39. A truck, initially traveling at a speed of 22 meters per second, increases speed at a constant rate of 2.4 meters per second ^{2} for 3.2 seconds. What is the total distance traveled by the truck during this 3.2-second time interval?

    A) 12 m   B) 58 m
    C) 70. m   D) 83 m

40. What is the final speed of an object that starts from rest and accelerates uniformly at 4.0 meters per second ^{2} over a distance of 8.0 meters?

    A) 8.0 m/s   B) 16 m/s
    C) 32 m/s   D) 64 m/s

41. If a car accelerates uniformly from rest to 15 meters per second over a distance of 100. meters, the magnitude of the car's acceleration is

    A) 0.15 m/s^2 B) 1.1 m/s^2
    C) 2.3 m/s^2 D) 6.7 m/s^2

42. A car traveling on a straight road at 15.0 meters per second accelerates uniformly to a speed of 21.0 meters per second in 12.0 seconds. The total distance traveled by the car in this 12.0-second time interval is

    A) 36.0 m   B) 180. m
    C) 216 m   D) 252 m

43. In a race, a runner traveled 12 meters in 4.0 seconds as she accelerated uniformly from rest. The magnitude of the acceleration of the runner was

    A) 0.25 m/s^2 B) 1.5 m/s^2
    C) 3.0 m/s^2 D) 48 m/s^2

44. A car, initially traveling east with a speed of 5.0 meters per second, is accelerated uniformly at 2.0 meters per second^2 east for 10. seconds along a straight line. During this 10.-second interval the car travels a total distance of

    A) 50. m   B) 60. m
    C) 1.0×10^2 m   D) 1.5×10^2 m

45. The speed of an object undergoing constant acceleration increases from 8.0 meters per second to 16.0 meters per second in 10. seconds. How far does the object travel during the 10. seconds?

    A) 3.6×10^2 m   B) 1.6×10^2 m
    C) 1.2×10^2 m   D) 8.0×10^1 m

46. A rocket initially at rest on the ground lifts off vertically with a constant acceleration of 2.0×10^1 meters per second^2. How long will it take the rocket to reach an altitude of 9.0×10^3 meters?

    A) 3.0×10^1 s   B) 4.3×10^1 s

    C) 4.5×10^2 s   D) 9.0×10^2 s

47. A roller coaster, traveling with an initial speed of 15 meters per second, decelerates uniformly at -7.0 meters per second^2 to a full stop. Approximately how far does the roller coaster travel during its deceleration?

    A) 1.0 m   B) 2.0 m

    C) 16 m   D) 32 m

48. A car traveling west in a straight line on a highway decreases its speed from 30.0 meters per second to 23.0 meters per second in 2.00 seconds. The car's average acceleration during this time interval is

    A) 3.5 m/s^2 east   B) 3.5 m/s^2 west

    C) 13 m/s^2 east   D) 13 m/s^2 west

49. A child riding a bicycle at 15 meters per second accelerates at -3.0 meters per second^2 for 4.0 seconds. What is the child's speed at the end of this 4.0-second interval?

    A) 12 m/s   B) 27 m/s

    C) 3.0 m/s   D) 7.0 m/s

50. As a car is driven south in a straight line with *decreasing* speed, the acceleration of the car must be

    A) directed northward

    B) directed southward

    C) zero

    D) constant, but not zero

51. Oil drips at 0.4-second intervals from a car that has an oil leak. Which pattern best represents the spacing of oil drops as the car accelerates uniformly from rest?

    A)

    B)

    C)

    D)

52. An object accelerates uniformly from rest to a speed of 50. meters per second in 5.0 seconds. The average speed of the object during the 5.0-second interval is

    A) 5.0 m/s   B) 10. m/s

    C) 25 m/s   D) 50. m/s

53. A locomotive starts from rest and accelerates at 0.12 meter per second^2 to a speed of 2.4 meters per second in 20. seconds. This motion could best be described as

    A) constant acceleration and constant velocity
    B) increasing acceleration and constant velocity
    C) constant acceleration and increasing velocity
    D) increasing acceleration and increasing velocity

Topic 2B: Acceleration due to gravity
Skill 14: Dropped objects

For all questions assume air resistance and friction to be negligible forces, unless otherwise specified.
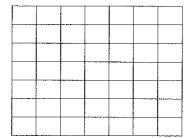
___ 54. If a freely falling object were somehow equipped with a speedometer, the speed would increase each second by about
a.   5. m/s.
b.   10. m/s.
c.   15. m/s.
d.   a variable amount.
e.   It depends on its initial speed.

___ 55. If a freely falling object were somehow equipped with an odometer to measure the distance it travels, then the distance it travels each succeeding second would be
a.   the same.
b.   less than the previous second.
c.   greater than the previous second.
d.   The distance cannot be predicted.

___ 56. Starting from rest, a freely-falling object will fall, in 10. seconds, a distance of about
a.   10. m.
b.   50. m.
c.   100. m.
d.   500. m.
e.   more than 500. m.

For the following problems you may use a value of $g = 10$ m/s/s

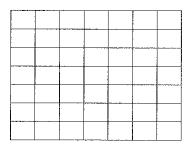57. A stone dropped from the top of a building strikes the ground in 4 s. How tall is the building?

58.   Silas McEvil pushes a safe off the top of a building 200 meters tall. How much time does his victim on the ground below have to move out of harm's way? At what velocity will the safe hit the ground?

59.   A dare-devil sky diver jumps from an airplane traveling at a height of 400 meters. If her parachute must open at 200 meters above ground, how much time will she be in a free-fall?

60.   A bomb dropped from an airplane is given an initial downward velocity of 10 m/s. What is its final velocity if it hits the ground 20 s after being released? Ignore air resistance.

61.   An empty propane tank dropped from a hot air balloon hits the ground with a velocity of 150 m/s. What is the height of the balloon?

62.   Roxanne hurls a rock downward from a cliff 15 m above a lake. One second later the rock hits the lake. What initial velocity did Roxanne give to the rock?

Δv	v_i	v_f	v_{avg}	d	a	t
	?			15	9.8	1

63. Draw the qualitative graphs of d vs t, v vs t and a vs t for the rock hurled by Roxanne in the previous question. [Consider down positive since no direction change occurs]