

Foundations of Math 11

Final Exam

June 2014

Written Section

- You may use a calculator for the duration of this exam
- Remember to show all your work in the written section
- Best of Luck!!!

Name: Key

Teacher: Sutcliffe

Block: 3

Multiple Choice

Written

Total

/50

/24

/74

Value: 24 marks

Suggested Time: 60 minutes

Show all work in your solutions!!! Final answers only will not receive full marks.

1. Abigail discovered a number trick in a book she was reading:

Choose a number.
Multiply by 3
Add 45
Multiply by 2
Divide by 6
Subtract your number

Prove **deductively** that you will always end up with the answer 15.

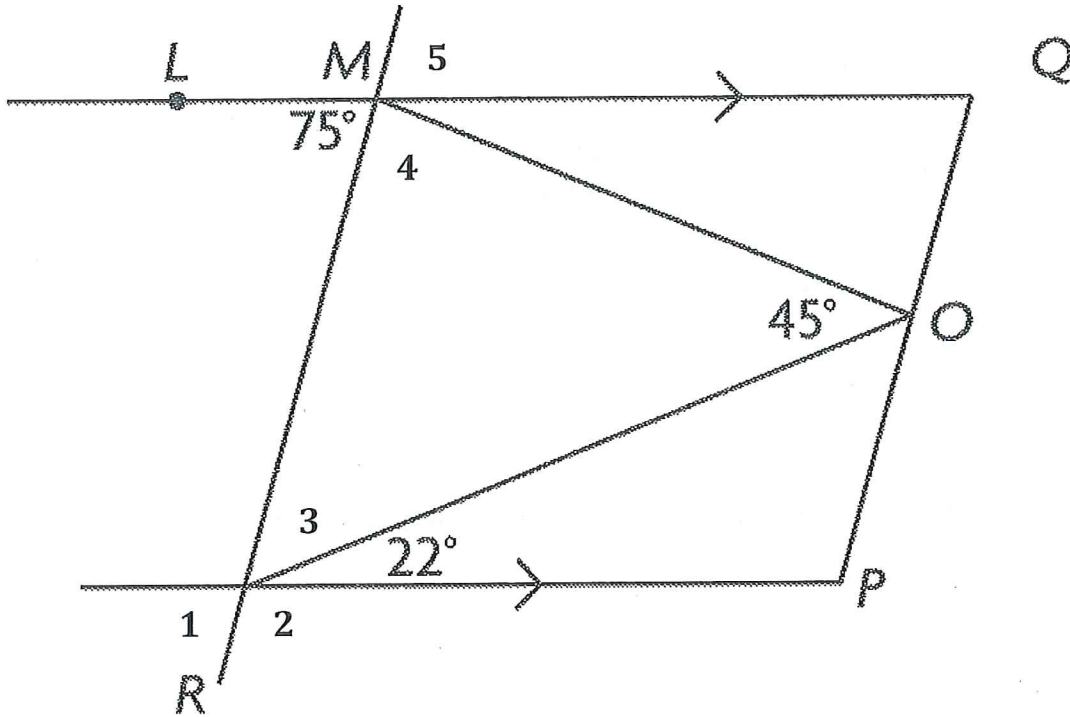
$$\begin{aligned} \text{any number} &= n \\ \text{multiply by 3} &= 3n \\ \text{add 45} &= 3n + 45 \\ \text{multiply by 2} &= 2(3n + 45) \\ &= 6n + 90 \\ \text{divide by 6} &= \frac{6n + 90}{6} \\ &= n + 15 \end{aligned}$$

$$\text{Subtract original} = n + 15 - n$$

$$= 15$$

QED

2. Find the missing angles in the diagram below. All answers must be accompanied by a reason for your decision. Remember more than one reason may be acceptable.

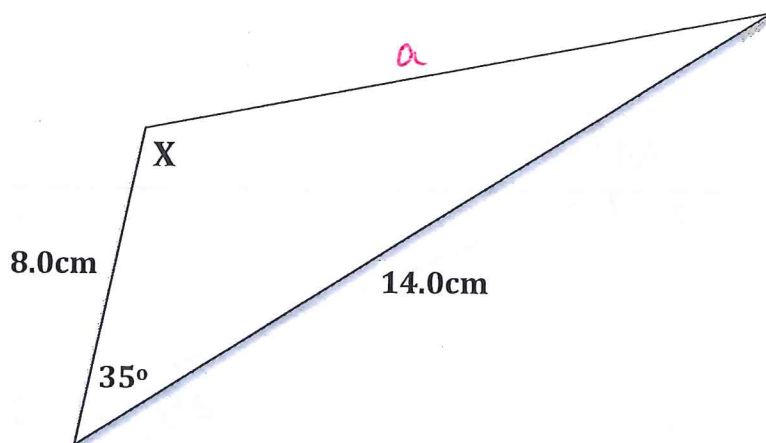


STATEMENT

REASON

- $\angle 1 = 75$ corresponding to $\angle LMR$
 $\angle 2 = 105$ supplementary to $\angle 1$
 $\angle 3 = 53$ vertically opposite to $\angle 1 - 22^\circ$
 $\angle 4 = 82$ angles in a triangle
 $\angle 5 = 75$ vertically opposite to $\angle LMR$

3. Determine the indicated angle to the nearest tenth of a degree (one decimal place).



- a) HINT: You have to find the missing side first! (2 marks)

$$a^2 = 8^2 + 14^2 - 2(8)(14)\cos 35$$

$$a^2 = 76.51$$

$$a = 8.75$$

- b) Now figure out the unknown angle X (2 marks)

$$\frac{\sin X}{14} = \frac{\sin 35}{8.75}$$

$$\sin X = .918$$

$$X = 66.6^\circ \text{ or } 113.4^\circ$$

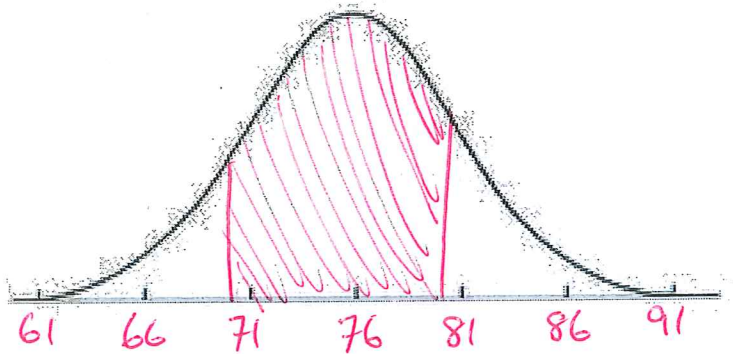
Angle in picture is clearly > 90

Answer:

113.4°

4. A teacher is analyzing the class results for a math test. The marks are normally distributed with a mean (μ) of 76 and a standard deviation (σ) of 5.

a) Label the normal curve with the distribution of test scores.



b) Calculate the z-score for 70% and for 80%. Round to two decimal places.

$$z_{70} = \frac{70 - 76}{5} = -1.20$$

$$z_{80} = \frac{80 - 76}{5} = 0.80$$

$$\frac{70 - 76}{5} = -1.20$$

$$\frac{80 - 76}{5} = 0.80$$

c) What percent of the class got between 70% and 80% on the test? Round to two decimal places.

CHART $\frac{-1.20}{0.1151}$

$\frac{0.80}{0.7881}$

$$.7881 - .1151 = .6730 \text{ OR } \boxed{67.30\%}$$

5. Given the optimization model below, draw a graph then label the vertices and find the optimal solution:

Optimization Model

Restrictions:

$$x \in W, y \in W$$

$$x \geq 0, y \geq 0$$

Constraints:

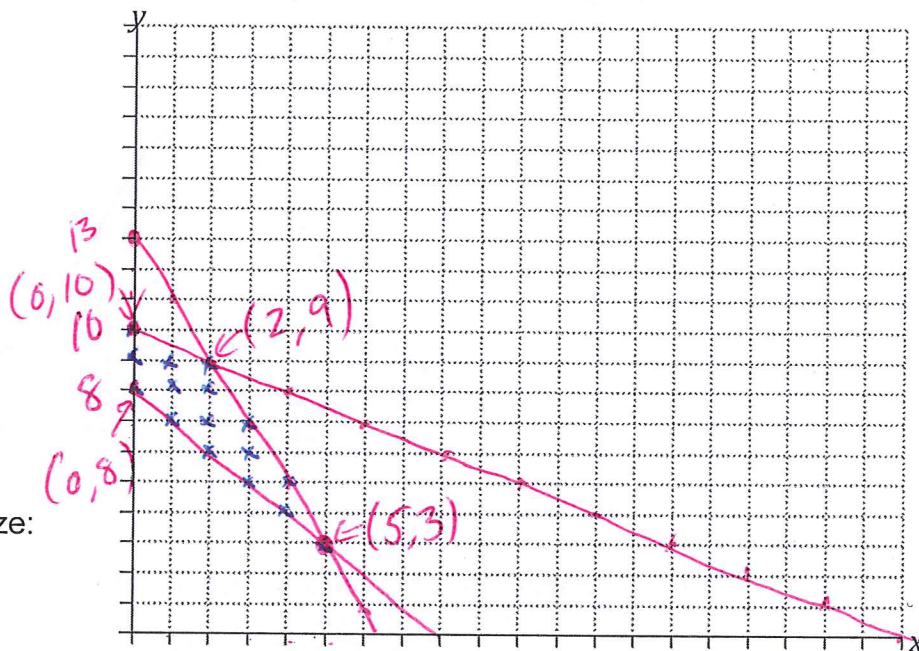
$$y \leq -\frac{1}{2}x + 10$$

$$y \geq -x + 8$$

$$y \leq -2x + 13$$

Objective function to maximize:

$$P = 5x + 3y$$

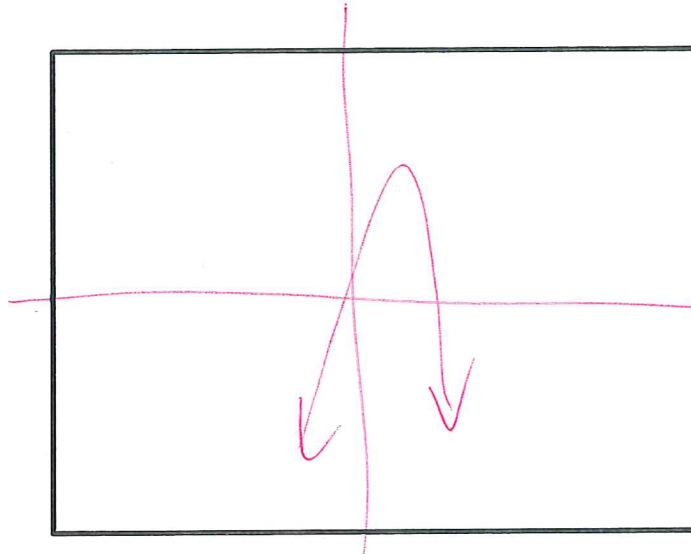


Intersection Point	$P = 5x + 3y$	P
$(0, 8)$	$5(0) + 3(8) =$	24
$(0, 10)$	$5(0) + 3(10) =$	30
$(2, 9)$	$5(2) + 3(9) =$	37
$(5, 3)$	$5(5) + 3(3) =$	34

Maximum: $(2, 9)$

6. The height of a golf ball above the ground, y , in meters, is modeled by the function $y = -4.9x^2 + 10x$, where x is the time in seconds after the ball is kicked.

a) Sketch the graph



$$\begin{aligned} X_{\min} &= \underline{-10} \\ X_{\max} &= \underline{10} \\ Y_{\min} &= \underline{-10} \\ Y_{\max} &= \underline{10} \end{aligned}$$

Zstandard

b) Determine the maximum height the ball will reach. Round to two decimal places.

CALC max

After 1.25 seconds, max height = 6.25 m

c) For how long is the ball in the air? Round to two decimal places.

CALC zero

x = 2.50 seconds

7. A standard coke can has a surface area of 200 cm^2 . If the dimensions are reduced by 9% (a scale factor of 0.91) in each direction, what will be the new surface area of the coke can? Round to two decimal places.



Area = twice!

$$200 \text{ cm}^2 \times 0.91 \times 0.91$$

$$= 165.62 \text{ cm}^2$$