KING'S MATHS SCHOOL

Welcome to GCSE 7+

Monday 12 April 2021

Session 6:
Angles and Circles

A puzzle to ponder

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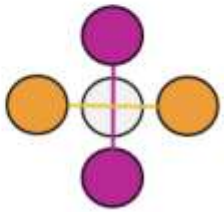
place a 'plus' somewhere on the grid

$38 \times 58 =$

what happens when you multiply opposite numbers? (2)



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	●	35	36	37	38	39	40
41	42	●	○	●	46	47	48	49	50
51	52	53	●	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$47 \times 49 =$

Keep GCSE 7+ safe for everyone

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- **Do not <u>ASK</u>** anyone for **their** personal contact details: email, 'phone number, social media name, Instagram address etc.
- **Do not <u>GIVE</u>** anyone **your** personal contact details: email, 'phone number, social media name, Instagram address etc.
- If **anyone** asks you, in the Chat or directly, for your personal contact details, or
- If you read in the Chat, or if you overhear, **anyone** asking for or giving out personal contact details, or
- If you have any concerns about the welfare/wellbeing of any participant, including yourself, then you must **as soon as possible**
  - email the Head teacher dan.abramson@kcl.ac.uk or text him 07902 911144 and say what your concern is,
  - or email kclmsoutreach@kcl.ac.uk and ask Dan to contact you.

Right angled triangles

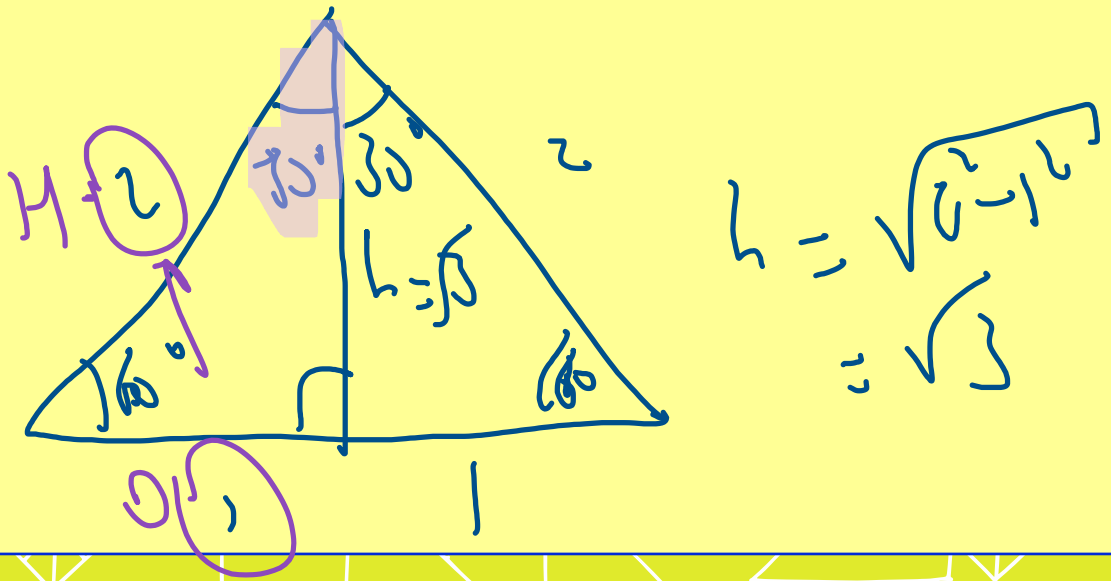
- You need to **know that**

Angle A	sin A	cos A	tan A
0°	0	1	0
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45°	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	1	0	undefined

Right angled triangles

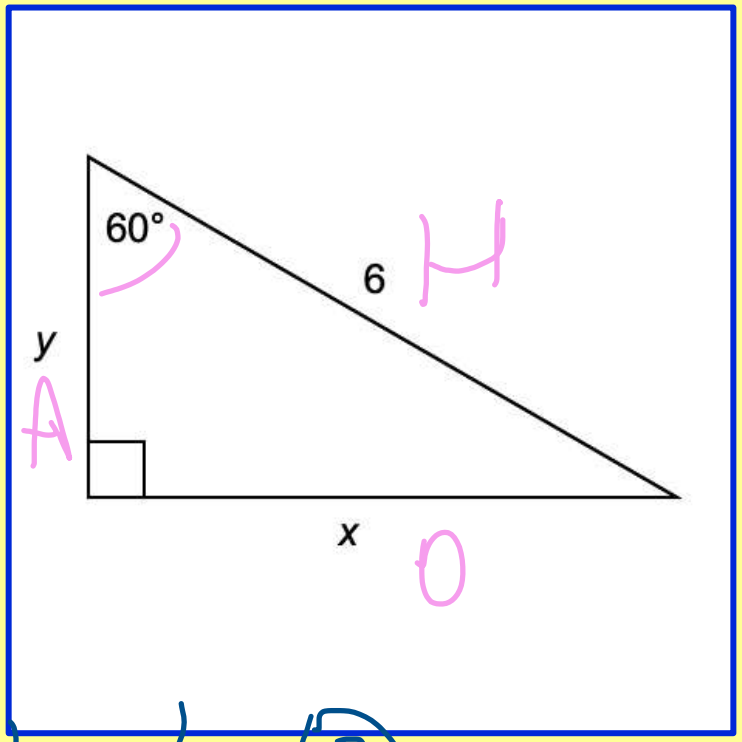
- You need to **know why e.g.**

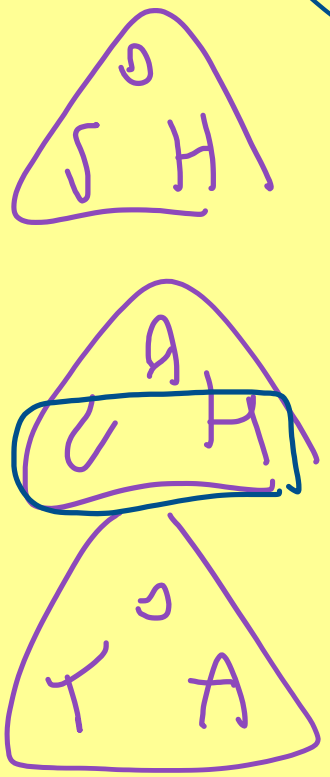
Angle A	sin A	cos A	tan A
$30°$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$



Right angled triangles

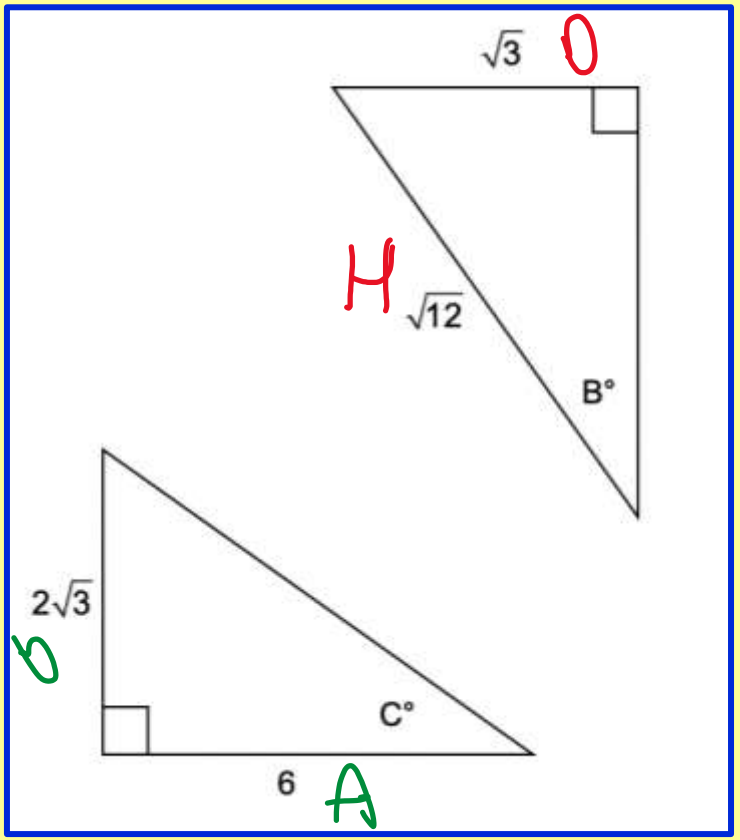
- You need to **know when to use** these, e.g.





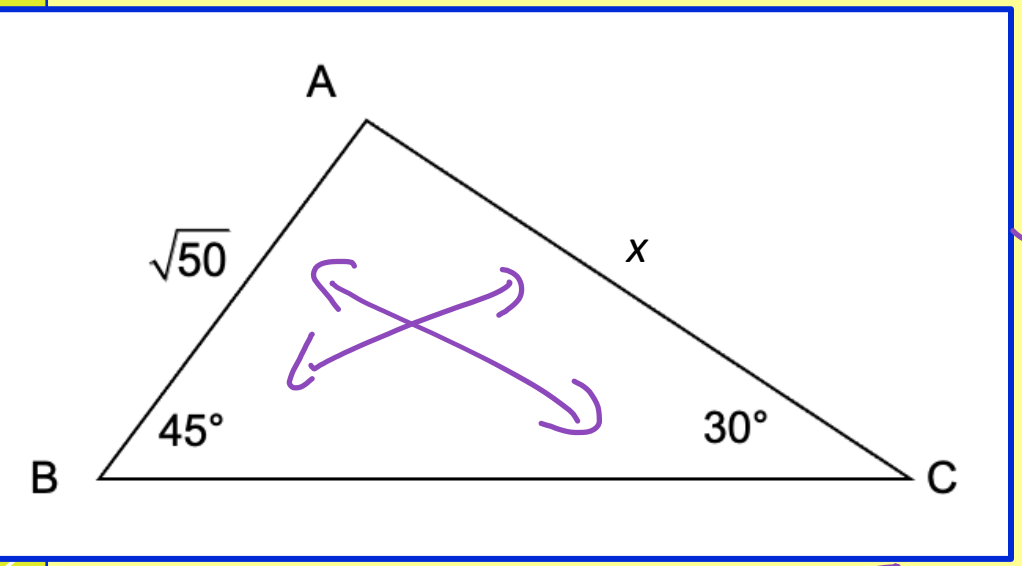
Right angled triangles

- You need to **know when to use** these, e.g.



Right angled? triangles

- You need to **know when to use** these, e.g.



$\frac{x}{\sin 45^\circ} = \frac{\sqrt{50}}{\sin 30}$

$\Rightarrow x \div \frac{1}{\sqrt{2}} = \sqrt{50} \div \frac{1}{2}$

$\Rightarrow x \times \frac{\sqrt{2}}{1} = \sqrt{50} \times \frac{2}{1}$

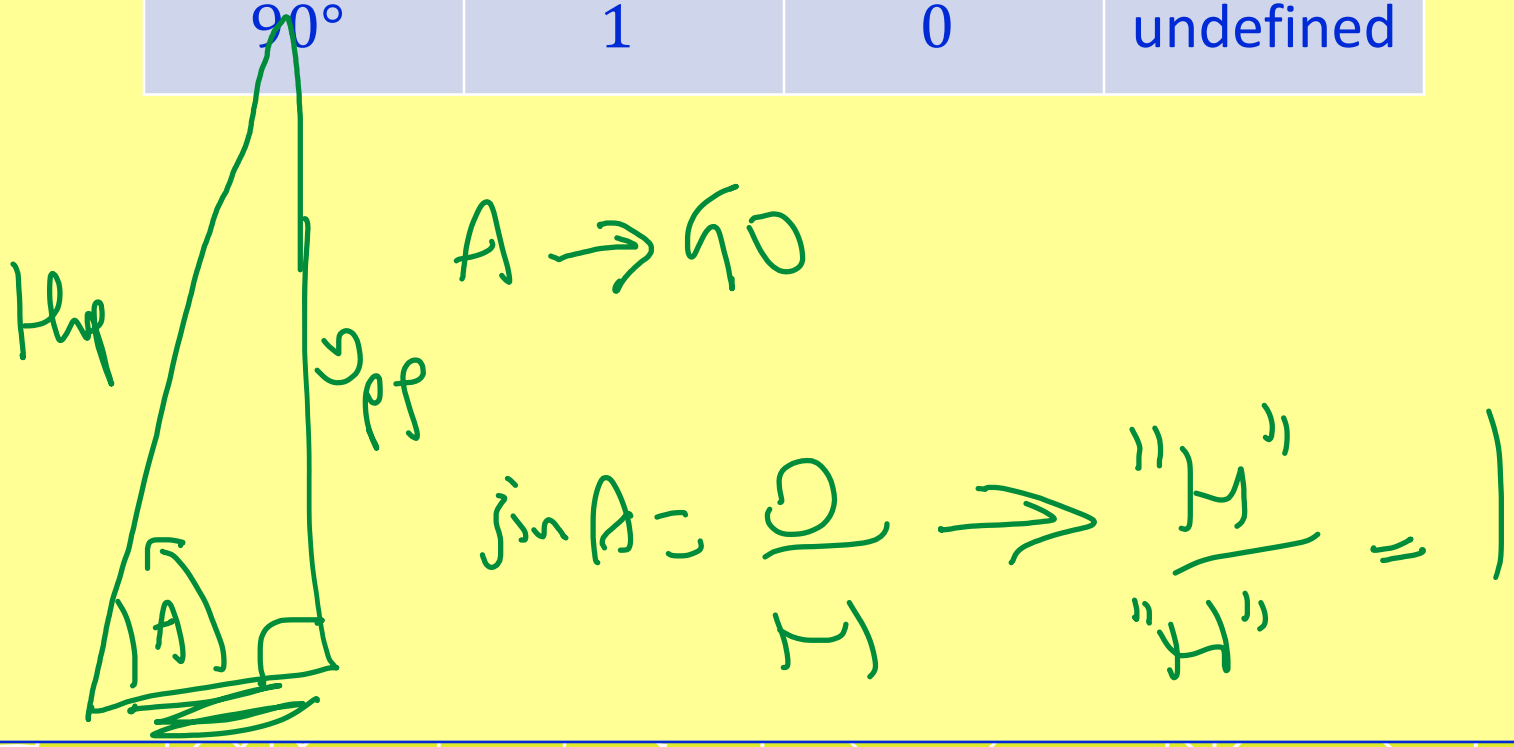
$\Rightarrow x\sqrt{2} = 2\sqrt{50} \Rightarrow x = \frac{2\sqrt{50}}{\sqrt{2}} = 2\sqrt{\frac{50}{2}} = 2\sqrt{25}$

$= \boxed{10}$

Right angled? triangles

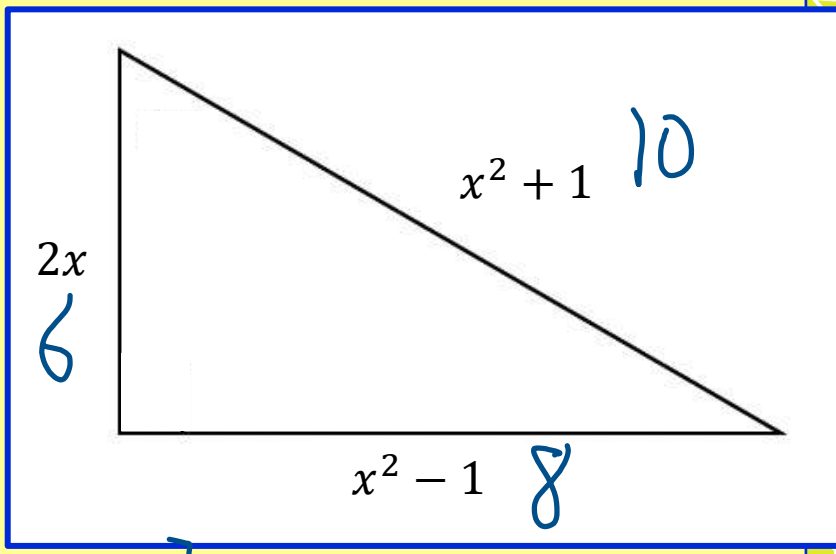
- You ought to **know why** we say that

Angle A	sin A	cos A	tan A
90°	1	0	undefined



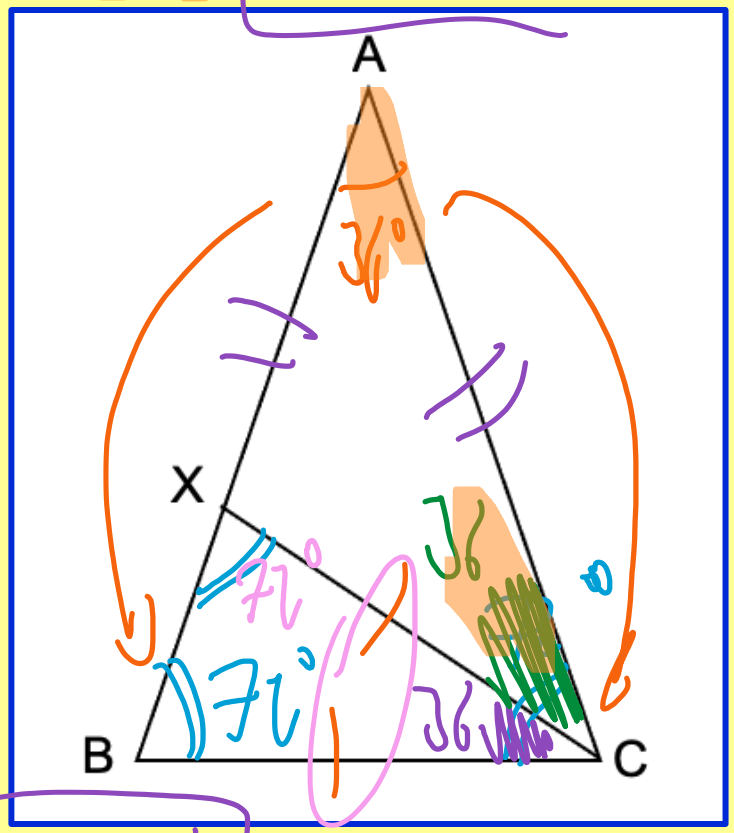
Right angled? triangles

- Is this triangle right-angled?



Other triangles

- AB = AC and CX = CB. Angle BAC = 36°. Prove that CX = XA.



$B\hat{X}C = 72^\circ$

$\Rightarrow X\hat{C}B = 180 - 72 - 72$

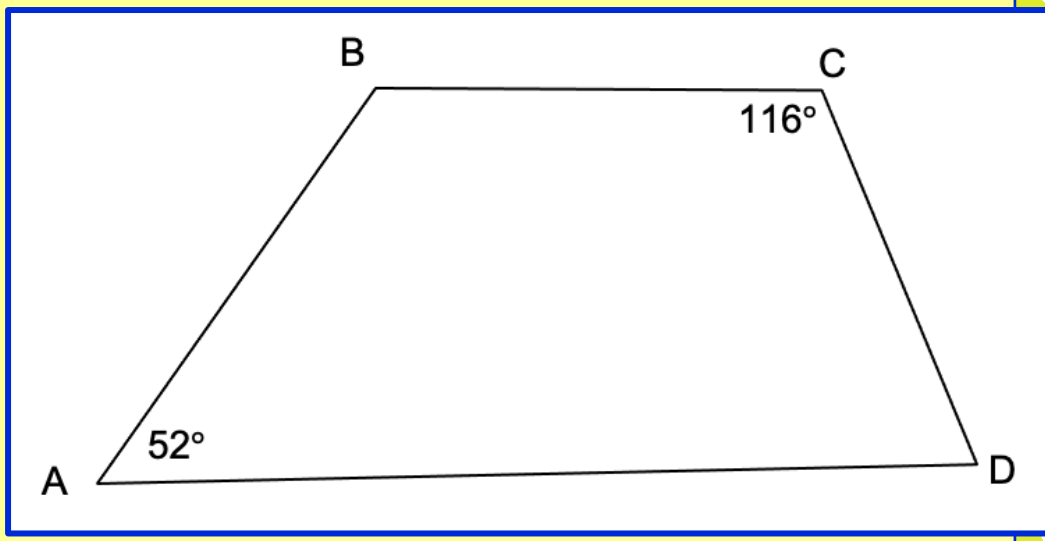
$= 36^\circ$

$X\hat{C}A = 36^\circ$

$\Rightarrow AXC$ is isosceles $\Rightarrow AX = XC$

Quadrilaterals

- Angle ABC is exactly twice angle ADC. What is the quadrilateral?



Quadrilaterals

- ABCD is a rhombus and AP is the bisector of angle DAC. Prove that angle DPA is three times the size of angle DAP.

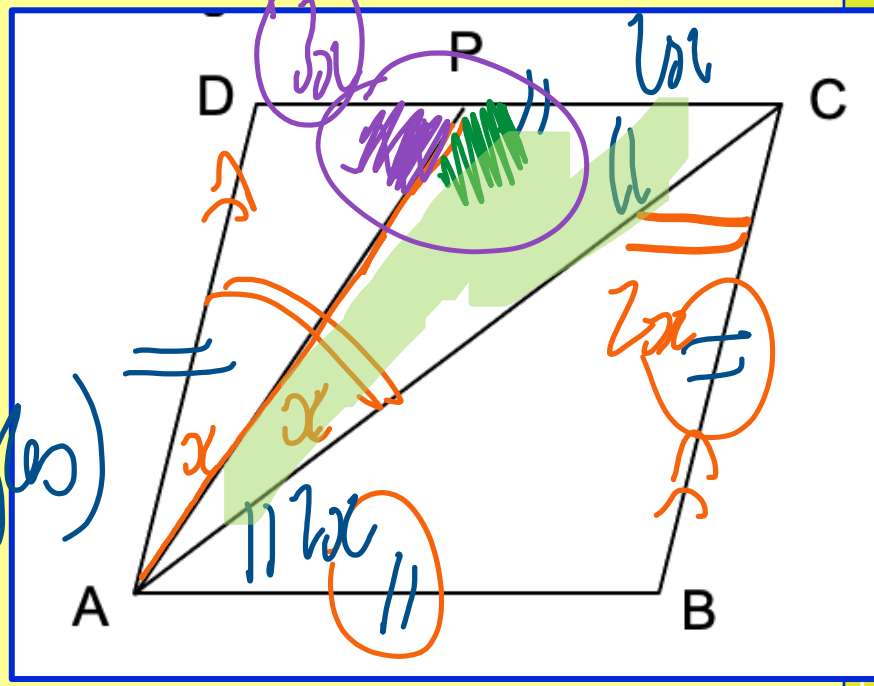
Let $D\hat{A}P = x$

$P\hat{A}C = x$ also

$\Rightarrow A\hat{C}D = 2x$ (alternate angles)

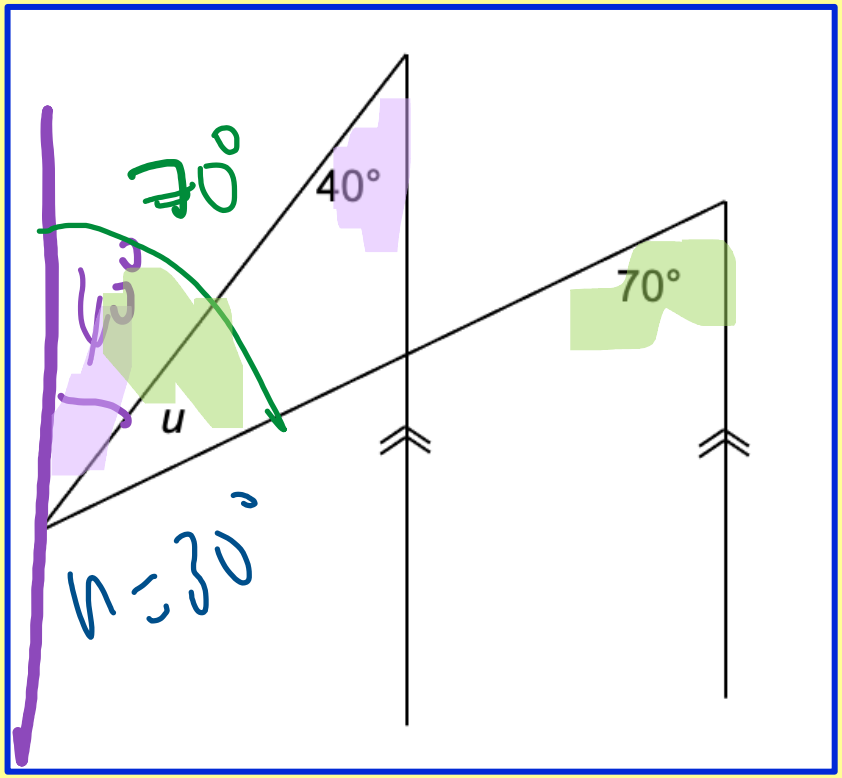
$= 180 - 3x$

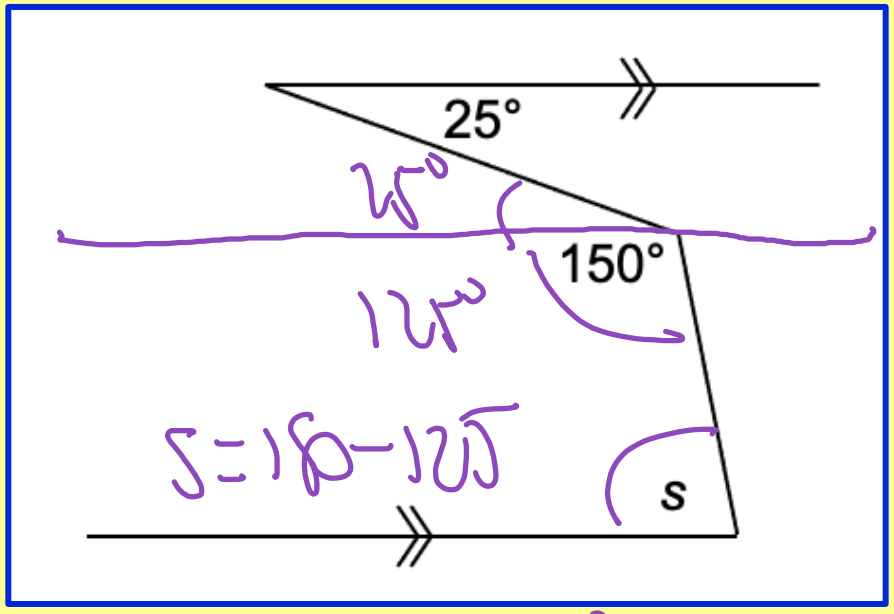
$D\hat{P}A = 3x$



Parallel lines

- Work out the unknown angles





Polygons

"n×30 = 360"

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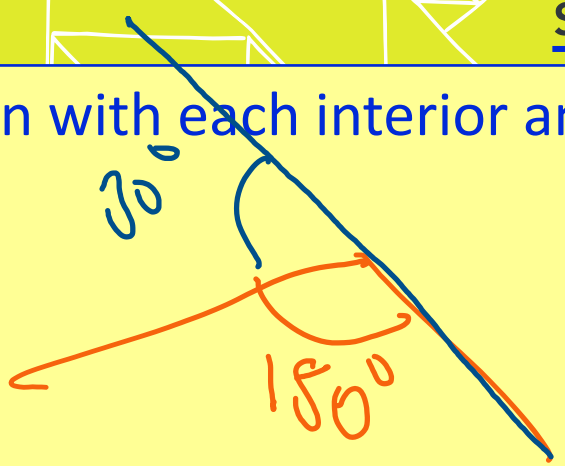
- How many sides has a regular polygon with each interior angle equal to 150°?

$n = \frac{360}{30} = 12$

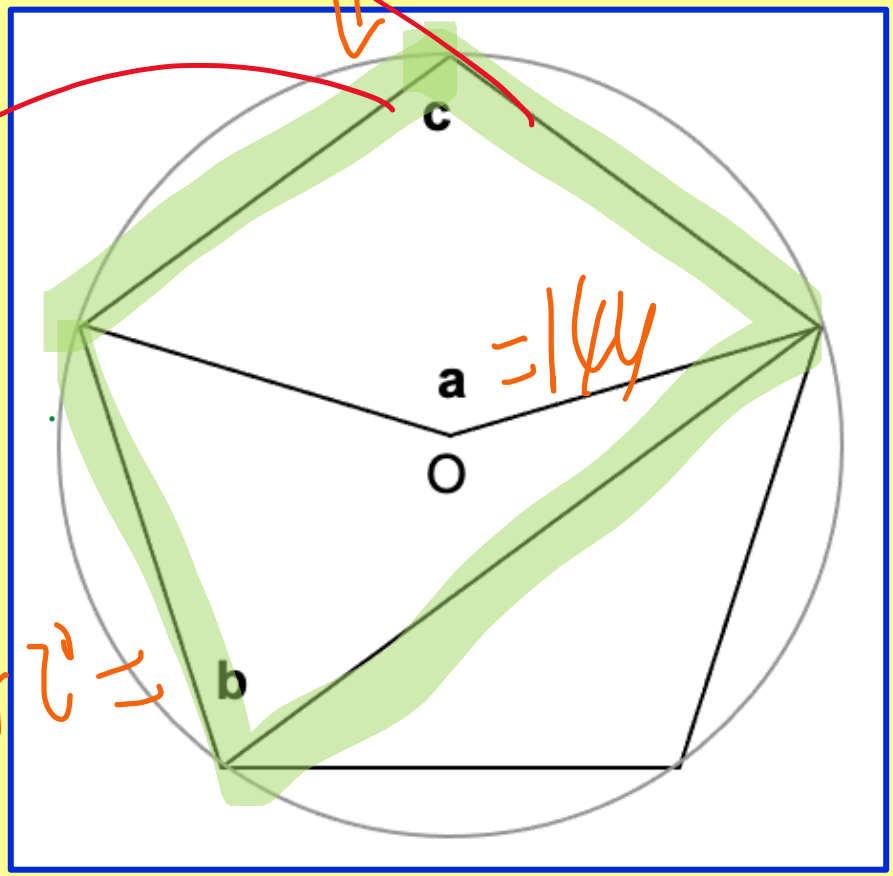


- Is there a regular polygon with each interior angle equal to
  a) • 170°? 10° 36÷10 ✓ 36-gon
  b) • 173°? 7° 36÷7 ✗
  c) • 177°? 3° 36÷3 ✓ 120-gon

ext

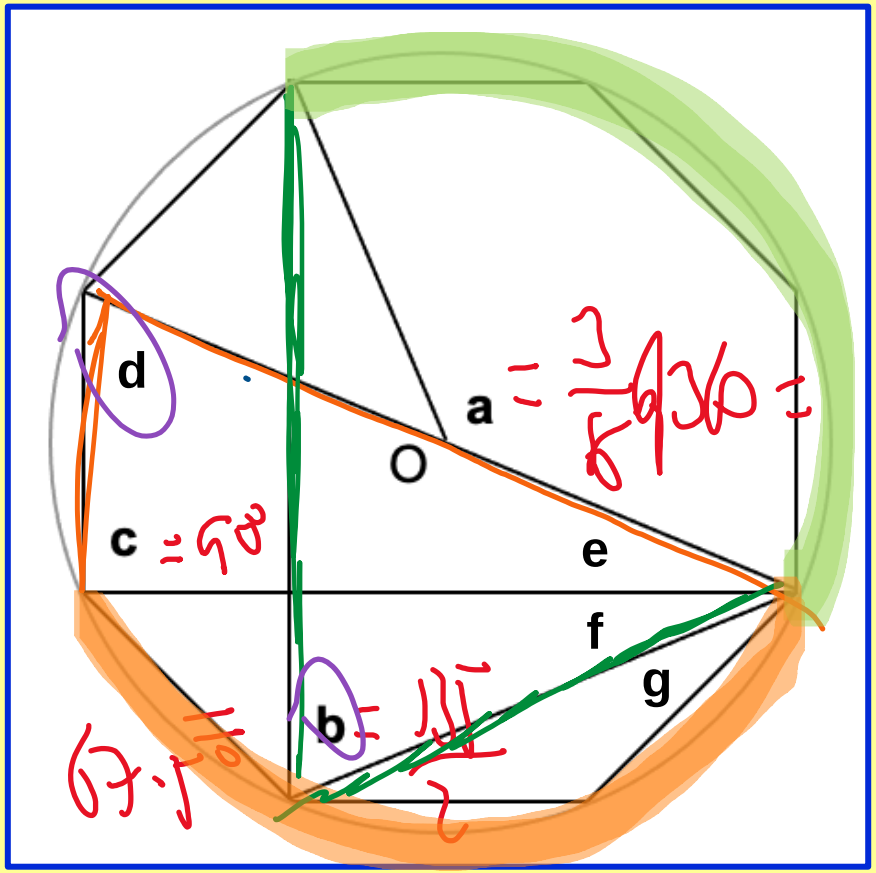
Angles and Circles

- Work out the missing angles in this regular pentagon



Angles and Circles

- Work out the missing angles in this regular octagon



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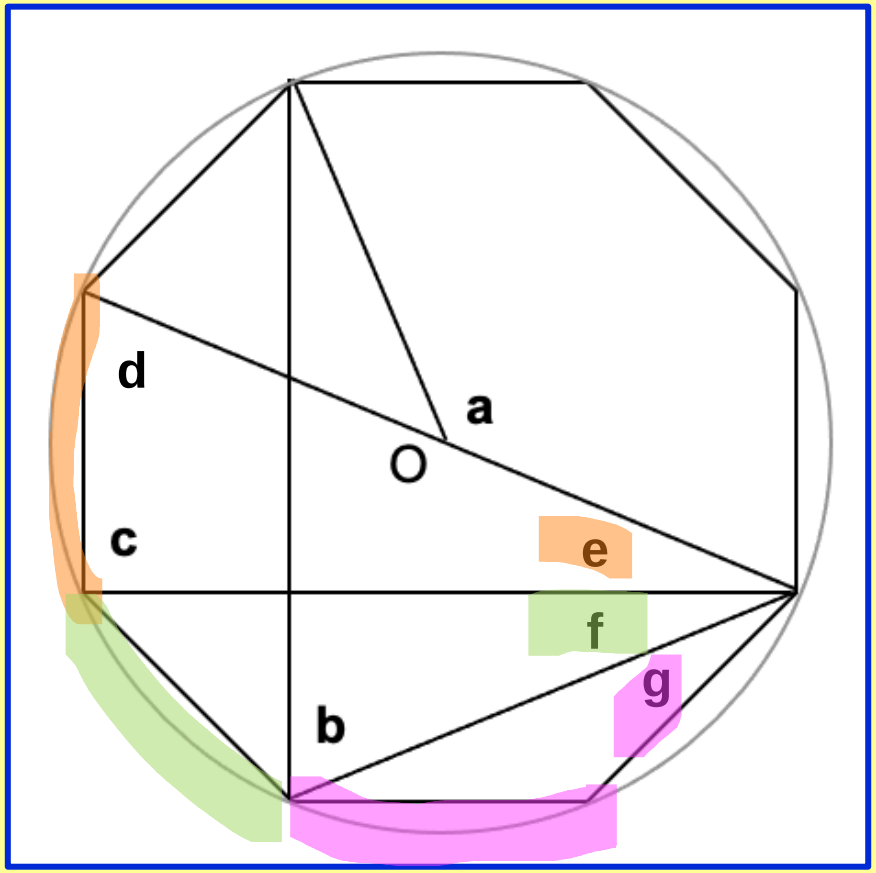

e = f = g

Angles and Circles

- Are the lines PT and PS tangents to the circle?