1. State the number of significant digits
   a. 431.92   5
   b. 0.00430   3
   c. 2001   4
   d. 4300   2
   e. 0.6700   4
   f. 2000.003   7

2. Answer in the proper number of significant digits
   a. 815 / 2.3
   b. 5.6 x 0.045 x 2.83
   c. 15.5 / 2.11
   d. 8.1 x 22.10 x 110

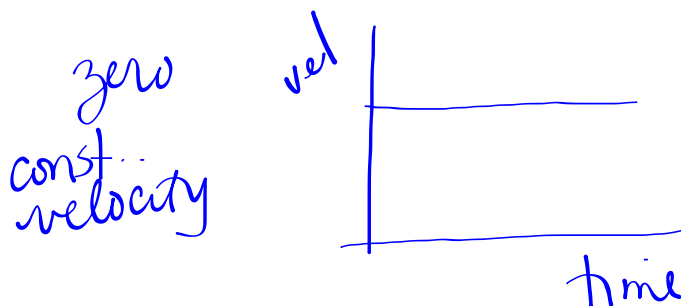(a) $354.3478261 = 350$

(b) $0.71316 = 0.71$

(c) 7.34597 7.35

(d) $19691.1 = 20000$ 2.0×10^4

3. Convert 1.7m/s to km/h
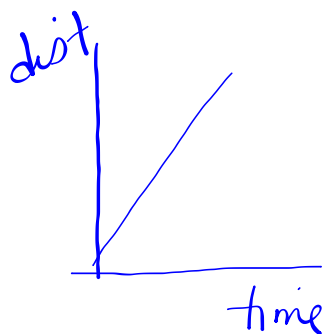
$$\frac{1.7m \div 10 \div 10 \div 10}{1s \div 60 \div 60} \, \frac{km}{h} = \frac{0.0017}{0.00027777\ldots} = 6.12 \frac{km}{h}$$

$$\frac{1.7m}{s} \times \frac{1 \, km}{1000 \, m} \times \frac{3600 \, s}{1 \, h} = 6.12 \, km/h$$

4. On a time-velocity graph, periods of no acceleration have what slope?

zero

const. velocity

vel

time

5. a. Sketch a distance time graph showing constant velocity
    b. Sketch a distance time graph showing no velocity
    c. Sketch a velocity time graph showing constant acceleration
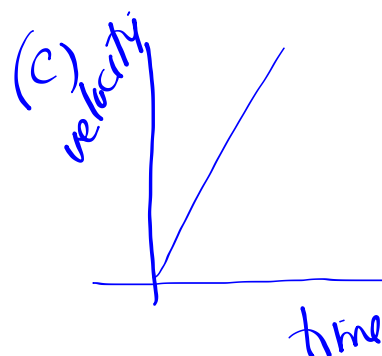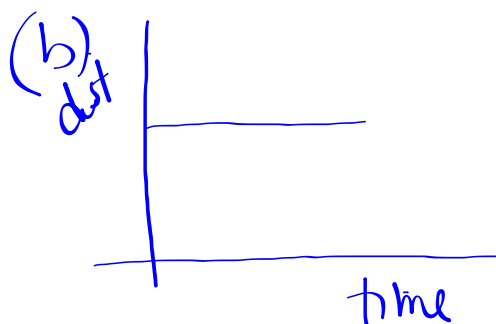
6. A car travels at a speed of 23.6 m/s. If the driver traveled for 32.4 s, find the distance covered?

6. $V = 23.6 \, m/s$
    $t = 32.4 \, sec$
    $d = ?$

$d = vt$
$= 23.6 \frac{m}{s} \times 32.4 \, s$
$=$
$764.64 \, m.$
$= 765 m$

7. A horse cantering across a field at 3.00 m/s is scared by a sudden noise and rapidly increases its

   pace. After 3.5 s, it is running at 5.4 m/s. find its average acceleration.

7. $a = ?$
    $V_i = 3.00 \, m/s$
    $V_f = 5.4 \, m/s$
    $t = 3.5 \, sec$

$a = \dfrac{V_f - V_i}{t}$
$= \dfrac{5.4 - 3.00}{3.5 \, sec}$

$0.6857 \, m/s^2$
$0.69 \, m/s^2$

8. a. A van travels a distance of 31500 m in 56 minutes. Calculate the speed in m/s.

   b. What is the speed in km/h

8. $d = 31500 \, m$
    $t = 56 \, min$ $\}$ $56 \, min \times \dfrac{60 \, sec}{1 \, min}$
    $V = ? \, m/s$ $-- 3360 \, sec$

$V = \dfrac{d}{t}$
$= \dfrac{31500 \, m}{3360 \, sec}$
$= 9.375 \, m/s$
$9.375 \, m/s$

(b) $9.375 \dfrac{m}{s} \times \dfrac{1 \, km}{1000 \, m} \times \dfrac{3600}{1 \, hr} = 33.75 \, km/h$ = | chart
$\dfrac{9.375 m \div 10 \div 10 \div 0}{1 s \div 60 \div 60}$

$\cdot 34 \, km/h$

9. Two cars travel the same distance. The first car travels at a speed of 39 m/s for 19 s

and the second car travels for 14 s. Calculate the speed of the second car in m/s.

9.

distance
~~cart~~

$v = 39 m/s$
$t = 19 sec$

$d = ?$

$d = vt$
$= 39 \frac{m}{s} \times 19s$
$= 741m$

second car
$d = 741m$
$v = ?$
$t = 14 sec$

$v = \frac{d}{t}$
$= \frac{741m}{14sec}$
$= 52.929m/s$
$53m/s$

10. A last minute shopper strides briskly at 0.3 m/s through a mall toward a music store. Noticing the clerk

starting to move the CD displays inside the store entrance and close the store, the shopper begins to speed

walk and in 4 s in moving at 0.8 m/s. Find the average acceleration

10.
$v_i = 0.3m/s$
$v_f = 0.8m/s$
$t = 4sec$
$a = ?$

$a = \frac{v_f - v_i}{t}$
$= \frac{0.8 \frac{m}{s} - 0.3 m/s}{4sec}$
$= 0.125m/s^2$
$0.1m/s^2$ 1 sign. digit

11. After accelerating at a rate of 0.25m/s² for 8 s , a frog is swimming at 0.3 m/s. What was its initial speed?

11. $V_i = ?$

$V_f = 0.3 \, m/s$

$a = 0.25 \, m/s^2$

$t = 8 \, sec.$

$V_i = V_f - at$

$= 0.3 \frac{m}{s} - 0.25 \frac{m}{s^2} \times 8 \, sec.$

$= -1.7 \, m/s$

$= -2 \, m/s$

12. How long would it take a coyote accelerating at 0.8 m/s² to increase its speed from 0.7 m/s to 4.2 m/s?

12. $t = ?$

$V_i = 0.7 \, m/s$

$V_f = 4.2 \, m/s$

$a = 0.8 \, m/s^2$

$t = \frac{V_f - V_i}{a}$

$= \frac{4.2 \, m/s - 0.7 \, m/s}{0.8 \, m/s^2}$

$= 4.375 \, sec$

13. A stunt man drops from the top of a building. If he accelerates at –9.8m/s² and hits a hugh air mattress on the ground in 8 seconds, what is his final velocity.

13. $a = -9.8 \, m/s^2$

$t = 8 \, sec$

$V_i = 0 \, m/s$

$V_f = ?$

$V_f = V_i + at$

$= 0 \, m/s + -9.8 \, m/s^2 \times 8 \, sec$

$= -78.4 \, m/s$

$-80 \, m/s$

14. A car moving at 60km/h accelerates to 95km/h in 0.15 hours. How far will the car travel as it accelerates.?

distance
from acceleration!

area under curve!

$A_1 = \frac{1}{2}(0.15)(35)$
$= 2.625$

$A_2 = bh$
$= 0.15(60)$
$= 9 \ km$

total: $2.625 + 9$
$= 11.625 \ km$
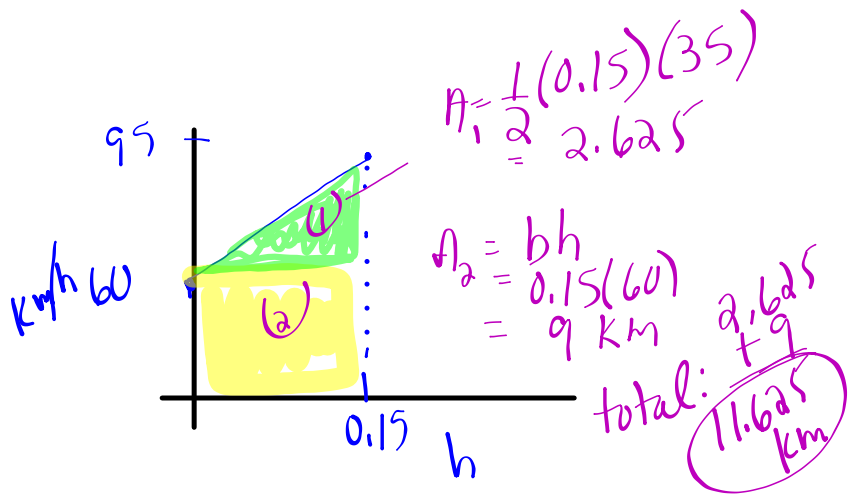
15. Describe the motion displayed by the following graphs

distance / time — + const velocity

velocity / time — + const. acceleration

distance / time — no speed stopped

velocity / time — const velocity no acceleration
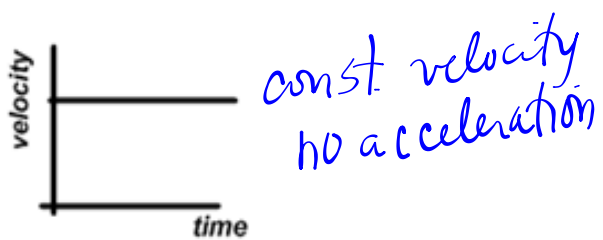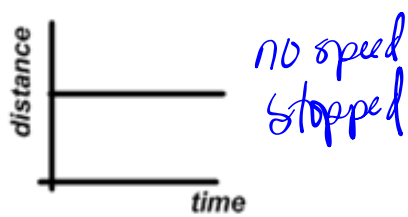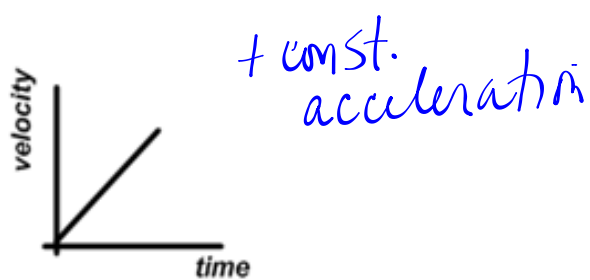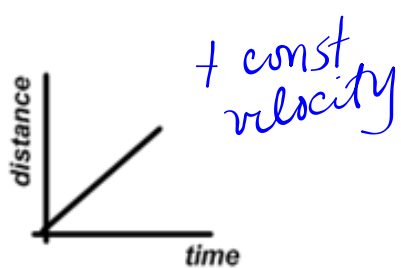
16. a. Determine Bob and Sue's Speed
    b. Who travelled the farthest?
    c. Who travelled the longest?

a) Bob
   Speed: $m_{(2,0)} = \dfrac{50-0}{8-2}$
   $(8,50) = \dfrac{50}{6}$ m/sec
   $= 8.3$ m/s

Sue
Speed $m_{(0,0)} = \dfrac{50-0}{12-0} = \dfrac{50}{12}$
       $(12,50)$ $= 4.16$ m/s
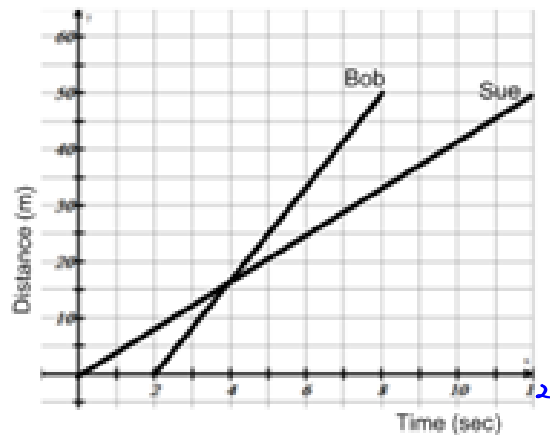
b) They both travelled 50m
   (same distance)

c) Sue travelled 12s, } Sue longest
   Bob travelled 8 sec
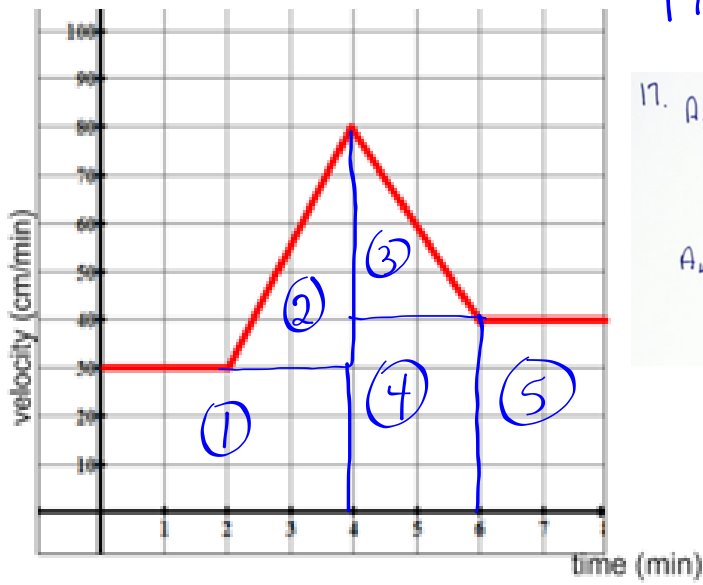
17.
determine the total distance travelled

17.
$A_1 = bh$ $\quad A_2 = \frac{1}{2}bh$ $\quad A_3 = \frac{1}{2}(2)(40)$

$\quad = 4 \times 30$ $\quad\quad = \frac{1}{2}(2)(50)$ $\quad\quad = 40$

$\quad = 120$ $\quad\quad\quad = 50$

$A_4 = bh$ $\quad A_5 = bh$ $\quad\quad$ TOTAL

$\quad = 2 \times 40$ $\quad\quad = 2 \times 40$ $\quad\quad\quad$ 370cm

$\quad = 80$ $\quad\quad\quad = 80$

18. A skunk walking at 0.2 m/s begins to accelerate as it travels 32.5m farther along a trail. If its period of acceleration is 50 sec, what is its final speed?

$V_i = 0.2 m/s$

$V_F = ?$

$d = 32.5 m$

$t = 50 sec$

? How do you get distance when something is accelerating? (Area under curve)

V_f

$V(m/s)$

0.2

32.5

22.5

10

50 sec

time (sec)

$0.2 + 0.9$
$= 1.1$
$\boxed{V_F = 1.1}$
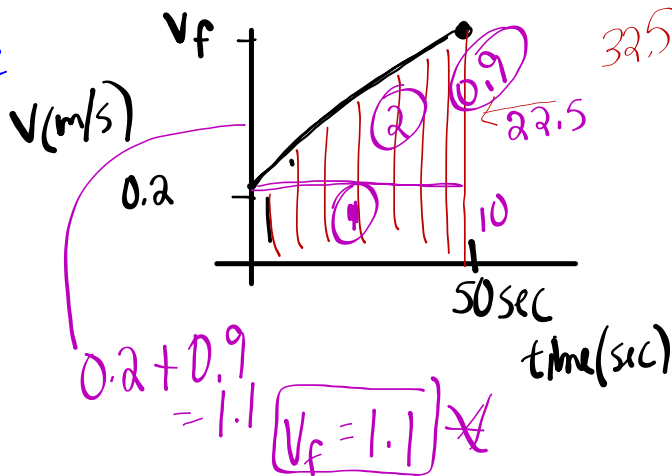
$A_1 = 50(0.2)$
$= 10$

$A_2 = \frac{1}{2}(50) h$
$22.5 = 25 h$
$\frac{22.5}{25} = h$
$0.9 = h$

19. The graph on the right represents the velocity of an object over a 12 hour trip.
    a. the average acceleration from 6
       to 9 hours?
    b. the average acceleration from|
       0 to 2 hours.
    c. How far did the car travel
       from 2 to 6 hours
    d. The total distance travelled
       during the entire journey

velocity (km/h)

time (hours)
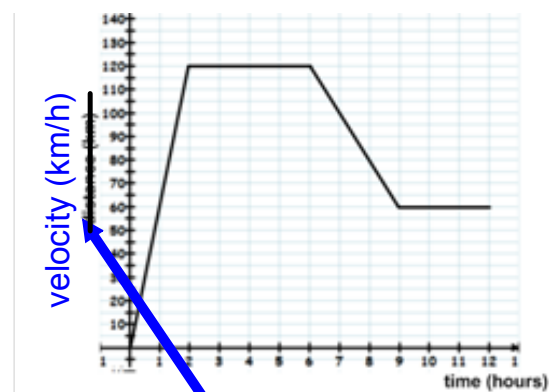
19. (a). $m_{(6,120)} = \dfrac{120-60}{6-9}$ (b) $m_{(0,0)} = \dfrac{120-0}{2-0}$
        $(9,60) = \dfrac{60}{-3}$ $(2,120)$

        $= -20 \; km/h^2$ $= 60 \; km/h^2$ change this to velocity (km/h)

    (c) 2 to 6 hrs   (d) TOTAL Area $= 1050 \; km$
        Area $= bh$
            $= 4(120)$
            $= 480 \; km$

20. Differentiate between an scalar and a vector quantity. Give an example of each

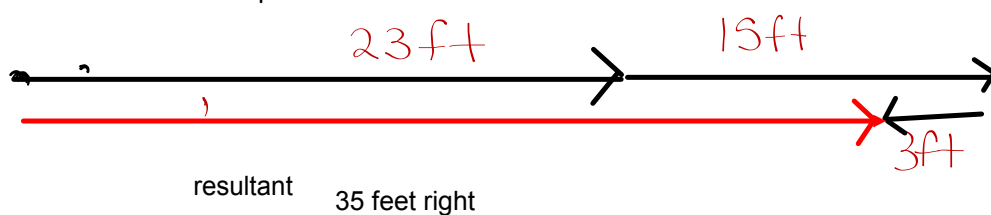Scalar = magnitude only (size)   Ex: 50km

vector = magnitude (size) & direction   Ex:
50 km North

21. An actor walks 23 feet stage right and then 15 feet and finally 3 feet stage left.

Find the resultant displacement

23ft   15ft

3ft

resultant   35 feet right

Ohm's Law : $V = IR$

electric potential (volts)   electric current (amps)   resistance (ohm's) Ω

22. A 12 Volt car battery pushes charge through the headlight circuit resistance of 10 ohms. How much current is passing through the circuit? *1.2 amps*

23. An electric heater works by passing a current of 100 A though a coiled metal wire, making it red hot. If the resistance of the wire is 1.1 ohms, what voltage must be applied to it? *110 volts*

24. A subwoofer needs a household voltage of 110 V to push a current of 5.5 A through its coil (circuit). What is the resistance of the subwoofer?? *20 Ω*

25. If a water heater has a voltage drop of 240V and a resistance of 12.8Ω, what is the current? *18.75 amps*

26. If the current of a walkman is 4.7 A and the resistance of 26Ω, what is the voltage? *122.2 volts*

Ohm's Law: $V = IR$

electric potential (volts)

electric current (amps)

resistance (ohm's) Ω

22. A 12 Volt car battery pushes charge through the headlight circuit resistance of 10 ohms. How much current is passing through the circuit?

$$I = \frac{V}{R}$$

$$= \frac{12}{10}$$

$$= 1.2 \text{ amps}$$

23. An electric heater works by passing a current of 100 A though a coiled metal wire, making it red hot. If the resistance of the wire is 1.1 ohms, what voltage must be applied to it?

$$V = IR$$
$$= 100 \times 1.1$$
$$= 110 \text{ volts}$$

24. A subwoofer needs a household voltage of 110 V to push a current of 5.5 A through its coil (circuit). What is the resistance of the subwoofer??

$$R = \frac{V}{I}$$

$$= \frac{110}{5.5}$$

$$= 20 \text{ ohms}$$

25. If a water heater has a voltage drop of 240V and a resistance of 12.8Ω, what is the current?

$$I = \frac{V}{R}$$

$$= \frac{240}{12.8}$$

$$= 18.75 \text{ amps}$$

26. If the current of a walkman is 4.7 A and the resistance of 26Ω, what is the voltage?

$$V = IR$$
$$= 4.7 \times 26$$
$$= 122.2 \text{ volts}$$

27. Static Electricity - a charge on a substance that stays in the same place. (friction... ex: wool sock rub against : balloon rubbed on hair

Law of Electric charge: like charges repel, unlike charges attract.

Discharge an object - Static wicks on planes - grounding wires (gas houses, lightening rods)

28.
what is the charge on each substance as it rubs together:
(a) Wool and Plastic
   +   —

Acetate	Weak hold on electrons
Glass	
Wool	POSITIVE CHARGE
Cat's fur, human hair	
Calcium, lead	
Silk	
Aluminum, zinc	
Cotton	
Paraffin wax	
Ebonite	
Plastic	
Carbon, copper, nickel	NEGATIVE CHARGE
Rubber	
Sulfur	
Platinum, gold	Strong hold on electrons

(b) Why does Silk become positively charged when rubbed against rubber? Because silk has a weaker hold on electrons.