Dear Student

By now you should have worked through chapters 1 and 2 of the textbook and completed your first assignment. As the assignments contain questions from old examination papers, you are in fact already preparing for the examination. Do as many examples as possible – the more examples you work through, the better you will be able to recognise a problem and solve it.

Remember, help is just a phone call or an e-mail away. Please contact me if you need any help with the second assignment. My contact details are as follows:

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ASSIGNMENT 1: SOLUTIONS

Question 1
To determine the slope of the given line

\[ 6 + 3x - 2y = 0, \]

we need to write it in the standard format of a line, namely

\[ y = mx + c. \]

We therefore need to manipulate the equation so that \( y \) is the subject to find the slope \( m \).

Rewriting the equation with \( y \) at the left gives

\[ 2y = 6 + 3x \]

or

\[ y = 3 + \frac{3}{2}x. \]

The slope of the given line is therefore \( \frac{3}{2} \).

[Option 2]

Question 2
The fraction simplified is

\[ \frac{(x - 4)(x + 3)}{(x - 4)(x + 5)} = \frac{(x + 3)}{(x + 5)}. \]

[Option 2]

Question 3
The \( x \)-intercept of the given line

\[ 2y - 10x + 5 = 0, \]

is found by setting \( y = 0 \), thus

\[ 2(0) - 10x + 5 = 0, \]

which results in

\[ -10x = -5 \]

\[ x = \frac{1}{2} = 0.5. \]

The \( x \)-intercept of the line \( 2y - 10x + 5 = 0 \) is at \( x = 0.5 \).

[Option 2]
**Question 4**
The cost of a suit is R800 in 2012. The price of the suit is 21% higher than this price in 2013 that is

\[
800 + \left( \frac{21}{100} \times 800 \right) = 800 + 168 = 968.
\]

In 2014 the price is 25% higher than in 2013, that is

\[
968 + \left( \frac{25}{100} \times 968 \right) = 968 + 242 = 1210.
\]

The price in 2014 is R1210.

**[Option 1]**

**Question 5**
Let \((x_1; y_1) = (3; 1)\) and \((x_2; y_2) = (\frac{4}{3}; 2)\). To determine the equation of a line

\[
y = mx + c
\]

we need to determine the slope \(m\) and \(y\)-intercept \(c\) of the line.

The slope \(m\) is

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 1}{\frac{4}{3} - 3} = \frac{1}{-\frac{5}{3}} = \frac{-3}{5},
\]
giving

\[
y = -\frac{3}{5}x + c.
\]

To determine the \(y\)-intercept \(c\) of the line, we use one of the given points \((x_1; y_1)\) and \((x_2; y_2)\), say \((3; 1)\), to find

\[
1 = -\frac{3}{5}(3) + c = -\frac{9}{5} + c,
\]

which results in

\[
c = \frac{14}{5}.
\]

The equation of the line is therefore

\[
y = -\frac{3}{5}x + \frac{14}{5}.
\]

**[Option 1]**

**Question 6**
A car was valued at R170 000 in 2013 and R140 000 in 2014. The decrease in the value of the car is

\[
R170 000 - R140 000 = R30 000.
\]
The percentage decrease is
\[
\frac{30000}{170000} \times 100 = 17.65\% 
\]

[Option 1]

**Question 7**

Simplifying gives
\[
\frac{3}{4} \div 2 \left(1 \frac{5}{6} - \frac{1}{7}\right) + \frac{3}{2} \times \frac{5}{7} = \frac{3}{4} \div 2 \left(\frac{11}{6} - \frac{3}{6}\right) + \frac{3}{2} \times \frac{5}{7} \\
= \frac{3}{4} \div \left(\frac{8}{3}\right) + \frac{15}{4} \\
= \frac{3}{4} \times \frac{3}{8} + \frac{15}{4} \\
= \frac{9}{32} + \frac{15}{4} \\
= 4 \frac{1}{32} 
\]

[Option 1]

**Question 8**

We need to give the linear equation for the total cost. It is given that

\[
\text{Fixed cost} = 1250 
\]

and

\[
\text{Variable cost} = (30 + 20x). 
\]

Therefore,
\[
\text{Total cost} = \text{fixed cost} + \text{variable cost} \\
= 1250 + 30 + 20x \\
= 1280 + 20x. 
\]

[Option 1]

**Question 9**

Revenue or income is defined as price times quantity, that is \( R = p \times q \). It is given that quantity is \( x \) and price is
\[
p(x) = 5 - \frac{x}{1000}. 
\]
Thus,

\[ R = p \times x \]
\[ = (5 - \frac{x}{1000}) \times x \]
\[ = 5x - \frac{x^2}{1000} \]
\[ = 5x - 0.001x^2. \]

**Question 10**

The given demand function is

\[ P = 50 - \frac{1}{2}Q. \]

According to the textbook the price elasticity of demand is given by

\[ \varepsilon_d = -\frac{1}{b} \times \frac{P}{Q}, \]

with \( a \) and \( b \) the values of the demand function

\[ P = a - bQ. \]

Comparing the demand function with this, we see that \( b = \frac{1}{2} \). We also need to write the demand function with \( Q \) as the subject, that is

\[ Q = -2(P - 50). \]

We can now substitute \( b \) and \( Q \) into the formula for elasticity of demand to find

\[ \varepsilon_d = -\frac{1}{\frac{1}{2}} \times \frac{P}{2(P-50)} \]
\[ = -2 \times \frac{-P}{2(P-50)} \]
\[ = \frac{P}{P-50}. \]

[Option 3]