GRAYS TUITION CENTRE – Online Tutoring

WEEK: 11

Week Beginning: (01/03/2021)

Subject: MATHS

Year: 9

Lesson Objective:

- Continue looking at graphs but now focus on equations of motion and how each equation relates to one another. i.e. speed distance time or acceleration
- Begin year 9 algebra questions

Class Worksheets

- Pages 206-208 GCSE Maths 4-9 Elmwood (Blue book)

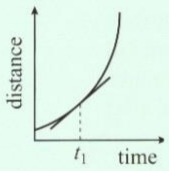
Homework

- Complete remaining classwork for homework

Additional Notes

- All homework from last week will be marked at the beginning of the lesson. Make sure that you have your homework with you in the lesson and are ready to mark it
- Also prepare any questions if you struggled with the homework so I can help you.
- All lesson worksheets and homework for next week (**due Week 12**) worksheets can be found below

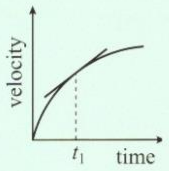
Key Facts



Gradient at time t_1 = gradient of tangent

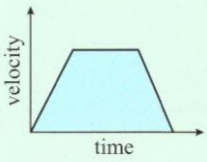
$$= \frac{\text{change in distance}}{\text{change in time}}$$

= velocity at time t_1



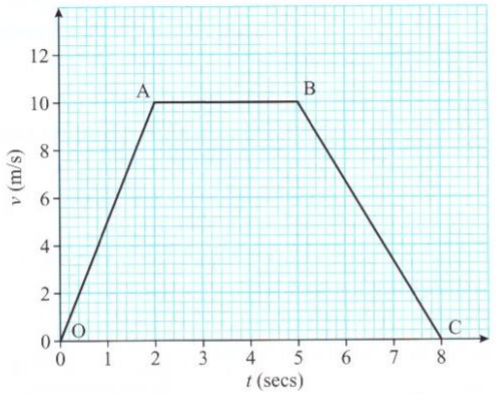
Gradient at time t_1 = rate of change of velocity

= acceleration at time t_1



area under a velocity/time graph = distance travelled

E6.11

1 

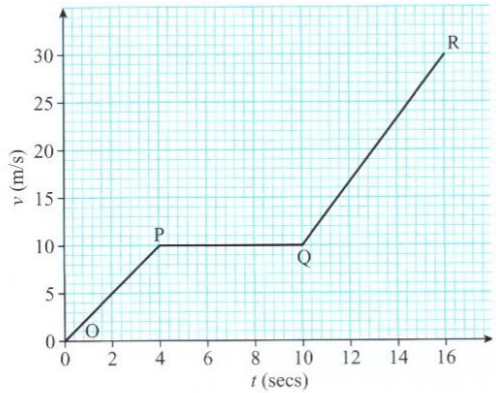
This velocity–time graph shows the motion of a particle. Find:

(a) the acceleration from O to A (in m/s^2).

(b) the acceleration from A to B (in m/s^2).

(c) the deceleration from B to C (in m/s^2).

(d) the total distance travelled from O to C.

2 

This velocity–graph shows the motion of a particle. Find:

(a) the total distance travelled from O to R.

(b) the acceleration when $t = 12$ seconds.

(c) the distance travelled in the first 2 seconds.

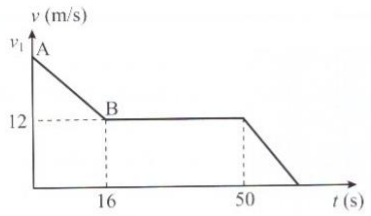
3 A skier starts from rest and accelerates uniformly to a speed of 23 m/s in 20 seconds. He maintains this speed for 60 seconds then slows down uniformly to a stop in a further 25 seconds.

(a) Draw a velocity–time graph for the above information.

(b) Find the total distance travelled by the skier.

(c) Find the acceleration when the skier is speeding up.

(d) How long does the skier take to cover the first 690 m?

4 

A particle travels 336 m from A to B.
Its velocity–time graph is shown opposite.

(a) Find the value of V_1.

(b) What is its deceleration after 4 seconds?

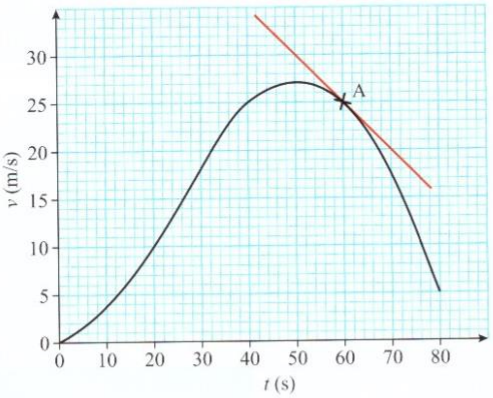
(c) How long does it take to travel 444 m?

5 s is the distance (in km) from Maria's house. Maria cycles such that $s = t^3 - t + 2$ where t is the time (in hours).

(a) Draw a graph of s against t for t-values from 0 to 3.

(b) Find Maria's speed after 2 hours.

(c) Work out Maria's average speed between 1 and 2·5 hours.

6 

The graph above shows a car accelerating and decelerating quickly.

(a) Estimate the distance travelled in the first 80 seconds (hint: use trapezium rule with 4 strips).

(b) Work out the deceleration at the point A.

(c) Work out the average acceleration between $t = 20$ s and $t = 40$ s.

7 A cyclist slows down from 22 km/h to 8 km/h in 2 minutes at a uniform rate. Sketch a velocity–time graph and work out the distance travelled by the cyclist.

Year 9 Algebra questions:

L6
Grade D
Progression : Quick

Solving Linear Equations (C)

Solve the following equations. Some questions will have negative, fraction or decimal answers.

Section A

1) $4x+10=30$
2) $4x-8=20$
3) $5+2x=65$
4) $9+4x=-15$
5) $14+6x=2$
6) $2x-3=-2$
7) $5+10x=-15$
8) $10=7-x$
9) $-3=16-x$
10) $-4=12-2x$
11) $25=46-3x$
12) $8=9-5x$

Section B

1) $\frac{x}{2}+11=19$
2) $\frac{x}{7}-6=1$
3) $12+\frac{x}{5}=20$
4) $3=\frac{x}{4}-3$
5) $7=\frac{x}{2}-4$
6) $-2=\frac{x}{8}-5$
7) $-1=6+\frac{x}{2}$
8) $14-\frac{x}{3}=10$
9) $5-\frac{x}{9}=-1$
10) $\frac{x+5}{3}=12$
11) $\frac{x-4}{11}=9$
12) $\frac{x+3}{8}=-2$

Section C

1) $3(x+2)=15$
2) $2(x+5)=24$
3) $6(x-9)=12$
4) $2(3x+5)=-44$
5) $5(4x-3)=11$
6) $-3(2x+1)=21$
7) $-9(x-4)=54$
8) $7(x-4)-3=46$
9) $2(3x-1)+3=21$
10) $2(x+1)+3x=37$
11) $12+4(2x+4)=68$
12) $3x-2(6x-3)=42$

Section D

1) $x+8=3x$
2) $6+x=2x$
3) $10+x=6x$
4) $3x-24=5x$
5) $4x+7=6x$
6) $9x+13=7x$
7) $12x-5=7x$
8) $5-2x=8x$
9) $2-4x=6x$
10) $4(x+3)=7x$
11) $5(2x-1)=16x$
12) $3(6x+4)=2x$

Section E

1) $9x+2=4x+12$
2) $5x+4=31+2x$
3) $12+3x=8x+3$
4) $20+2x=6+9x$
5) $7+x=13+4x$
6) $5x-3=2x+6$
7) $5x-6=18-3x$
8) $8-2x=4-6x$
9) $4x-21=6x-3$
10) $x-3=1+7x$
11) $9x-5=7-4x$
12) $-8x+4=-26x+1$

Homework:

Support Questions

6. Expand.

a) $x(3x-9)$ b) $(-4n)(2n-3)$ c) $b(2b^2-3b+1)$
d) $(-x)(x-2)$ e) $(-4m)(m^2-m)$

Key Question #6

1. State the like terms in each group. (2 marks)

a) $4w, 5w^2, 5z, x^2, -x, 3w, 3v$ b) $4x^2, -3x^2, 4z, 2y, y^2, 4w$

2. Simplify. (5 marks)

a) $-12t+2+7t+5$ b) $6-4r-5r-1$
c) $4n^2+4n+1-7n^2-2n-6$ d) $-4x^2+3x+1-3x^2-7+x$
e) $2+5m+n^2-5+1m-4n^2$

3. Simplify. (3 marks)

a) $(3+7x^2)+(4-6x^2)$ b) $(1-7w^2)-(-4+8w^2)$
c) $(6x^2-7x)+(-2x+9x^2)$

4. Simplify. Then determine the value of the polynomial when n = -3 and when n = 2. (4 marks)

a) $(5n^2+3n-4)+(-3n^2+4n-1)$ b) $(7n^2-5n-2)-(-n^2+6n+8)$

5. Expand. (5 marks)

a) $2w(3w+4)$ b) $-4n(5n-9)$ c) $c(7c^2-5c-6)$
d) $(-h)(h+6)$ e) $(-6x)(-x^2+x)$