2-8-1	10/10/22	Isaac Abella.

1) P:) How Far does the ball roll before stopping?

A)

R:)

$X_1 = 0 \longrightarrow X_2 = ?$

Dr. Bennet

$V_1 = 2.9\,m/s$ $\quad V_2 =$

O:) $X_1 = 0$ $\quad x^2 = ?$

$V_1 = 2.9\ m/s$

$a = .28\ m/s^2$

Solution: No time given equation

$$S_2 = S_1 + \left(\frac{V_2^2 - V_1^2}{2(a)}\right)$$

$$X_2 = \left(\frac{0_2^2 - (2.9m/s)^2}{2(.28)}\right) = -8.41 / .56$$

$$\boxed{= 15.01\ m} + 0 =$$

15.01

2-8-1	10/10/22	Isaac Abella

1) P:) How long does it take to stop?

B) .

R:)

$x_1 = 0$ $\quad$ $x_2 = 15.01$ m.

Dr. Ben. $\quad$ pins.

$V_1 = 2.9$ m/s. $\quad$ $V_2 = 2.9$ m/s.

O:) $x_1 = 0$ $\quad$ $x_2 = 15.01$ m

$V_1 = 2.9$ m/s.

$a = .28$ m/s^2

$T = ?$

Solution:

$$V^2 = V_0^2 + 2 \cdot ad.$$

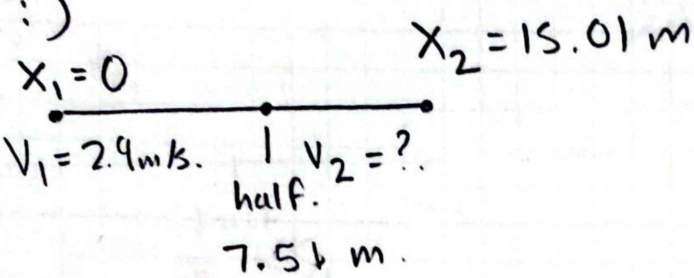
$$2.9 \text{ m/s} = (2.9 \text{ m/s})^2 + 2(.28 \text{ m/s})(15.01 \text{ m})$$

$$T = \frac{0 - 2.9 \text{ ms}}{.28} = \boxed{10.4 \text{ seconds.}}$$

2-8-1	10/10/22	Isaac Abella.

1) P:) How fast was the ball going
c) when it had traveled half the distance found in Part A?

R:)



O:) $V_1 = 2.9$ $V_2 = 0$
$X_1 = 0$ $X_2 = 15.01$
$a = .28$ m/s.
$T = 10.4$ seconds.

Solution:

$15.01/2 = 7.505$ meters.

Use no time available equation.

given V_1, d, an a, find V_2.

Find the V_2 of total alley the divide in half.

$$\sqrt{2.9^2 + 2(.28)(15.01)}$$

$$= \frac{4.1 \text{ m/s}}{2} \quad \boxed{= 2.05 \text{ m/s}}$$

2-8-1	10/10/22.	Isaac Abella

1) P:) How long did it take the bull
D)   to travel half the distance
       found in Part A?

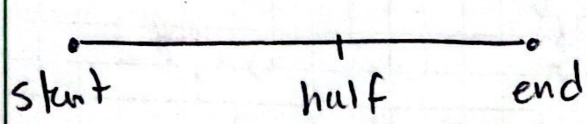
R.)

O:) $T = ?$

$V_1 = 2.9 \, m/s$

$V_2 = 2.05 \, m/s$.

$X_1 = 0$.



$X_1 = 0$ $\quad$ $X_2 = 7.51$

$V_1 = 2.9 \, m/s$ $\quad$ $V_2 = 2.05 \, m/s$

$a = .28 \, m/s^2$.

Solution:

Final conditions.

$$7.51 = S_2 = 0 + 2.05 \cdot \Delta T + \tfrac{1}{2}(.28)(\Delta)^2$$

solver
=

$$T = \boxed{3.03. \text{ seconds}}$$

2-8-2	10/10/22	Isaac Abella.

1) A) P: How far did the subway train travel while speeding up?

R:)

rest

$V_1 = 0$

$X_1 = 0$

end of acceleration

$V_2 = ?$

$T = 15$

acceleration = 1.6 m/s 2.

O:) $V_2 = ?$

$T = 15\,s$.

$V_1 = 0$ $\quad$ $V_2 = ?$

$X_1 = 0$ $\quad$ $a = 1.6\,m/s$

$X_2 = ?$

Solution : use initial conditions formula.

$$S_2 = S_1 + V_1 \cdot \Delta T + \tfrac{1}{2}(a)(T)^2$$

$$= S_2 = 0 + 0(15) + \tfrac{1}{2}(1.6)(15)^2$$

$$\underset{0}{\vee} \qquad \underset{180\,m.}{\vee}$$

2-8-2	10/10/22	Isaac Abella.

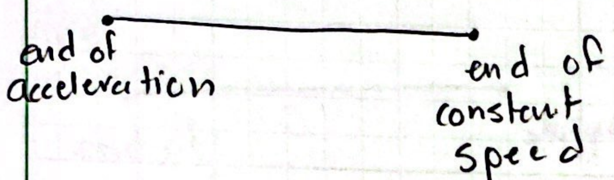
2) B) P:) How far did the subway train travel while moving at a constant speed?

R)

O:) T = 81 seconds

constant speed = 1.6 m/s.

V_1 and V_2 = 1.6 m/s ?



Solution: average velocity   t = 81 sec.

$V\_ = 1.6 \text{ m/s} (81 \text{ seconds}) = 129.6$

$V_0 = 129.6 \text{ m/s} \cdot 81 \text{ seconds} = 10497.6 \text{ m}$

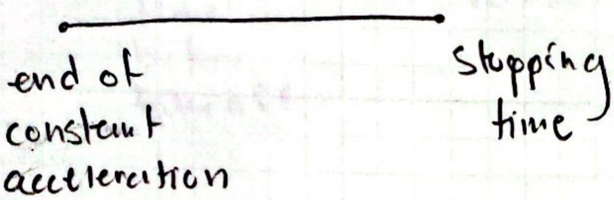
$1.6 (15) = 24 = V_0$.

$24 \cdot 81 = 1944 \text{ m}$

2-8-2 | 10/10/22 | Isaac Abella.

2) c) P:) How far did the subway train travel while coming to a stop?

R:)



O:) T = 11 sec

Velocity = 24 m/s

a = 1.6 m/s².

$V_F = 0$

$V^2 = V_0^2 + 2 \cdot a \Delta s.$

deceleration = $\frac{\text{Final velocity} - \text{initial velocity}}{\text{time}}$

Solution.

$$\frac{0 - 24\text{ m/s}}{11\text{ seconds}} = -2.18\text{ m/s}$$

$$V^2 = (24\text{ m/s})^2 + 2(-2.18)(\Delta s)$$

$$0 = (24\text{ m/s})^2 + 2(-2.18)$$

$$\frac{576}{-4.36}$$

$$\boxed{= 132.1\text{ m}}$$

D) Total distance:

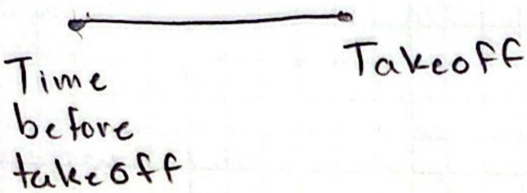
$$180\text{ m} + 1944 + 132 = \boxed{2256\text{ m.}}$$

2-8-3	10/10/22	Isaac Abella.

3) P:) What is the speed in m/s
A) required for take off

R:)

O:) . $a = 3.2\ m/s^2$.
for 4 sec.



full throttle $= 6.3\ m/s^2$

takeoff speed $= 164$ knots.

Solution:

$$\frac{164 \text{ knots}}{1} \cdot \frac{.51444\ m}{1 \text{ knot}}$$

1 knot $= .51444$.

$$\boxed{= 84.36 \text{ meters/sec.}}$$

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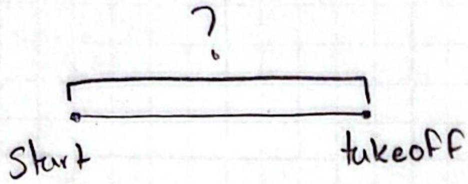
2-8-3	10/10/22	Isaac Abella

3) P:) What is the length of the runway?

B)

$a_2 = 6.3$ m/s.^{2}

R:)



O:) $a_1 = 3.2$ m/s^2

T = 4 seconds

s = 84.3 m/s.

A) Solution :

Find distance of acceleration time.

IV 1 : $\frac{1}{2}(3.2)(4)^2 = 25.6$ m. ✓

Afterburner speed :

B) $V_2 = V_1 + a \cdot \Delta T$

$V_2 = 0 + 3.2 \cdot 4$ seconds $= \boxed{12.8 \text{ m/s}}$

Second leg trip.

use the no. time available equation.

$$25.6\text{m} + \left(\frac{84.3^2 + 12.8^2}{2(6.3)}\right) = \boxed{577.01 \text{ m}}$$

Time = $25.6 + 12.8\,\Delta T + \frac{1}{2}(6.3)(T)^2 = 577$ S.

= 11.4 seconds

c)

11.4 seconds + 4.0 seconds

$\boxed{= 15.4 \text{ seconds}}$

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