

Linear Motion

Problem

1. How much time does a car with an acceleration of 2 m/s^2 take to go from 20 m/s to 28 m/s ?
2. A skateboarder starting from rest accelerates down a ramp at 1 m/s^2 for 4 s . What is the final speed of the skateboarder?
3. Starting from rest, a car undergoes a constant acceleration of 3 m/s^2 . How far will the car travel in the first second?
4. A crate falls from an airplane flying horizontally at an altitude of 1140 m . Neglecting air drag, how long will the crate take to strike the ground?
5. What vertical distance can a person with a 0.9 s hang time jump?
6. What speed must you toss a ball straight up so that it takes 2 s to return to you?
7. You toss a ball at 10 m/s straight upward. How much time will the ball take to reach the top of its path?
8. A stone is dropped from a cliff. After it has fallen 20 m , what is the stone's velocity?
9. A bicycle travels 20 km in 30 minutes. What is its average speed?
10. A pear falls from a tree and 1 second later hits the ground. How fast is the pear falling when it hits the ground?
11. What is the average acceleration of a car that goes from rest to 58 km/h in 7 seconds?
12. A jet on an aircraft carrier can be launched from 0 to 46 m/s in 2 seconds. What is the acceleration of the jet?
13. What is the hang time of a person who can jump a vertical distance of 0.8 m ?
14. What is the average speed of a cheetah that runs 93 m in 4 seconds?
15. If a projectile fired beneath the water, straight up, breaks through the surface at a speed of 12 m/s , to what height above the water will it ascend?

Linear Motion Answer Section

PROBLEM

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|---------------------|-------------------|----------|---------------------|--|
| 1. ANS:
4 s | | | | |
| DIF: 3 | REF: p. 15, p. 16 | OBJ: 2.4 | STO: Ph.1.c | |
| 2. ANS:
4 m/s | | | | |
| DIF: 3 | REF: p. 15, p. 16 | OBJ: 2.4 | STO: Ph.1.c | |
| 3. ANS:
1.5 m | | | | |
| DIF: 3 | REF: p. 15, p. 16 | OBJ: 2.4 | STO: Ph.1.c | |
| 4. ANS:
15.1 s | | | | |
| DIF: 3 | REF: p. 22 | OBJ: 2.7 | STO: Ph.1.i | |
| 5. ANS:
1 m | | | | |
| DIF: 3 | REF: p. 19, p. 20 | OBJ: 2.6 | STO: Ph.1.a, Ph.2.c | |
| 6. ANS:
10 m/s | | | | |
| DIF: 3 | REF: p. 18 | OBJ: 2.6 | STO: Ph.1.a, Ph.2.c | |
| 7. ANS:
1 s | | | | |
| DIF: 3 | REF: p. 18 | OBJ: 2.6 | STO: Ph.1.a, Ph.2.c | |
| 8. ANS:
20 m/s | | | | |
| DIF: 3 | REF: p. 20, p. 21 | OBJ: 2.6 | STO: Ph.1.a, Ph.2.c | |
| 9. ANS:
40 km/hr | | | | |
| DIF: 2 | REF: p. 11, p. 12 | OBJ: 2.2 | STO: Ph.1.a, Ph.1.b | |
| 10. ANS:
10 m/s | | | | |
| DIF: 3 | REF: p. 18 | OBJ: 2.6 | STO: Ph.1.a, Ph.2.c | |

11. ANS:
8.3 km/h·s

DIF: 2

REF: p. 16

OBJ: 2.4

STO: Ph.1.c

12. ANS:
23 m/s

DIF: 2

REF: p. 15, p. 16

OBJ: 2.4

STO: Ph.1.c

13. ANS:
0.8 s

DIF: 3

REF: p. 22

OBJ: 2.7

STO: Ph.1.i

14. ANS:
23.3 m/s

DIF: 2

REF: p. 11, p. 12

OBJ: 2.2

STO: Ph.1.a, Ph.1.b

15. ANS:
7.2 m

DIF: 3

REF: p. 20, p. 21

OBJ: 2.6

STO: Ph.1.a, Ph.2.c