Physical Science Motion and Forces Worksheet

1. What is the force on an object that goes from 35 m/s to 85 m/s in 20 seconds and has a mass of 148 kg?

2. Calculate the force on an object that has a mass of 12 kg and an acceleration of 4 m/s^2 .

3. During a race, a sprinter increases from 5.0 m/s to 7.5 m/s over a period of 1.25 s. What is the sprinter's average acceleration during this period?

4. A motorcycle has a mass of 250 kg and a velocity of 68 m/s, what is it's momentum?

5. A 3,000-N force acts on a 200-kg object. The acceleration of the object is

6. A truck travels to and from a stone quarry that is located 2.5 km to the east. What is its distance? What is its displacement?

7. A cross-country runner runs 10 km in 40 minutes. What is his average speed?

8. A runner went from 6 m/s to 2 m/s in 2 seconds, what was his acceleration?

9. A dog travels 250 meters east in 8 seconds. What is the velocity of the dog?

10. A large truck loaded with scrap steel weighs 14 metric tons and is traveling north on the interstate heading for Chicago. It has been averaging 48 hm/h for the journey and has traveled over 1450 km so far. *It has just stopped* to refuel. What is its current momentum?

11. James rode his bike 0.65 hours and traveled 8.45 km. What was his speed?

12. A 10-kg wagon has a speed of 25 m/s. What is its momentum?

13. A dog travels north for 18 meters, east for 8 meters, south for 27 meters and then west for 8 meters. What is the distance the dog traveled and what is the displacement of the dog?

14. Brittany drove at a speed of 85 km / hr south for 4 hours. How far did she travel?

15. What is the mass of an object that has a force of 89 N and an acceleration of 25 m/s^2?

16. What is the force acting on an object with a mass of 2489 kg and an acceleration of 6.25 m/s^2?

17. The driver of a pickup truck drove at a velocity of 75.0 km/m for 33 minutes. What distance did the bus travel?

18. A high speed train travels with an average speed of 227 km/h. The train travels for 2 h. How far does the train travel?

19. A 300-N force acts on a 25-kg object. The acceleration of the object is

20. A 10.0 kg dog chasing a rabbit north at 6.0 m/s has a momentum of

21. Newton's first law of motion is also called the law of ___

22. The statement "to every action there is an equal and opposite reaction" is ___.

23. The law that states that the unbalanced force acting on an object equals the object's mass times its acceleration is ____

24. Which of the following best illustrates balanced forces? a) a rock falling to the ground b) a stretched rubber band being held between two hands c) a person lifting a heavy box off of the ground d) a crash between a large truck and a train

25. _____ forces acting on an object cause the object to accelerate

26. Sally sits on a rock. Her weight is an action force. Describe its reaction force.

27. Friction is a force that __ motion between two surfaces that are touching each other

28. At the same speed, a bowling ball is harder to stop than a soccer ball because the bowling ball has greater ____

29. Why is your weight less on the Moon than on Earth, but your mass is the same?

30. The size of the gravitational force between two objects depends on their ___ and _____

31. The law that states that every object maintains constant velocity unless acted on by an unbalanced force is _____

32. A tug-of-war that results in one team pulling the other across the line is an example of ___forces

33. 1. An object in motion at a constant velocity will change its motion only if a(n) __ force acts on it.

34. The law that states that for every action force there is an equal and opposite reaction force is ____

35. The __ velocity is the highest velocity that will be reached by a falling object.

36. In a car crash, ___could cause you to crash into the windshield

37. Of the following, the greatest gravitational force would occur between: a) a marble and a baseball 5 meters apart. b) a loaded freighter on the high seas and Earth. c) the moon and an astronaut standing on the moon d) the moon and Earth

38. When the forces acting on an object are ___, the net force is zero

39. When objects are moved further apart from each other, the force of gravity increases / decreases

40. According to Newton's second law of motion, a larger force acting on an object causes a greater ____ of the object

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Answer Section

PROBLEM

1. 370 N
2. $F = ma$ = 12 kg × 4 m/s^2 = 48 kg × m/s^2 = 48 N
3. 2.0 m/s^2
4. 250 kg = m
   68 m/s = v
   ? =p
   p = mv
   p = 250 x 68
   p = 17000 kgxm/s
5. 150 m/s^2
6. Distance = 5 km, Discplacement = 0 km
7. 0.25 km / m
8. 6 m/s = v_i
   2 m/s = v_f
   2 s = t
   ? = a
   a = v_f - v_i / t
   a = 2 – 6 / 2
   a = -2 m/s^2
9. 250 m = d
   8 s = t
   ? = v
   v = d/t
   v = 250 / 8
   v = 2.5 ,/s
10. 0 (zero) kg•m/s
11. 0.65 hr = t
    8.45 km = d
    s = d/t
    s = 8.45/0.65
    s = 13 km/hr
12. 250 kg × m/s
    $p = mv$ = 10 kg × 25 m/s = 250 kg × m/s
13. distance = 61 m
    displaceent = 9 meters south
14. 85 km / hr = s
    4 hrs = t
    ? = d
    s = d/t
    85 km/hr = d / 4 hrs
    d = 340 km
15. 3.56 kg
16. 15556.25 N
17. 75 km / m = v
    33 m = t
    ?= d
    v = d/t
    d = 75 x 33
    d = 2475 km
18. $d = s \times t$ = 227 km/h × (2.00 h) = 454 km
19. 12 m/s^2
20. 60.0 kg•m/s north.

SHORT ANSWER

21. inertia
22. Newton's third law of motion
23. Newton’s second law of motion
24. B
25. Unbalanced
26. The rock supplies an upward reaction force on Sally equal to her weight
27. opposes
28. inertia or mass
29. Your mass is the same because you didn't change the amount of matter, but the gravitational force decreased, decreasing your weight
30. masses and the distance between them
31. Newton’s first law of motion
32. unbalanced
33. unbalanced
34. Newton’s third law of motion
35. terminal
36. inertia
37. D
38. balanced
39. decreases
40. acceleration