Speed and Acceleration Problems

1. Colin and Jeff are at Jeff's house playing with their little finger skateboards. They decide to go to Dairy Queen and both leave at 3:55. Colin walked straight their (a distance of 2 km) and arrived at 4:35. Jeff stopped two blocks from his house to chat with a friend, then raced to DQ, arriving at exactly the same time as Colin. Would you say that, since they both took the same time to travel the same distance, they traveled the same speed? Explain.

2. Colin skateboards down the sidewalk in front of the school, traveling at 24 km/h. How much time would it take him to travel 6.0 km?

3. How far could Jennifer run if she ran 36 km/h for 5 min?

4. If you ran 15 km/h for 20 min, how much distance would you cover?

5. How much time would it take Marcy to walk 2 km to Tim Horton's for an apple fritter if she walked at a rate of 4.5 km/h?

6. Riley chucks a water balloon at a big, mean looking guy in the courtyard. Running for his life, he travels 100m in 9.83s. What was his average velocity in "m/s" and "km/h"?

7. Kendra is coming home late, past her curfew. As she sneaks quietly into her house trying not to wake up her parents, she slinks up the stairs moving 10.7 m in 26.8 s. Find her speed.

8. For her birthday, Stacey gets a shiny new bike with a horn and a basket on the front. She wants all her friends to see and so begins riding up and down her street. What is her speed if she goes 40.5 m in 5.6 s?

9. Wanting to act out our chemical reaction analogies, Sharis sees a guy at the dance that she has a crush on and decides to chase him down. Find her speed if she runs 80.3 m in 4.6 s.

10. The night before a big science test, Kendra goes to see "What a Girl Wants" (a silly chick flick). Now she doesn't want to write the test and is dragging herself to class. If her speed is 0.2 m/s, how far will she move in 28 s?

11. While on a weekend trip to New York city, you spot Angelina Jolie and just HAVE to meet her (obviously! because she's hot). You run after her at 2.7 m/s. How far will you have moved in 15.9 s?

12. Josh G struts down the hall toward class at 0.1 m/s. In 5 minutes, how far would he travel?

13. While showing off for some grade nine girls at the ski hill, Josh D wipes out on a snowboard. After the crash he tumbled 30 m in 4.2 s, what was his speed in:
    a) m/s   b) km/hr?

14. Jeff stays after class to work on is science homework and is late for hockey practice. He decides to run so the coach won't be mad. If the locker room is 300 m from the classroom and Jeff can run a surprising 25 m/s, how long would it take him to get there?

15. While waiting for his Mom to come out of the hairdresser's, Sean accidentally puts the car in gear and

it begins to roll forward. How far would the vehicle travel if it moved at 34 m/s for 2.5 s?

16. John has borrowed his parents car without permission and is driving without a license. He sees them out walking and realizes that they will be home in about 45 seconds. He is 500 m from home and driving 25 m/s. Will he get to the driveway before they do?

17. Stewart is skating at the rink and trying to impress a cute girl. Unfortunately he is staring at her and crashes into somebody, falls and makes a fool of himself. Calculate how far he will slide on the ice if he were skating at 12 m/s and slid for 2.5 s.

18. Rob is really bored one Saturday night and goes outside to study the nocturnal habits of mice in the hayfield. He sees a mouse sniffing along at 0.1 m/s. but it hears and starts to scurry for safety. In just 3.7 s it accelerates to 0.9 m/s. Find its acceleration.

19. A little grade nine kid moves down the hall at 1.2 m/s. When he sees Luke coming, he begins to run. After 3.2 s, he is moving at 3.6 m/s. What is his acceleration?

20. Cripps throws a textbook at Devine. After just 0.2 s, it is moving at 10.4 m/s. Find its acceleration.

21. Josh D has a huge crush on Christina and thinks he can catch her. Josh is running at 3.0 m/s and accelerates at 1.5 m/s^2 for 13 s. What is his final velocity? (22.5 m/s) Not to be caught by Josh, Christina is running at 2.0 m/s and accelerates at 2.5 m/s^2 for 10 s. What is her final velocity? At this speed, who will get what they want?

22. A car moving at 4.5 m/s accelerates at 2.5 m/s^2. After 7 s, it will be moving how fast?

23. Greenacre is out roaming the halls at 0.3 m/s. Seeing Mr. Atkinson come around the corner, he accelerates at 0.7 m/s^2 for 8 s. By then, how fast is he moving?

24. Cripps has joined the school ping pong team. On his serve, the ping pong ball is accelerated at 4.6 m/s^2. After how many seconds would it be traveling at 9.3 m/s?

25. While attempting to stop Devine from throwing his hat out the window, Stewart throws a punch at him. His fist accelerates at 5.7 m/s^2. After how much time would it be traveling at 1.03 m/s?

26. A spider is poking along at 0.2 m/s when Sharis spots it. As she doesn't like spiders, she decides to squash it but it accelerates at 1.7 m/s^2. After what time would it be moving at 1.7 m/s?

27. Stewart and Matt decide to take the train to Quebec for the weekend to visit a strip club. The train starts from rest and reaches a speed of 54 km/h in 10 s. Find its acceleration.

28. Being a keen student, Rob decides to study the movement of the train (on his way to the same strip club with Gilchrist and Devine). After a stop in Hull, the train pulls away from the station, accelerating at 0.4 m/s^2. After 2 minutes, how fast is it moving?

29. As part of a twisted science experiment, Devin attaches Dopey the iguana to a small rocket. How much time would it take for the rocket, which started from rest and accelerates at 20 m/s^2, to reach a speed of 500 m/s?

30. A commercial airliner starts from rest and accelerates to a speed of 220 km/h in 22 s. What is the acceleration?

31. Looking for some good old-fashioned fun. Andrew decides to slide down the hill by the staff entrance on a toboggan. Calculate the acceleration of the toboggan that reaches a velocity of 32 m/s in 8 s.

32. While participating in the "Tractor Race Finals", Rob accelerates his tractor from rest to a speed of 18 m/s in 6 s. What is the acceleration of the little guy?

33. Sharis decides to be brave and go skydiving. If she accelerates at 9.81 m/s^2 for 4.9 s, what would her speed be at that time?

34. Christina is printing off a sheet after science class and doesn't want to miss her bus (because she lives so far away that nobody would ever drive her home). Running out the front doors at an impressive 18 m/s, she realizes that the bus is pulling away and she can't make it. She slows down and stops in 4.5 s. Calculate her acceleration.

Answers

1. no because Jeff stopped
2. t = 0.25h
3. d = 3km
4. d = 5.0 km
5. t = 0.44h
6. 10.2 m/s; 36.6 km/h
7. 0.399 m/s
8. 7.2 m/s
9. 17 m/s
10. 5.6 m
11. 43 m
12. 30 m
13. a) 7.1   (b) 26
14. 12 s
15. 85 m
16. 20 s, yes
17. 30 m
18. 0.2 m/s^2
19. 0.75 m/s^2
20. 52 m/s^2
21. 27 m/s   Christina
22. 22 m/s
23. 6 m/s
24. 2.0 s
25. 0.18 s
26. 0.9 s
27. 1.5 m/s^2
28. 48 m/s
29. 25 s
30. 2.8 m/s^2
31. 4 m/s^2
32. 3 m/s^2
33. 48 m/s
34. -4 m/s^2