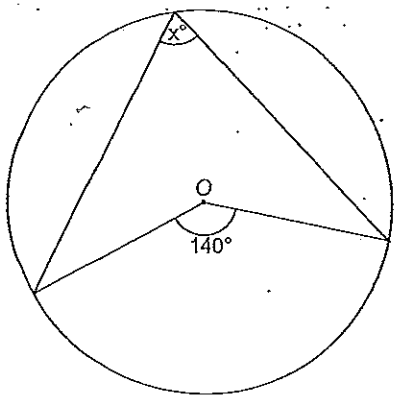
SYDNEY GIRLS H.S.

Year 10 Topic Test: Circle Geometry & Further Algebra

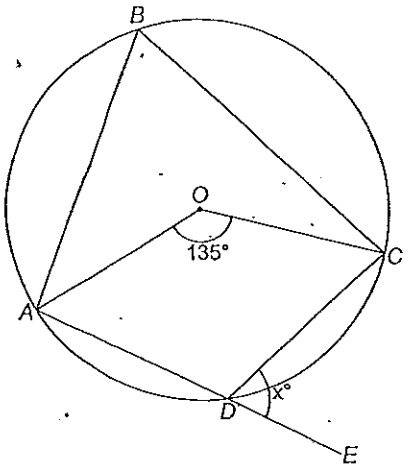
Name:	Result:

1. Find the value of the pronumeral in the following giving reasons.

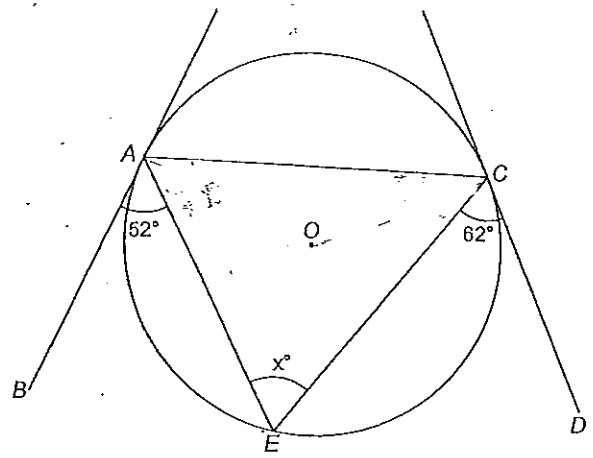
a.



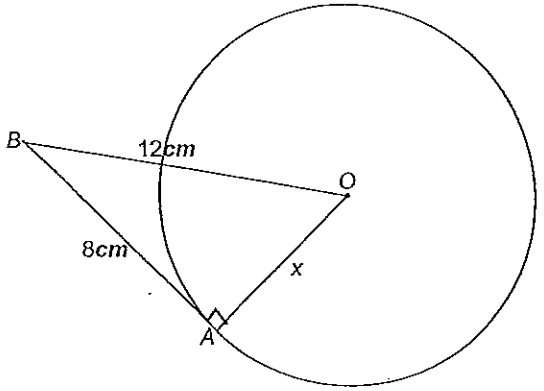
b.



c.

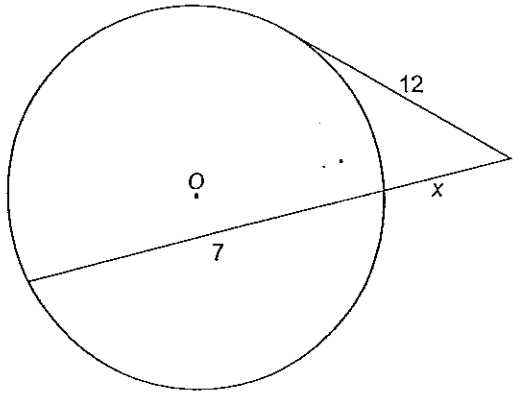


d.

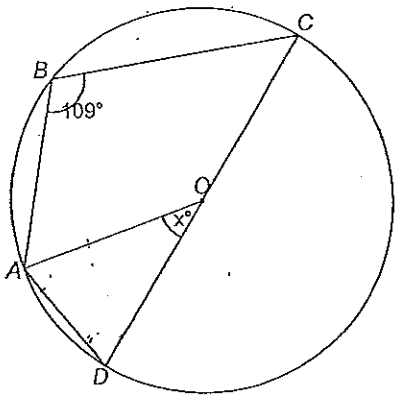


AB is a tangent to the circle.

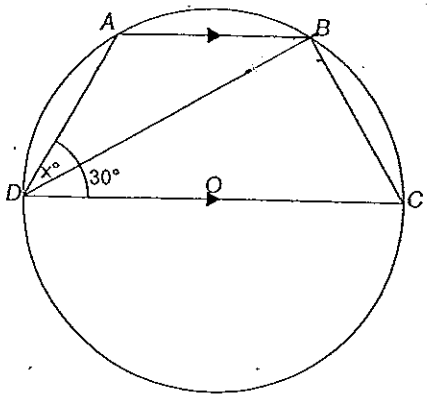
e.



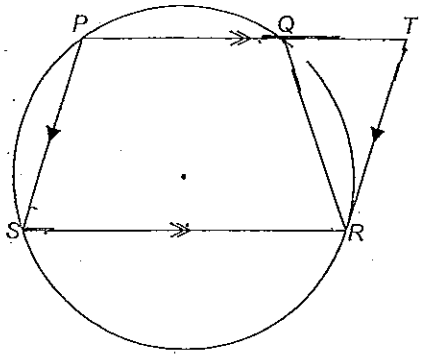
f.



g.



2. *PQRS* is a cyclic quadrilateral. Side *PQ* has been produced to *T* so that *PTRS* is a parallelogram. Prove that *RQT* is an isosceles triangle.



3. Solve the following equations simultaneously

$y = x^2 - 3x + 4$
$y - x = 1$

4. Solve the following literal equations for x

a. $a + x = 7$

b. $\frac{ax+by}{c} = 3$

c. $a = \frac{x-2}{x+2}$

5. Find a new expression for $x^2 + 2x$ if x is replaced with $a + 2$.

6. In these formulae, what values can x take?

a. $y = x + 7$

b. $y = \sqrt{x}$

c. $y = \sqrt{x-7}$

d. $y = \frac{1}{x+2}$

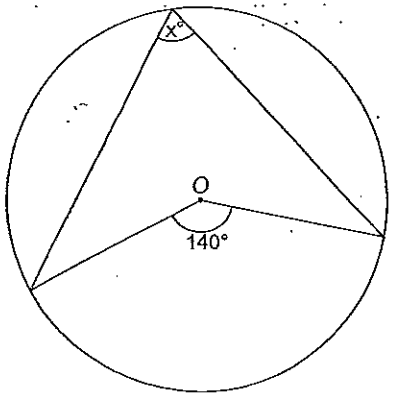
End of Test

Year 10 Topic Test: Circle Geometry & Further Algebra

Name: | **Result:**

1. Find the value of the pronumeral in the following giving reasons.

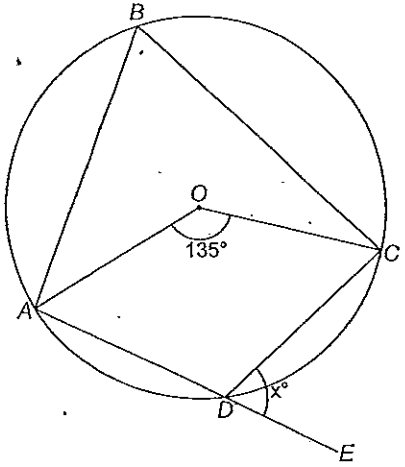
a.



$x = 140 \div 2$ (∠ at the circ. is half that at the centre)

$= 70°$ ✓ (2)

b.



$\angle ABC = \frac{1}{2} \times 135°$ (∠ at the circ. is half that at the centre)

$= 67.5°$

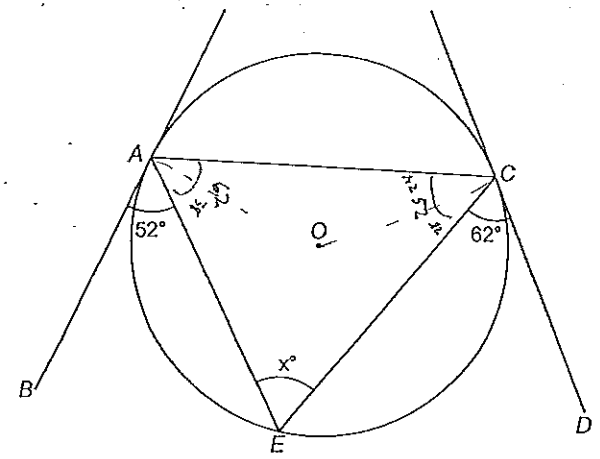
$\angle ADC = 180 - \angle ABC$ (Opp ∠'s of a cyclic quad are supplementary)
$= 112.5°$

$\therefore x = 180 - \angle ADC$ (∠'s on a straight line)

$\therefore x = 67.5°$

✓ (2)

c.



$\angle CAE = 62°$ (∠ in alternate segment)

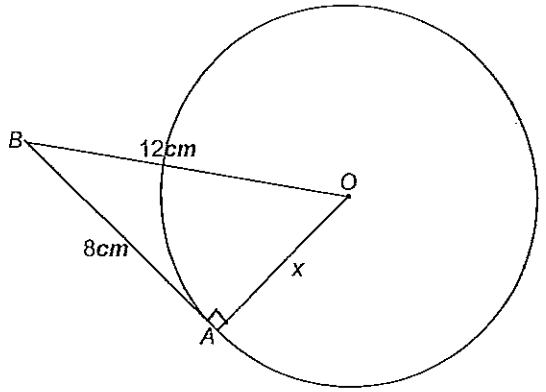
$\angle ACE = 52°$ (∠ in alt. segment)

$\therefore x = 180 - 62 - 52$ (∠ sum of △)

$= 66°$

✓ (3)

d.



AB is a tangent to the circle.

$\angle BAO$ is a right ∠ (tangents perp to radii/diams)

$\therefore 12^2 = 8^2 + x^2$

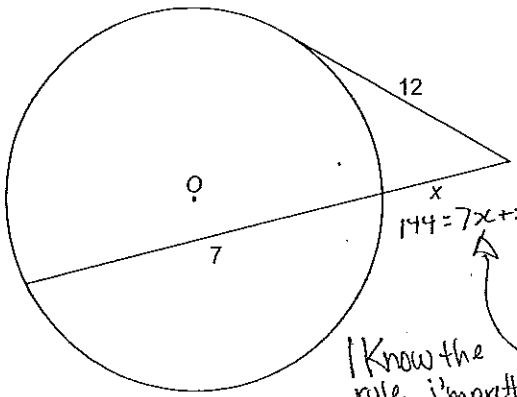
$x^2 = 12^2 - 8^2$

$= 80$

$x = \sqrt{80}$ cm

✓ (3)

e.



$144 = 7x + x^2$

I know the rule, i'm pretty sure, I just can't work it out...

product of secant & it equal to square of tangent)

$x^2 = 20.57$

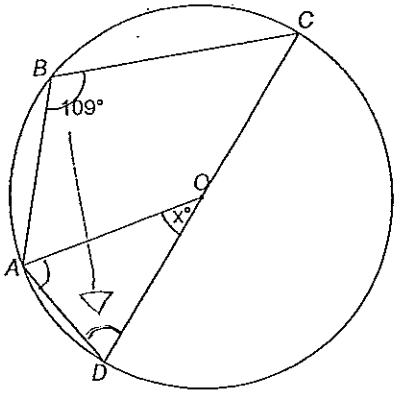
$x = 4.53$

(2)

$12^2 = (7+x) \times x$ (product of secant is equal to square of tan

$12^2 = 7x + x^2$

f.



$\angle ODA = 180 - \angle ABC$ (opp ∠s in cyclic quad supp.)

$= 71$

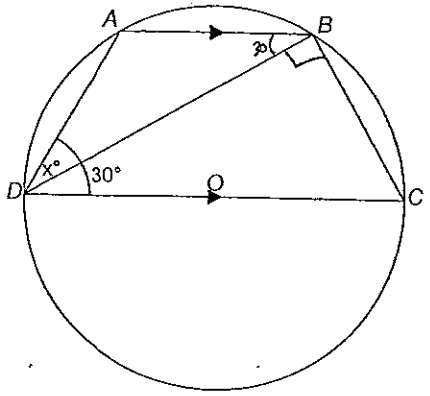
$\angle OAD = \angle ODA$ (base ∠s of isos, equal radii)

$= 71°$

$\therefore x = 180 - 71 - 71$ (∠ sum of △)

$= 38°$ ✓ (3)

g.



$\angle ABD = 30°$ (alt. ∠s, AB // DC)

$\angle ADBC = 90°$ (∠ is in a semi circle are right ∠'s)

$\angle ABC = 30° + 90°$

$= 120°$

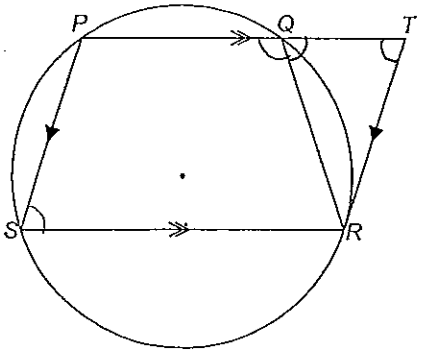
$\angle ADC = 180 - \angle ABC$ (opp ∠s in cyclic quad are supp)

$= 60°$

$\therefore \angle ADB = 60 - 30$

$= 30°$ ✓ (3)

2. *PQRS* is a cyclic quadrilateral. Side *PQ* has been produced to *T* so that *PTRS* is a parallelogram. Prove that *ROT* is an isosceles triangle.



$\angle PSR = \angle PTR$ (opp ∠'s in parallelogram are equal)

$\angle PSR = \angle TQR$ (opp ∠s in cyclic quad are supplementary and ∠s on a straight line)

$\therefore \angle TQR = P\hat{T}R$

$\therefore \triangle ROT$ is an isosceles △ (base ∠'s are equal)

✓ (3)

3. Solve the following equations simultaneously

$y = x^2 - 3x + 4$

$y - x = 1$

(2)

$y = 1 + x$

$\therefore x^2 - 3x + 4 = 1 + x$

$x^2 - 4x + 3 = 0$

$(x-3)(x-1) = 0$

$x = 3, x = 1$

Sub $x = 3$ into $y - x = 1$

$y - 3 = 1$

$y = 4$

now sub $x = 1$ in.

I DON'T Remember what to do next

4. Solve the following literal equations for *x*

a. $a + x = 7$

$x = 7 - a$ ✓ (1)

b. $\frac{ax+by}{c} = 3$

$ax + by = 3c$

$ax = 3c - by$

$x = \frac{3c - by}{a}$ ✓ (2)

c. $a = \frac{x-2}{x+2}$

$a(x+2) = x - 2$

$ax + 2a = x - 2$

$ax - x = -2a - 2$

$x(a-1) = -2(a+1)$

$x = \frac{-2(a+1)}{a-1}$ (1)

I don't like fractions very much

5. Find a new expression for $x^2 + 2x$ if x is replaced with $a + 2$.

$(a+2)^2 + 2(a+2)$

$= a^2 + 4a + 4 + 2a + 4$

$= a^2 + 6a + 8$ ✓ (2)

6. In these formulae, what values can x take?

a. $y = x + 7$

$x = 7 - y$

$x \leq 7$ X (0)

b. $y = \sqrt{x}$

$x^2 = y^2$

$x \geq 0$ ✓ (1)

c. $y = \sqrt{x-7}$

$y^2 = x - 7$

$x = y^2 + 7$

$x \geq 7$ ✓ (1)

d. $y = \frac{1}{x+2}$

$\frac{1}{y} = x + 2$ (Im not sure if you are actually able to do this, but im hoping for the best)

$\frac{1}{y} - 2 = x$

$x < 0$ X (0)

$\frac{1}{5} =$

$\frac{1}{x} = \frac{y}{1}$

$2^2 + 7 = 11$

End of Test