 30
	B = x minutes for 40 pages A = x + 4 minutes for 40 pages A does in one in minute of 40 pages = 40/x+4 B does in one in minute of 40 pages = 40/x so, 6[(40/x+4)+40/x]= 50 $5x^2 - 28x - 96 = 0$ (x - 8)(x+12) = 0 x = 8 B = 8 minutes for 40 pages A = 12 minutes for 40 pages so, A needs 24 minutes for 80 pages.
11.	Six machines, each working at the same constant rate, together can complete a certain job in 12 days. How many additional machines, each working at the same constant rate, will be needed to complete the job in 8 days?" A) 2 B) 3 C) 4 D) 6 E) 7
	Remember, Work done = Rate*Time here, W=R*12*6 In second case, W=R*8*n Equating both, we get n=9 Hence we need 3 more machines.
12.	At their respective rates, pump A, B, and C can fulfill an empty tank, or pump-out the full tank in 2, 3, and 6 hours. If A and B are used to pump-out water from the

half-full tank, while C is used to fill water into the tank, in how many hours, the tank will be empty?
A. 2/3
B. 1
C. 3/4
D. 3/2
E. 2

Effective rate (empty) : 1/2+1/3-1/6 = 4/6 = 2/3 per hour

So whole tank will be emptied in 3/2 hrs..and half will be in 3/4 hrs. C...
http://gmatclub.com/forum/ps-pool-fills-77440.html

let X = # of hours for the tank to empty

X*Rate A + X*Rate B - X*Rate C = 1/2 tank

X*(1/2) + X*(1/3) - X*(1/6) = 1/2
X = 3/4

It takes 3/4 hrs to empty the tank

ANSWER: C. 3/4

13.	Working together at their respective rates, machine A, B, and C can finish a certain work in 8/3 hours. How many hours will it take A to finish the work independently? (1) Working together, A and B can finish the work in 4 hours. (2) Working together, B and C can finish the work in 48/7 hours.
	Ans : B
14.	John can complete a given task in 20 days. Jane will take only 12 days to complete the same task. John and Jane set out to complete the task by beginning to work together. However, Jane was indisposed 4 days before the work got over. In how many days did the work get over from the time John and Jane started to work on it together?

Ans **10**

Solution

Let the total no of days worked = n
So jane worked n-4 days

Work rate of John = 1/20
Work rate of John = 1/12

setting up the equation R x t = w
janes+ johns work + Johns work = total work

(1/20+1/12) x (n-4) + (1/20 *4) = 1
Solve for N

15.	Working together at their constant rates , A and B can fill an empty tank to capacity in1/2 hr. what is the constant rate of pump B? 1) A's constant rate is 25LTS / min 2) the tanks capacity is 1200 lts.
	Ans. A
16.	Lindsay can paint 1/x of a certain room in 20 minutes. What fraction of the same room can Joseph paint in 20 minutes if the two of them can paint the room in an hour, working together at their respective rates? 1/3x 3x/x-3 x-3/3x x/x-3 x-3/x
	Lindsay can paint 1/x of a certain room in 20 minutes. What fraction of the same room can Joseph paint in 20 minutes if the two of them can paint the room in an hour, working together at their respective rates? Lindsay paint 1/x in 20 min so 3/x in 60 min Together they paint 3/x + j = 1 in 60 min J = 1 - 3/x J = x/x - 3/x J = x-3/x in 60 min so in 20 min he will only paint a third (20/60 = 1/3) 1/3 * (x-3)/x answer: (x-3)/3x
17.	Machines X and Y run at different constant rates, and machine X can complete a certain job in 9 hours. Machine X worked on the job alone for the first 3 hours and the two machines, working together, then completed the job in 4 more hours. How many hours would it have taken machine Y, working alone, to complete the entire job? 18 13+1/2 7+1/5 4+1/2 3+2/3
	X work rate 1/9 X worked for 3 hours + x+y worked for 4 hours and completed 1 work 3*(1/9) + 4(1/9 + 1/y) = 1 (1/3)*(1/4)+ (1/9 + 1/y) = 1/4 1/9 + 1/y = 3/12 - 1/12 => 1/9 + 1/y = 1/6 1/y = 1/18

	So it would take y 18 hours to complete the work
18.	Six machines, each working at the same constant rate, together can complete a certain job in 12 days. How many additional machines, each working at the same constant rate, will be needed to complete the job in 8 days? A) 2 B) 3 C) 4 D) 6 E) 8
	Rate for six machines 1/12 (they do 1/12 of the work in 1 day or 1 work in 12 days) Rate for one machine 1/12 * 6 = 1/72 (so 6 machines working 1/72 is 6*1/72 or 1/12 which is correct) To complete the work in 8 days we need a rate of 1/8, so how many machines do we need to get a rate of 1/8 ? (1/72)*x = 1/8 x = 72/8 x = 9 If 6 can complete the work in 12 days 9 can complete it in 8 days, so three more.
19.	Machince A and B are each used to manufacture 660 sprockets. It takes A 10 hours longer to produce 660 sprockets than machine B. B produces 10 percent more sprockets per hour than A. How many sprockets per hours does machine A produce? A. 6 B. 6.6 C. 60 D. 100 E 110
	B takes x hours A takes x + 10 hours rate of A = 660/x+10 rate of B = 660/x thus, 660/x = (660/x+10)*1.10 x = 100 so B = 100 A = 110 sprockets per hour ans E. http://gmatclub.com/forum/kaplan-800-rate-machines-98696.html#p1006524
20.	A company has two types of machines, type R and type S. Operating at a constant rate, a machine of type R does a certain job in 36 hours and a machine of type S does the same job in 18 hours. If the company used the same number of each type of machine to do the job in 2 hours, how many machines of type R were used?

	a) 3 b) 4 c) 6 d) 9 e) 12
	Rate R 1/36 Rate S 1/18 x = number of machines So how many machines do we need to complete the work in 2 hours or equivalent, have a rate of 1/2? x/36 + x/18 = 1/2 3x/36 = 1/2 x/12 = 1/2 x = 6 Six machines of each
21.	One hour after Yolanda started walking from X to Y, a distance of 45 miiles, Bob started walking along the same road from Y to X. If Yolanda's walking rate was 3 miles /hour and Bob's was 4 miles / hour, how many miles had Bab walked when they met? a) 24 b) 23 c) 22 d) 21 e) 19.5
	When bob starts walking The distance left between them is 45-3 = 42 miles Time taken to meet = Distance / Relative speed = 42/(3+4) = 6 hours so, bob walked = 6 x 4 = 24 miles Ans. A. http://gmatclub.com/forum/one-hour-after-yolanda-started-walking-from-x-to-y-a-4299.html#p1007888
22.	Working alone at its own constant rate, a machine seals k cartons in 8 hours, and working alone at its own constant rate, a second machine seals k cartons in 4 hours. If the two machines, each working at its own constant rate and for the same period of time, together sealed a certain number of cartons, what percent

	of the cartons were sealed by the machine working at the faster rate? 25% 33 1/3% 50% 66 2/3% 75%
	if each one has worked for 8 hrs then number of cartoons = k + 2k = 3k. Mac B produces 2k of these. hence % = 2k/3k = 66.66% http://gmatclub.com/forum/working-alone-at-its-own-constant-rate-104981.html
23.	Micheal and Adam can do together a piece of work in 20 days. After they have worked together for 12 days Micheal stops and Adam completes the remaining work in 10 days. In how many days Micheal complete the work separately. 80 days 100 days 120 days 110 days 90 days
	Rate of both = 1/20 Together they do = 1/20*12 = 3/5 Left work = 1 - 3/5 = 2/5 Adam completes 2/5 work in 10 day so he took 10*5/2 = 25 days to complete the left work alone. Thus the rate of adam is 1/25 Rate of Micheal = 1/20 - 1/25 = 1/100 Thus micheal takes 100 days to complete the whole work. ans. B. http://gmatclub.com/forum/time-work-61136.html#p1008045
24.	Matt and Peter can do together a piece of work in 20 days. After they have worked together for 12 days Matt stops and Peter completes the remaining work in 10 days. In how many days Peter complete the work separately. 26days 27days 23days 25days 24 days
	Is identical with 23 except that they ask for Adams rate which is 25
25.	A certain car averages 25 miles per gallon of gasoline when driven in the city and 40 miles per gallon when driven on the highway. According to these rates, which of the following is closest to the number of miles per gallon that the car

	averages when it is driven 10 miles in the city and then 50 miles on the highway? 28 30 33 36 38
	Answer is 36 10/25 + 50/40 = 33/20 gallons for entire trip so trips lasts 60 miles 60 * 20/33 = 36.36 http://gmatclub.com/forum/a-certain-car-averages-25-miles-per-gallon-of-gasoline-when-67202.html
26.	Working together, John and Jack can type 20 pages in one hour. They will be able to type 22 pages in one hour if Jack increases his typing speed by 25%. What is the ratio of Jack's normal typing speed to that of John? 1/3 2/5 1/2 2/3 3/5
	Let the rate of John be x pages per hour and the rate of Jack y pages per hour. so x + y = 20------------(i) After 25% increase by y x + 1.25y = 22-----------(ii) Solving i and ii y = 8 x = 12 Ratio = 2/3 Ans. D http://gmatclub.com/forum/hours-to-type-pages-102501.html#p1008066
27.	Tom, working alone, can paint a room in 6 hours. Peter and John, working independently, can paint the same room in 3 hours and 2 hours, respectively. Tom starts painting the room and works on his own for one hour. He is then joined by Peter and they work together for an hour. Finally, John joins them and the three of them work together to finish the room, each one working at his respective rate. What fraction of the whole job was done by Peter?
	Tom = 1/6 Peter = 1/3 = 2/6 John = 1/2 = 3/6 1 hours Tom + 1 hour (Tom+Peter) + x hours (Tom+Peter+John) = 1 1/6 + (1/6+1/3) + (1/6+1/3+1/2)*x = 1 1/6 + 1/2 + 6/6*x = 1 x = 1/3 hour

	Now, peter work for 1/3*1*3 + 1/3 = 1/9 + 1/3 = 4/9 ans. http://gmatclub.com/forum/work-rate-problem-124035.html#p1008095
28.	Machines X and Y produced identical bottles at different constant rates. Machine X, operating alone for 4 hours, filled part of a production lot; then machine Y, operating alone for 3 hours, filled the rest of this lot. How many hours would it have taken machine X operating alone to fill the entire production lot? (1) Machine X produced 30 bottles per minute. (2) Machine X produced twice as many bottles in 4hours as machine Y produced in 3 hours.
	(1) x filled 30 x 4 = 120 bottles, but we do not know the what portion is 120. insufficient. (2) y = 3b x = 6b total 9b so 2 sufficient. Ans. B http://gmatclub.com/forum/machines-x-and-y-produce-identical-bottles-at-different-122897.html#p1008098
29.	One smurf and one elf can build a treehouse together in two hours, but the smurf would need the help of two fairies in order to complete the same job in the same amount of time. If one elf and one fairy worked together, it would take them four hours to build the treehouse. Assuming that work rates for smurfs, elves, and fairies remain constant, how many hours would it take one smurf, one elf, and one fairy, working together, to build the treehouse? (A) 5/7 (B) 1 (C) 10/7 (D) 12/7 (E) 22/7
	D s,e,f - speed of smurf, elf, and fairy t- time to build the treehouse with one smurf, one elf, and one fairy, working together s+e=1/2 s+2f=1/2 e+f=1/4 s+e+f=1/t fast way to solve: multiply first equation by 2 and sum three equations:

	3*(s+e+f)=1+1/2+1/4 3*1/t=7/4 t=12/7 http://gmatclub.com/forum/work-problem-confusing-110855.html
30.	Company S produces two kinds of stereos: basic and deluxe. Of the stereos produced by Company S last month, 2/3 were basic and the rest were deluxe. If it takes 7/5 as many hours to produce a deluxe stereo as it does to produce a basic stereo, then the number of hours it took to produce the deluxe stereos last month was what fraction of the total number of hours it took to produce all the stereos? A.7/17 B.14/31 C. 7/15 D.17/35 E.1/2
	The easiest way for me is to plug in numbers. Let the number of basic stereos produced be 40, and number of delux stereos produced be 20. Total of 60 stereos. If it takes an hour to produce a basic stereo then it will take 1.4 hours to produce a deluxe stereo. 40 basic stereos = 40 hours. 20 delux stereos = 28 hours. Total hours = 68. Then the fraction would be 28/68 = 7/17. Therefore answer A. http://gmatclub.com/forum/company-s-produces-two-kinds-of-stereos-basic-and-deluxe-65318.html