## Homework for Section 3.1

### Problem 1

Exercise 1.1: Students use a protractor to measure angles to justify these facts.

Exercise 1.2: a) The activity used to justify the fact that the sum of the measures of the three angles of a triangle is 180° is the same activity described on page 37 of our textbook. Students copy a triangle, cut off the corners, and arrange the angles to form a straight angle.
b) "The angles opposite equal sides are equal."

Exercise 1.3: Answers vary. These exercises could be followed in class under teacher supervision.

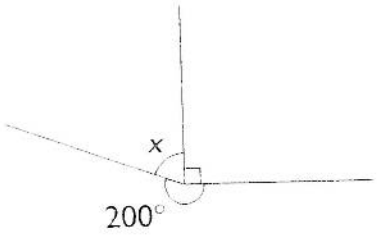
### Problem 2

a) prob. 1: 48, 143, 345
prob. 2: x= 134°, y = 46°, z = 144°
prob. 3: 155°
prob. 4: 90°
prob. 5: 35°
prob. 6: m = n = 40°
prob. 6: a = 29°, b = 145°, c = 85°.

b) At least 12 different symbols were used for angles.

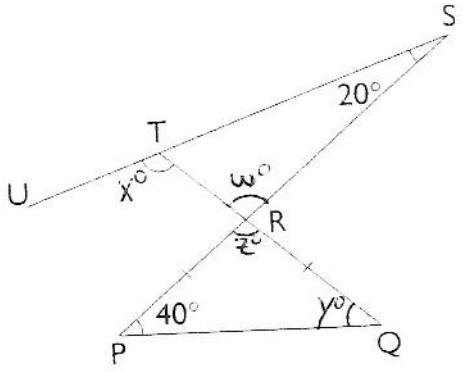
### Problem 3

prob. 35:




$x + 90 + 200 = 360$ ($\angle$s at a point)
$x + 290 = 360$
$\therefore\ x = 70$

prob. 36: Let $x = \angle UTR$, $y = \angle Q$, $z = \angle PRQ$, and $w = \angle TRS$.



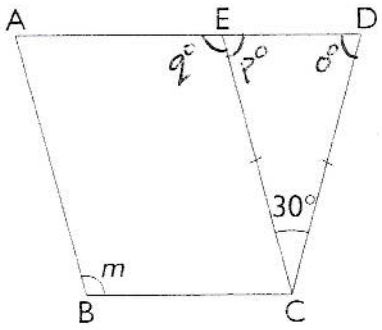

$y = 40$ (base $\angle$s of isos. $\Delta$)

$z + 40 + 40 = 180$ ($\angle$ sum of $\Delta$)
$z = 100$

$w = 100$ (vert. $\angle$s)

$x = 100 + 20$ (ext. $\angle$ of $\Delta$)
$\therefore x = 120$

prob. 37: Let $o = \angle CDE$, $p = \angle CED$, and $q = \angle CEA$.




$o = p$ (base $\angle$s of isos. $\Delta$)
$2p + 30 = 180$ ($\angle$ sum of $\Delta$)
$p = 75$

$q + 75 = 180$ ($\angle$s on a line)
$q = 105$

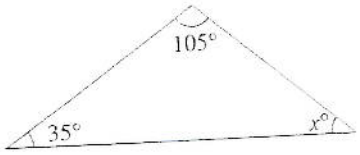
$\therefore m = 105$ (opp. $\angle$s //-ogram)

**Problem 4**

a) True, by ($\angle$ sum of rt. $\Delta$)
b) False. The angle sum in a triangle is 180°, so the sum of any two angles in a triangle must be less than 180°.
c) True, by ($\angle$s on a line)

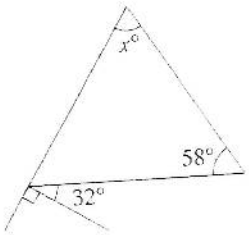
**Problem 5**

b)



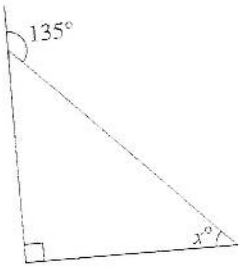

$x + 35 + 105 = 180$ ($\angle$ sum of $\Delta$)
$\therefore x = 40$

d)



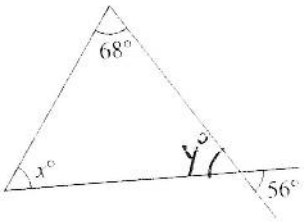

$x + 58 = 32 + 90$ (ext. $\angle$ of $\Delta$)
$\therefore x = 64$

e)




$x + 90 = 135$ (ext. $\angle$ of $\Delta$)
$\therefore x = 45$

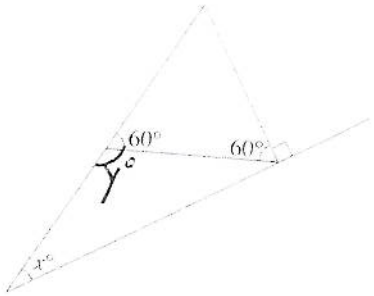
g)




$y = 56$ (vert. $\angle$s)

$x + 68 + 56 = 180$ ($\angle$ sum of $\Delta$)
$x + 124 = 180$
$\therefore x = 56$

j)

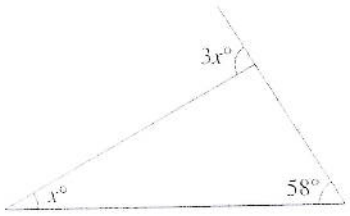



$y + 60 = 180$ ($\angle$s on a line)
$y = 120$

$x + 120 = 90 + 60$ (ext. $\angle$ of $\Delta$)
$x + 120 = 150$
$\therefore x = 30$

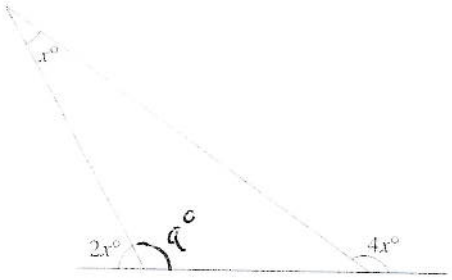
**Problem 6**

b)




$3x = x + 58$ (ext. $\angle$ of $\Delta$)
$2x = 58$
$\therefore x = 29$

c)

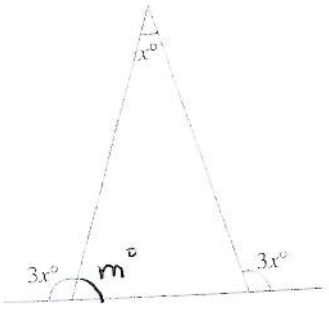



$a = 180 - 2x$ ($\angle$s on a line)
$4x = x + 180 - 2x$ (ext. $\angle$ of $\Delta$)
$5x = 180$
$\therefore x = 36$

f)


$c = 180 - 3x$ ($\angle$s on a line)
$4x = 2x + 180 - 3x$ (ext. $\angle$ of $\Delta$)
$5x = 180$
$\therefore x = 36$

g)




m = 180 – 3x (∠s on a line)
3x = x + 180 – 3x (ext. ∠ of Δ)
5x = 180
∴ x = 36