DAWSON COLLEGE *December 17, 2010*

FINAL EXAM

ENGINEERING MATHEMATICS I FOR MECHANICAL TECHNOLOGY

Mathematics 201-941-DW

Instructor: B. Szczepara

There are 10 problems, each worth the same amount.

1.

a) Solve the following system of linear equations [illegible]

$$x - y + z = 3$$

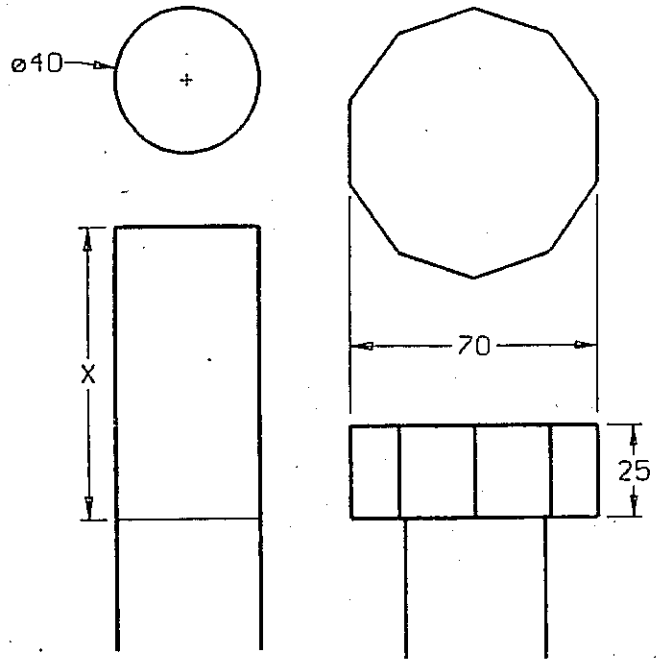
$$2x - y + 2z = 2$$

$$x - 2y + 2z = 1$$

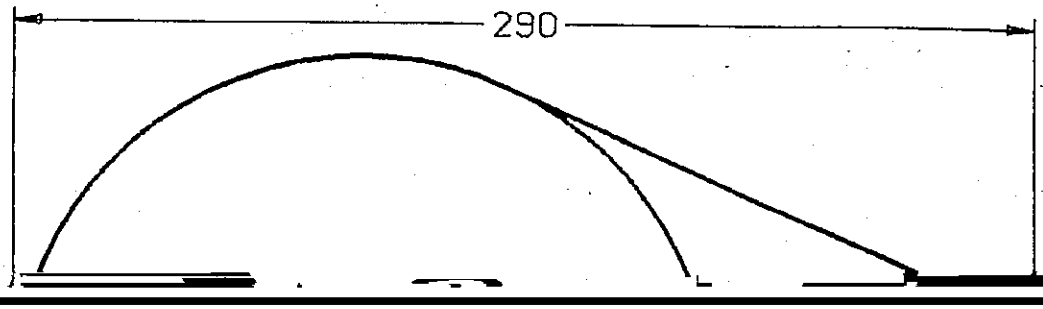
b) Acme fertilizer Corporation buys ten kilogram bags of manure from three farmers – Adam, Bob, and Chuck. Each of Adam's bags contains 7kg of cow manure, 1kg of pig manure, and 2kg of sheep manure . Each of Bob's bags contains 3kg of cow manure, 5kg of pig manure, and 2kg of sheep manure . Each of Chuck's bags contains 4kg of cow manure, 2kg of pig manure , and 4kg of sheep manure. Acme wants to mix up 40000kg of fertilizer that will be 50% cow, 25% pig and 25% sheep. How many bags should Acme Corporation buy from each farmer?

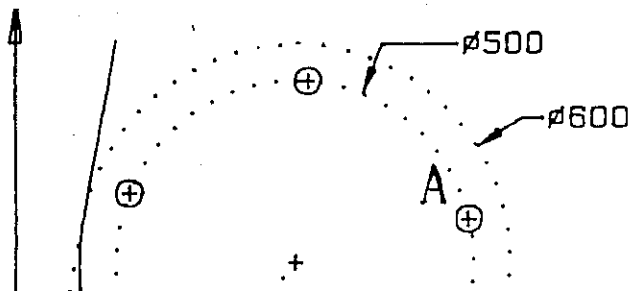
2. If the clearance of the ballbearing in the following figure is 6 mm. Find the [illegible]

3. You got the contract to make bolts. See the following figure for specifications. Find the length of the piece of stock needed to stamp the bolthead.

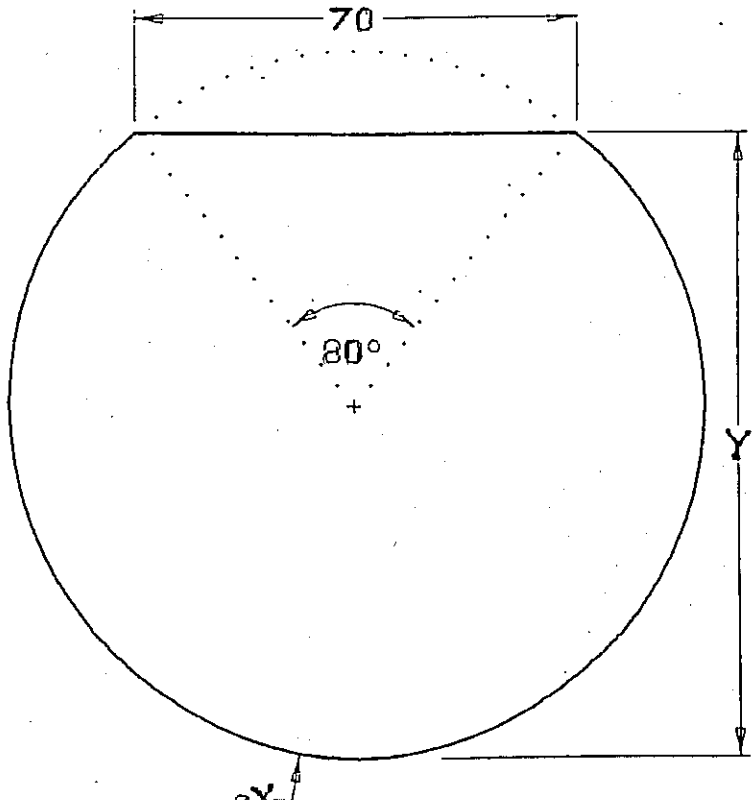


4. Find the beltlength of the drive in the following figure

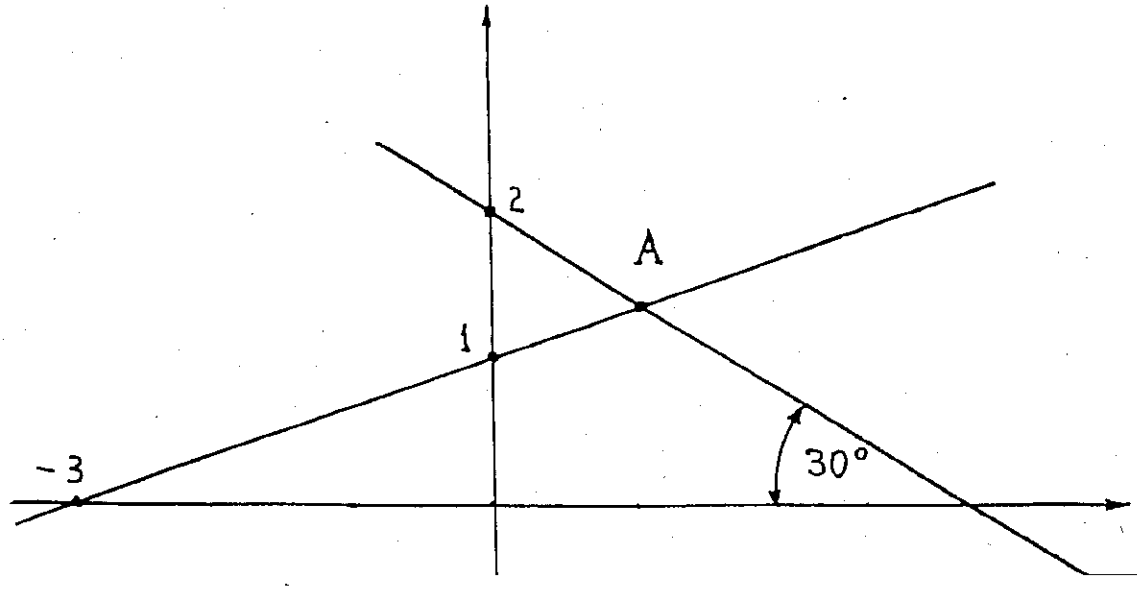



ø500
ø600
A

7. Find X and Y in the following figure.



8. Find the exact coordinates of the point A of intersections of the following lines.



9. a) Solve the following equation for x:

$$\sqrt{2x+1}+\sqrt{x+5}=6$$

b) Find the equation of the parabola passing through the points $(1,2), (-1,4)$ *and* $(2,7)$.

10. a) Find the center and the radius of the circle given by the equation:

$$x^2+y^2-6x+5y+3=0$$

b) Find the radius of the circle with center at the point $(2,-2)$ and tangent to the line

ANSWERS:

1. a) x = 5, y = -4, z = -6 **b)** 1750, 1250 and 1000 bags from Adam, Bob and Chuck, respectively.

2. X = 157.17 and Y = 35.584

3. X = 79.1849

4. The beltlength is equal 764.156

5. A = (628.2465, 526.1071)

6. X = 9.495

7. X = 108.901 and Y = 96.1617

8. $A=\left(\frac{1}{1+\sqrt{3}},\frac{1+\sqrt{3}}{2}\right)\approx(1.0981,1.3660)$

9. a) x = 4 **b)** $y=2x^2-x+1$