**Practice – 2**

Once you feel confident with acceleration, complete problems 1 to 7. Check your answers by going to the Solutions tab in Moodle.

Instructions: Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

1. The following graph shows a velocity function.
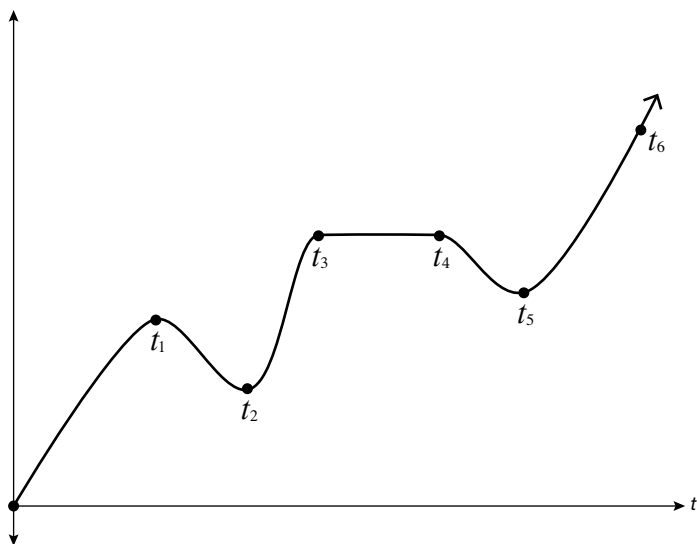
State whether the acceleration is positive, negative, or zero for each of the following intervals.

a. 0 to t_1

b. t_1 to t_2

c. t_2 to t_3

d. t_3 to t_4

e. t_4 to t_5

f. t_5 to t_6

2. A particle's position, in centimetres, is defined by the function $s(t) = 2t^3 - 24t$, where $t \geq 0$, and t is in seconds. Find the acceleration at the moment when the velocity is 0 cm/s.

3. An object is moving along a straight path defined by the position function
    $s(t) = t^3 - 3t^2 - 12t$, where s is in meters and t is in seconds.

    a. At what time is the object's acceleration zero?

    b. What is the position and the velocity of the object when $a(t) = 0$?

    c. Describe the object's motion when $a(t) = 0$.

4. The brakes of a bus are fully applied when the bus is travelling at 108 km/h. If braking
    produces a constant acceleration of -15 m/s^2, and the velocity function is given by
    $v(t) = -15t + 30$, how long will it take the bus to stop?

5. If $3s^2 + 5v^2 = 28$, where s is displacement and v is velocity, find the acceleration a.

6. The relationship between velocity v and time t is given by $\dfrac{1}{v} + \dfrac{1}{3} = 4t$. Prove that the
    acceleration is $-4v^2$.

7. A gun was fired. The bullet travelled a distance s in the barrel of the gun. The velocity of the
    bullet is given by $v = \dfrac{6000s}{6 + s}$. Find the acceleration of the bullet in terms of s.