 Province of the

EASTERN CAPE

EDUCATION

**DIRECTORATE SENIOR CURRICULUM MANAGEMENT (SEN-FET)**

**HOME SCHOOLING SELF-STUDY WORKSHEET ANSWER SHEET**

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| --- | --- | --- | --- | --- | --- |
| **SUBJECT** | AUTOMOTIVE | **GRADE** |  | **DATE** | APRIL 2020 WK 3 |
| **TOPIC** | FORCES: MEMORANDUM | **TERM 1**  **REVISION** | (Please tick) | **TERM 2 CONTENT** | (√) |

**QUESTION 1**

Define the term compression ratio of an engine.

The bore and stroke of an engine is 84 mm and 90 mm respectively and they have a compression ratio of 8,5 **:** 1.

**Calculate:**

1. The swept volume

b) The original clearance volume in cm3

c) The compression ratio is increased to 9,5**:** 1. What would be the new bore diameter, if the clearance volume remains unchanged?

**SOLUTION:**

**Compression Ratio**

1.1 Is the ratio between the total volume of a cylinder when the piston is at **bottom dead centre** to the volume of the charge in a cylinder when the piston is at **top dead centre.**

**Compression ratio calculations:**

1.2.1 Swept Volume = X L

= X 9

= 498,76 cm3

1.2.2 Compression ratio =

CV =

=

= 66,50 cm3

1.2.3 **New bore diameter:**

Compression ratio =

CR = + 1

CR – 1 =

9,5 – 1 =

SV = 66,5 x 8,5

X L = 66.5 x 8,5

D2 =

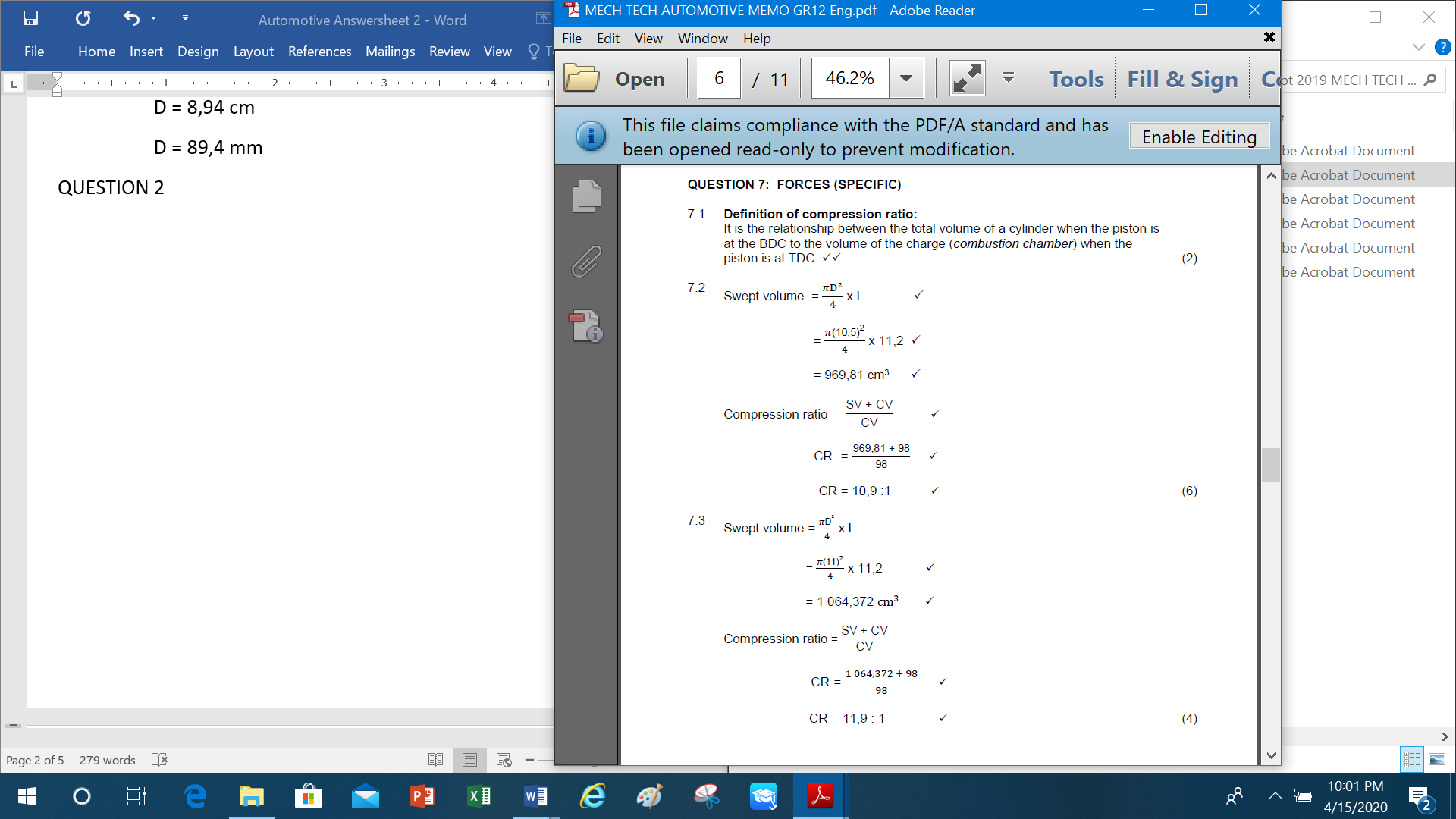
= 79,97 cm2

D= √79,97

D = 8,94 cm

D = 89,4 mm

**QUESTION 2 SOLUTION**



**Question 3**

**3.1 Indicated power (IP):**

It is a measure to determine the power developed by the burning fuel within the cylinder of an engine.

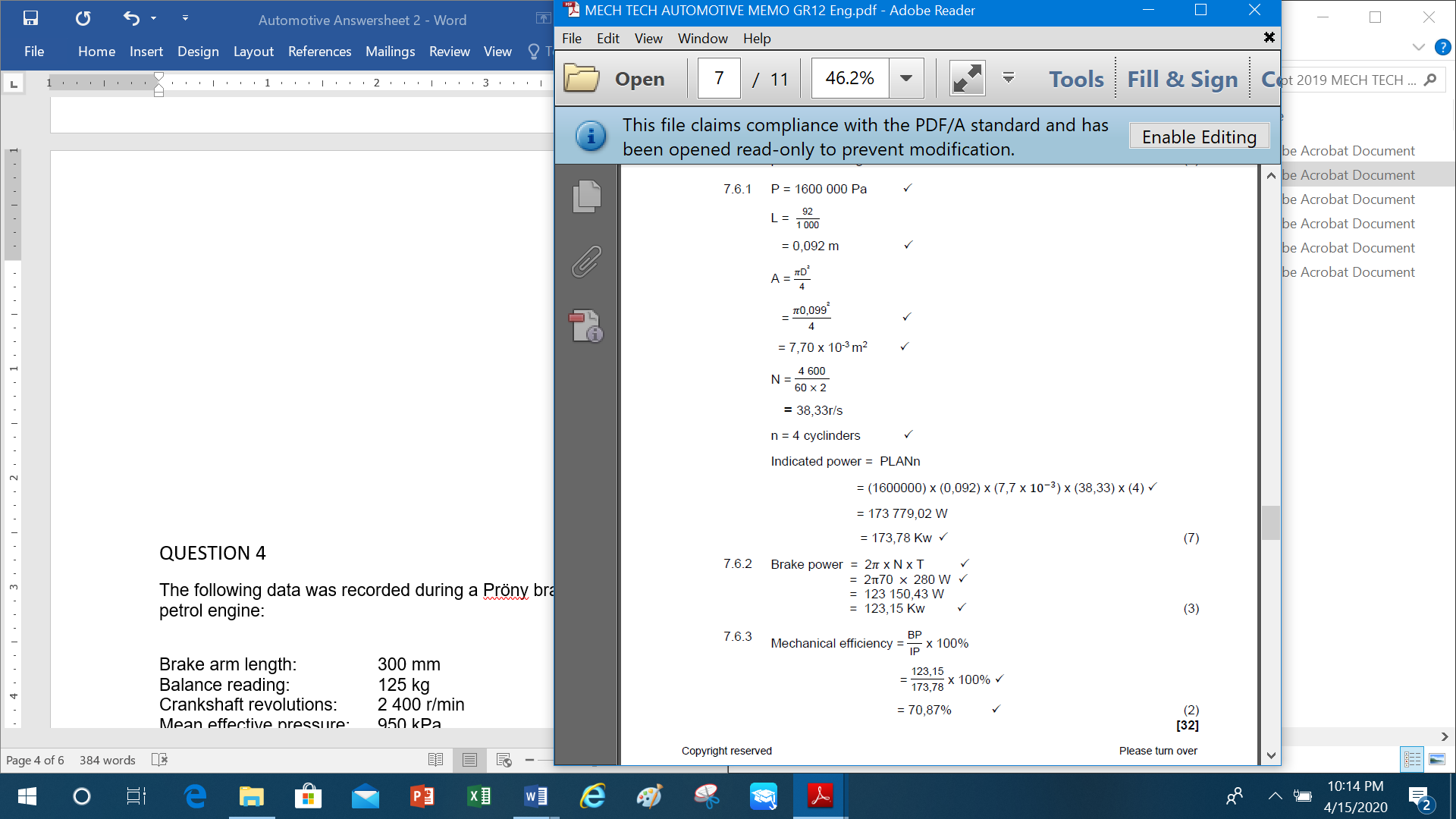
**3.2 Brake power testing tools:**

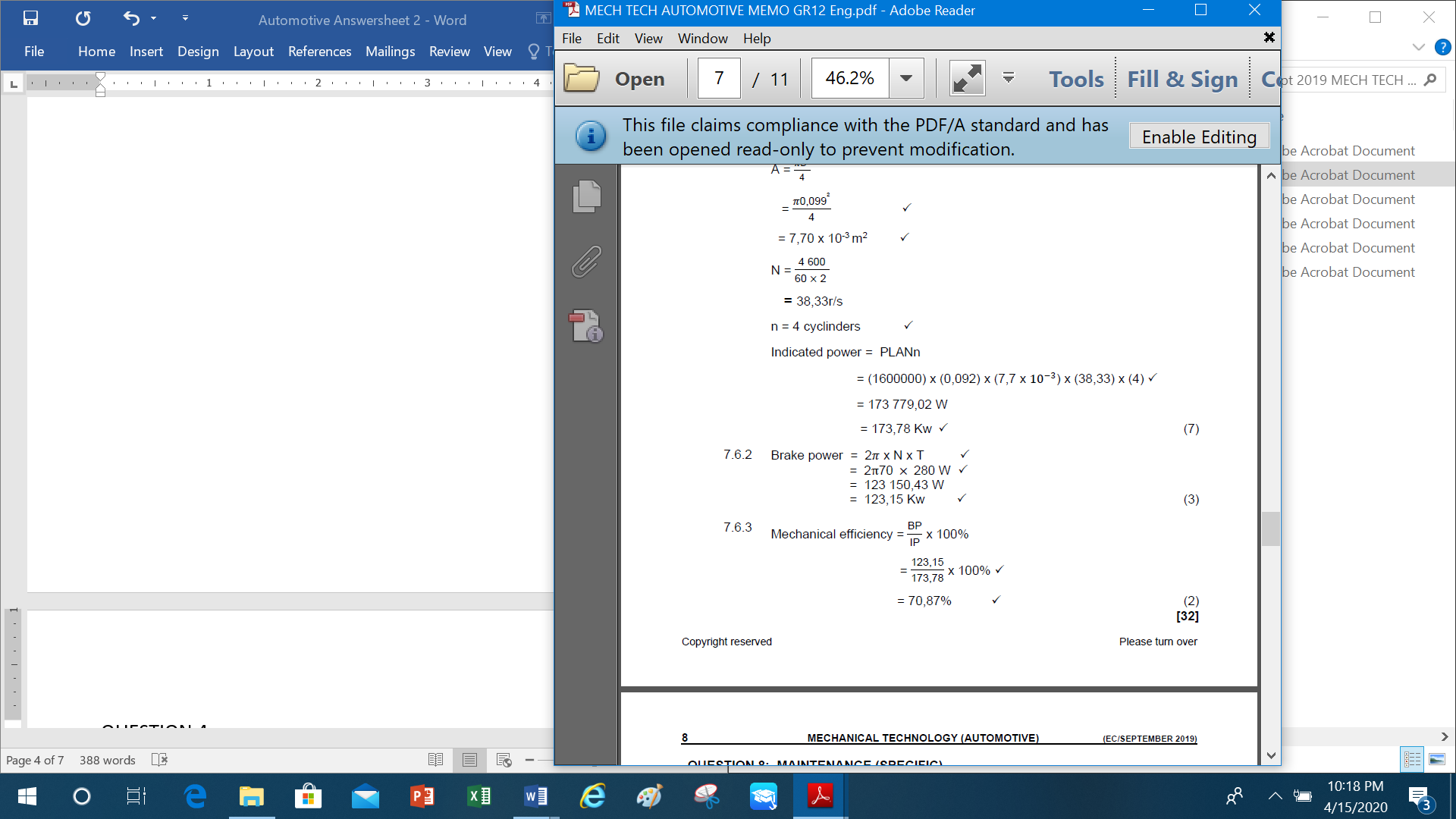
3.2.1 **Electric dynamometer** is an electric current generating mechanism fitted to the engine. As the engine drives the generator and by measuring the amount of electricity produced, it determines the engine brake power in the process.

3.2.2 **Chassis dynamometer** is a measuring tool used at the drive wheels of a vehicle. It consists of two rollers loaded in-line with the specifications of increasing resistance in order to determine the brake power of an engine.

3.2.3 **Power Calculation**

**Given Data:**





**QUESTION 4**

The following data was recorded during a Pröny brake test on a four-stroke four-cylinder petrol engine:

Brake arm length: 300 mm

Balance reading: 125 kg

Crankshaft revolutions: 2 400 r/min

Mean effective pressure: 950 kPa

Bore diameter: 120 mm

Stroke length: 140 mm

SOLUTION:

**Power calculations:**

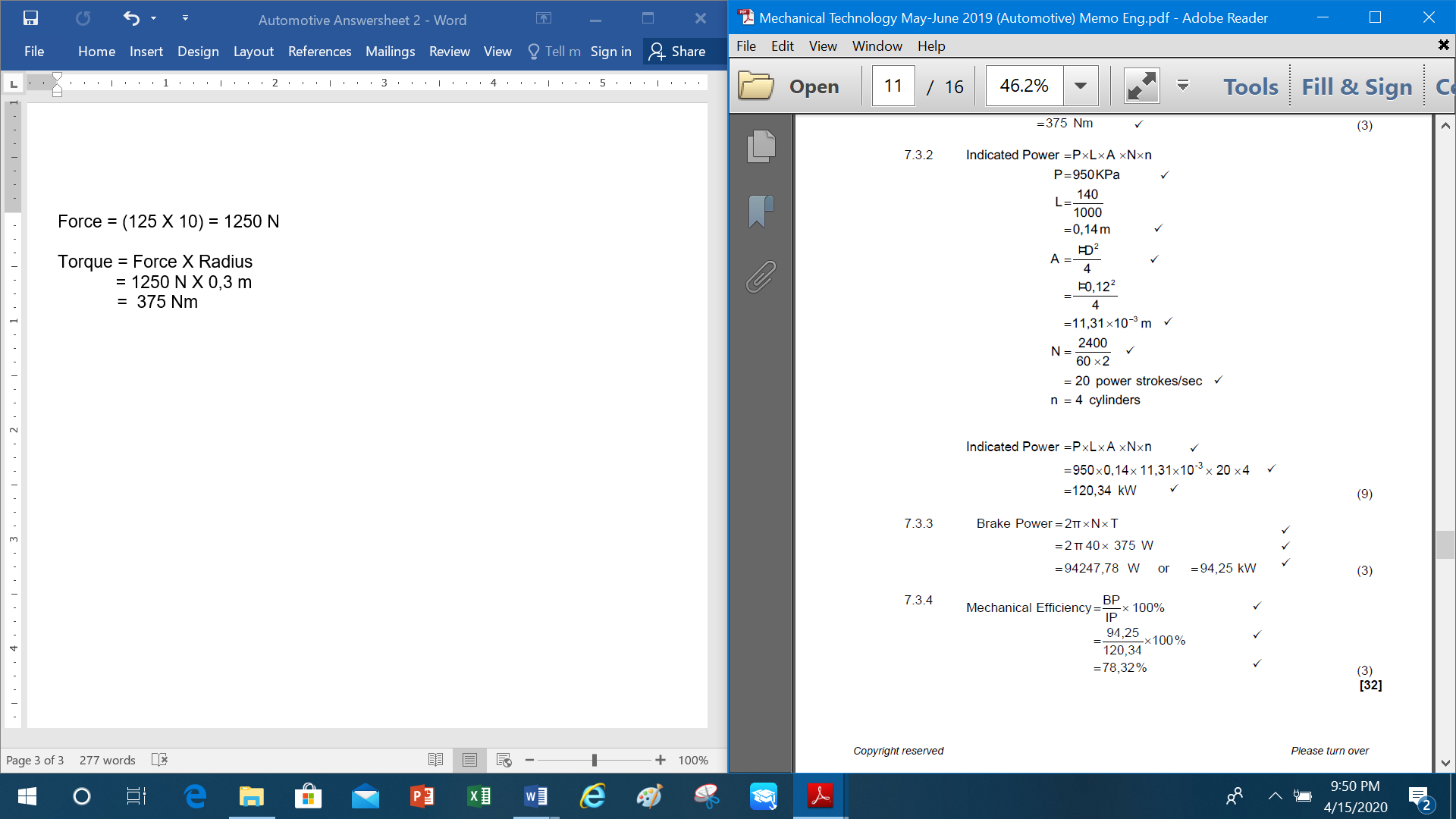
Take gravitational acceleration to be 10m/s2

Force = (125 X 10) = 1250 N

Torque = Force X Radius

= 1250 N X 0,3 m

= 375 Nm



0,122

D2

