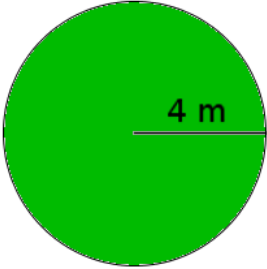


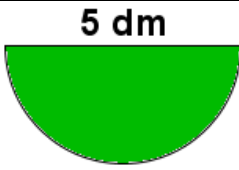
**Løsningsforslag**

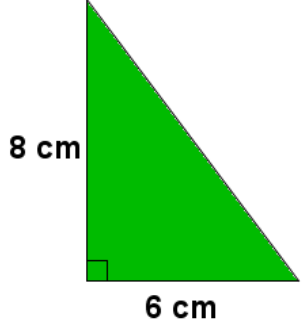
Oppgave 1. Regn ut.

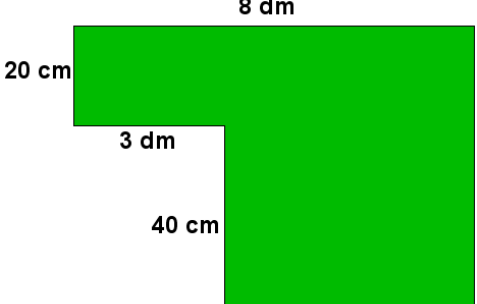
- a)  $20 \text{ m} = 20 \cdot 10 \text{ dm} = 200 \text{ dm}$
- b)  $2.5 \text{ km} = 2.5 \cdot 1\,000 \text{ m} = 2\,500 \text{ m}$
- c)  $20\,000 \text{ mm}^2 = 20\,000 : 100 : 100 \text{ dm}^2 = 2 \text{ dm}^2$
- d)  $25 \text{ m}^3 = 25 \cdot 1\,000 \text{ dm}^3 = 25\,000 \text{ dm}^3$
- e)  $2 \text{ m} + 15 \text{ dm} + 300 \text{ cm} = 2 \cdot 100 \text{ cm} + 15 \cdot 10 \text{ cm} + 300 \text{ cm} = 200 \text{ cm} + 150 \text{ cm} + 300 \text{ cm} = 650 \text{ cm}$
- f)  $0.2 \text{ m}^3 + 500 \text{ dl} + 6\,000 \text{ cm}^3 =$   
 $0.2 \cdot 1\,000 \text{ dm}^3 + 500 : 10 \text{ dm}^3 + 6\,000 : 1\,000 \text{ dm}^3 =$   
 $200 \text{ dm}^3 + 50 \text{ dm}^3 + 6 \text{ dm}^3 = 256 \text{ dm}^3$

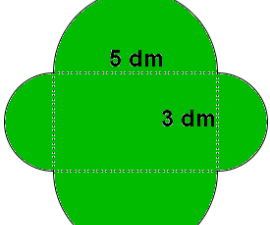
Oppgave 2. Finn areal og omkrets til de grønne figurene.

	<p><b>Areal</b> <math>A = 3.14 \cdot 4 \text{ m} \cdot 4 \text{ m} = 50.24 \text{ m}^2</math></p> <p><b>Omkrets</b> <math>O = 2 \cdot 3.14 \cdot 4 \text{ m} = 25.12 \text{ m}</math></p>
---	---

	<p><b>Areal</b> <math>A = \frac{3.14 \cdot 2.5 \text{ dm} \cdot 2.5 \text{ dm}}{2} = 9.8125 \text{ dm}^2</math></p> <p><b>Omkrets</b> <math>O = \frac{2 \cdot 3.14 \cdot 2.5 \text{ dm}}{2} + 5 \text{ dm} = 12.85 \text{ dm}</math></p>
---	--

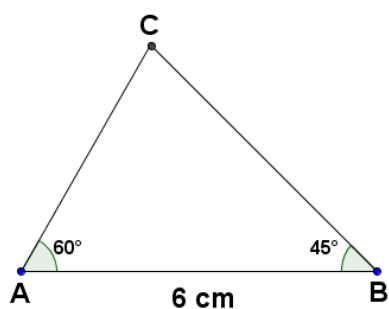
	<p><b>Areal</b> <math>A = \frac{6 \text{ cm} \cdot 8 \text{ cm}}{2} = 24 \text{ cm}^2</math></p> <p><b>Omkrets</b> Vi kaller den ukjente siden for x.          Pytagoras' setning gir at <math>x^2 = 6^2 + 8^2 = 36 + 64</math>          Det betyr at <math>x^2 = 100</math>, så <math>x = \sqrt{100} = 10</math>          Da er omkretsen lik <math>8 \text{ cm} + 6 \text{ cm} + 10 \text{ cm} = 24 \text{ cm}</math></p>
--	---

	<p><b>Areal</b> <math>A = 8 \text{ dm} \cdot 6 \text{ dm} - 3 \text{ dm} \cdot 4 \text{ dm} = 48 \text{ dm}^2 - 12 \text{ dm}^2 = 36 \text{ dm}^2</math></p> <p><b>Omkrets</b>  <math>O = 3 \text{ dm} + 2 \text{ dm} + 8 \text{ dm} + 6 \text{ dm} + 5 \text{ dm} + 4 \text{ dm} = 28 \text{ dm}</math></p>
---	--

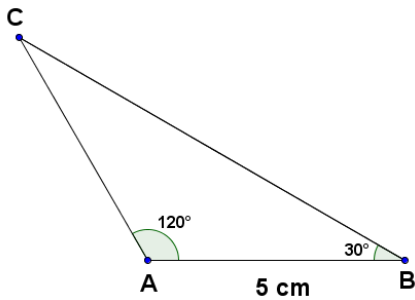
	<p><b>Areal</b>  <math>A = 3 \text{ dm} \cdot 5 \text{ dm} + \frac{3.14 \cdot 2.5 \text{ dm} \cdot 2.5 \text{ dm} \cdot 2}{2} + \frac{3.14 \cdot 1.5 \text{ dm} \cdot 1.5 \text{ dm} \cdot 2}{2} = 15 \text{ dm}^2 + 19.625 \text{ dm}^2 + 7.065 \text{ dm}^2 = 41.69 \text{ dm}^2</math></p> <p><b>Omkrets</b> <math>O = \frac{2 \cdot 3.14 \cdot 2.5 \text{ dm} \cdot 2}{2} + \frac{2 \cdot 3.14 \cdot 1.5 \text{ dm} \cdot 2}{2} = 25.12 \text{ dm}</math></p>
---	---

### Oppgave 3.

a) Konstruer en trekant ABC der  $AB = 6 \text{ cm}$ ,  $\angle A = 60^\circ$  og  $\angle B = 45^\circ$ .



b) Konstruer en trekant ABC der  $AB = 5 \text{ cm}$ ,  $\angle A = 120^\circ$  og  $\angle B = 30^\circ$ .



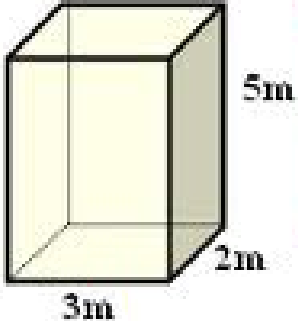
Oppgave 4. Regn ut de ukjente vinklene.

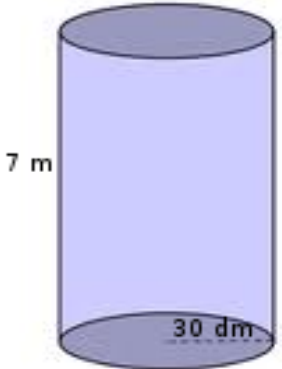
<p>A right-angled triangle with vertices A, B, and C. The right angle is at vertex B, indicated by a small square. Angle A is marked with a green arc and labeled '50°'. Vertex C is at the top.</p>	$\angle C = 180^\circ - 50^\circ - 90^\circ = 40^\circ$
--	---

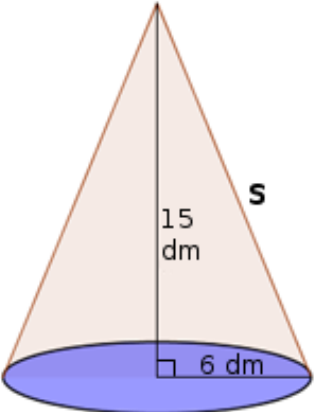
<p>An isosceles triangle with vertices A, B, and C. Side AC is labeled '9 cm' and side AB is labeled '9 cm'. Angle A is marked with a green arc and labeled '30°'. Vertices B and C are to the right of A.</p>	$\angle B + \angle C = 180^\circ - 30^\circ = 150^\circ$ <p><math>\angle B</math> og <math>\angle C</math> er motstående vinkler til like lange sider AC og AB, derfor er <math>\angle B = \angle C</math>. Det betyr at <math>\angle B = 75^\circ</math> og <math>\angle C = 75^\circ</math></p>
--	---

<p>A triangle with vertices A, B, and C. Side AC is labeled '6 dm' and side BC is labeled '0.6 m'. Angle B is marked with a green arc and labeled '35°'. Vertex C is at the top, A is at the bottom left, and B is at the bottom right.</p>	$AC = 6 \text{ dm} = 6 : 10 \text{ m} = 0.6 \text{ m}$ <p>Det betyr at AC er like lang som BC. Da er motstående vinkler <math>\angle B</math> og <math>\angle A</math> like store. Det betyr at <math>\angle A = 35^\circ</math> Da er <math>\angle C = 180^\circ - 35^\circ - 35^\circ = 110^\circ</math></p>
---	--

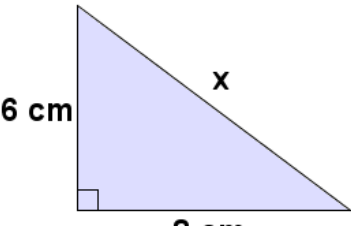
Oppgave 5. Finn volum i  $\text{m}^3$  og overflate i  $\text{m}^2$  til figurene.  
(Tabell med formler står på neste side.)

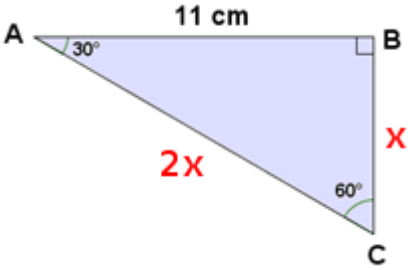
	<p><b>Volum</b> <math>V = 3 \text{ m} \cdot 2 \text{ m} \cdot 5 \text{ m} = 30 \text{ m}^3</math></p> <p><b>Overflate</b>  <math>O = 3 \text{ m} \cdot 2 \text{ m} \cdot 2 + 3 \text{ m} \cdot 5 \text{ m} \cdot 2 + 2 \text{ m} \cdot 5 \text{ m} \cdot 2 = 12 \text{ m}^2 + 30 \text{ m}^2 + 20 \text{ m}^2 = 62 \text{ m}^2</math></p>
---	---

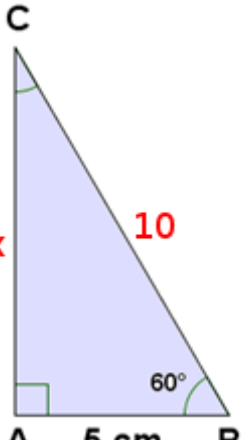
	<p><b>Volum</b> <math>V = 3.14 \cdot 3 \text{ m} \cdot 3 \text{ m} \cdot 7 \text{ m} = 197.82 \text{ m}^3</math></p> <p><b>Overflate</b>  <math>O = 2 \cdot 3.14 \cdot 3 \text{ m} \cdot 3 \text{ m} + 2 \cdot 3.14 \cdot 3 \text{ m} \cdot 7 \text{ m} = 188.4 \text{ m}^2</math></p>
--	--

	<p><b>Volum</b> <math>V = \frac{3.14 \cdot 0.6 \text{ m} \cdot 0.6 \text{ m} \cdot 1.5 \text{ m}}{3} = 0.5652 \text{ m}^3</math></p> <p><b>Overflate</b> Vi bruker først Pytagoras' setning for å finne s.  <math>s^2 = (0.6 \text{ m})^2 + (1.5 \text{ m})^2 = 0.36 \text{ m}^2 + 2.25 \text{ m}^2 = 2.61 \text{ m}^2</math>          Da er <math>s = \sqrt{2.61} \text{ m}</math>. Vi kan nå finne overflaten O.</p> <p><math>O = 3.14 \cdot 0.6 \text{ m} \cdot 0.6 \text{ m} + 3.14 \cdot 0.6 \text{ m} \cdot \sqrt{2.61} \text{ m} = 4.17 \text{ m}^2</math></p>
---	---

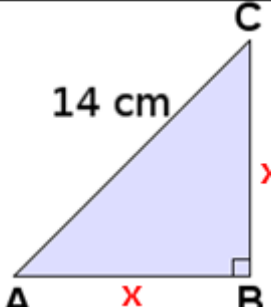
Oppgave 6. Regn ut lengdene til de ukjente sidene i trekantene.

	<p>Trekanten er rettvinklet, så vi bruker Pytagoras' setning:  <math>x^2 = 6^2 + 8^2 = 36 + 64 = 100</math>  <math>x = \sqrt{100} = 10</math>  <math>x = 10 \text{ cm}</math></p>
---	---

	<p>Dette er en 30-60-90-trekant.          Da er den lengste siden 2 ganger så lang som den korteste siden. Vi kaller lengden til den korteste siden <math>x</math> og lengden til den lengste siden <math>2x</math>.</p> <p>Da får vi at <math>(2x)^2 = 11^2 + x^2</math>, altså at <math>4x^2 = 121 + x^2</math>          Da er <math>4x^2 - x^2 = 121</math>, som betyr at <math>3x^2 = 121</math></p> $\frac{3x^2}{3} = \frac{121}{3}, \text{ så } x^2 = \frac{121}{3}$ $x = \sqrt{\frac{121}{3}} = 6.4, \text{ så siden BC} = 6.4 \text{ cm}$ $2x = 2 \cdot \sqrt{\frac{121}{3}} = 12.7, \text{ så siden AC} = 12.7 \text{ cm}$
---	---

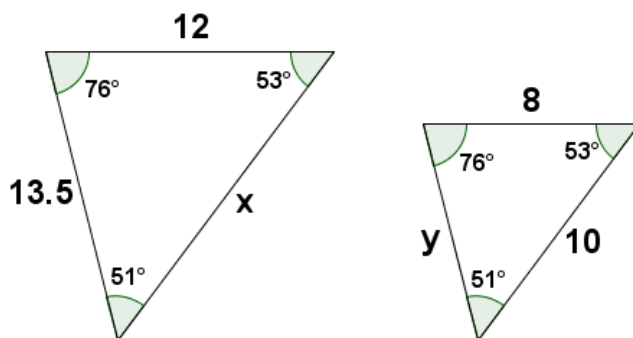
	<p><math>\angle A = 90^\circ</math> og <math>\angle B = 60^\circ</math> og da må <math>\angle C</math> være lik <math>30^\circ</math>.          Da har vi en 30-60-90-trekant, og da er den lengste siden BC 2 ganger så lang som den korteste siden AB.          Da er <math>BC = 2 \cdot 5 \text{ cm} = 10 \text{ cm}</math>. Vi kaller lengden til AC for <math>x</math>.</p> <p>Pytagoras' setning gir da at <math>10^2 = x^2 + 5^2</math>, altså at <math>100 = x^2 + 25</math>.          Det betyr at <math>100 - 25 = x^2</math>, altså at <math>x^2 = 75</math>.</p> $x = \sqrt{75} = 8.7$ <p>Siden AC = 8.7 cm og siden BC = 10 cm.</p>
---	--

d) I trekant ABC er siden AB like lang som siden BC.  
 Finn lengdene til AB og BC.

	<p>Siden AB er like lang som siden BC.          Da kaller vi begge lengdene til disse sidene for <math>x</math>.</p> <p>Trekanten er rettvinklet, så vi bruker Pytagoras' setning:  <math>14^2 = x^2 + x^2</math>, som betyr at <math>196 = 2x^2</math> slik at <math>x^2 = 98</math>  <math>x = \sqrt{98} = 9.9</math></p> <p>Siden AB = 9.9 cm og siden BC = 9.9 cm.</p>
---	--

Oppgave 7. Trekantene nedenfor er formlike.

Regn ut lengden til de ukjente sidene x og y.



Samsvarende sider er:

12 og 8 (motstående vinkel  $51^\circ$ )

13.5 og y (motstående vinkel  $53^\circ$ )

x og 10 (motstående vinkel  $76^\circ$ )

Da har vi at  $\frac{x}{10} = \frac{12}{8}$  som betyr at  $x = \frac{12}{8} \cdot 10 = 15$

Vi har også at  $\frac{y}{13.5} = \frac{8}{12}$  som betyr at  $y = \frac{8}{12} \cdot 13.5 = 9$

Formler:

	Volum	Overflate
Kjegle	$\frac{\pi r^2 H}{3}$	$\pi r^2 + \pi r s$
Prisme	$L \cdot B \cdot H$	$2 LB + 2 LH + 2 BH$
Sylinder	$\pi r^2 H$	$2 \pi r^2 + 2 \pi r H$