

S2 Extension – Test 2 Revision

1. Patterns and Relationships

1. (a) Complete the table below for $y = x^2 - 4x + 3$.

x	-1	0	1	2	3	4	5
y							

(b) Draw the curve $y = x^2 - 4x + 3$ on a coordinate diagram.

2. (a) Complete the table below for $y = x^2 + 2x - 3$.

x	-4	-3	-2	-1	0	1	2
y							

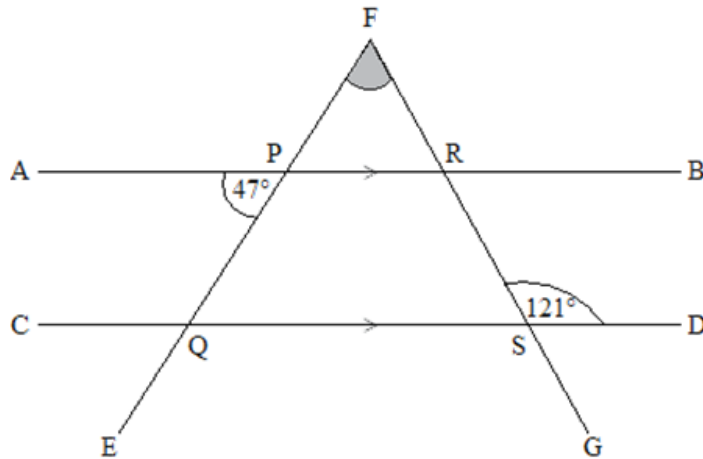
(b) Draw the curve $y = x^2 + 2x - 3$ on a coordinate diagram.

2. Angles

1. In the diagram below, lines AB and CD are parallel.

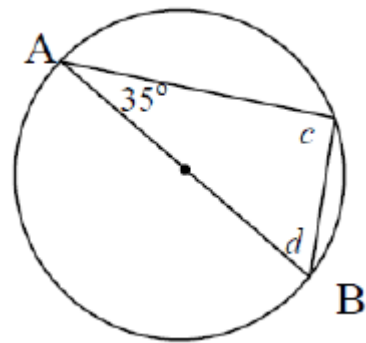
Lines EF and GF intersect AB and CD at the points P, Q, R and S as shown.

Angle APQ is 47° and angle DSR is 121° .

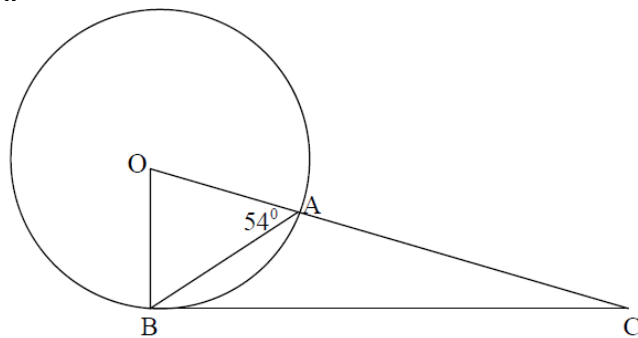


Calculate the size of angle EFG.

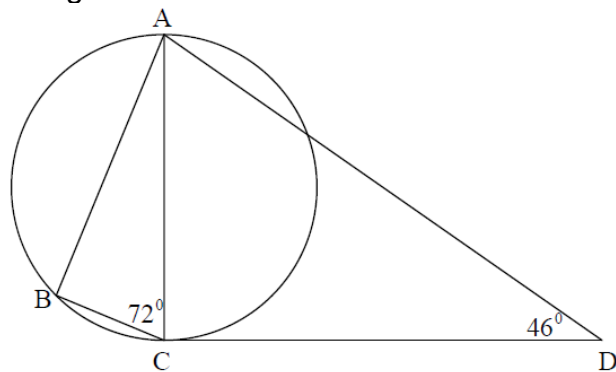
2. In the diagram below AB is a diameter of the circle.
Calculate the sizes of angles marked c and d .



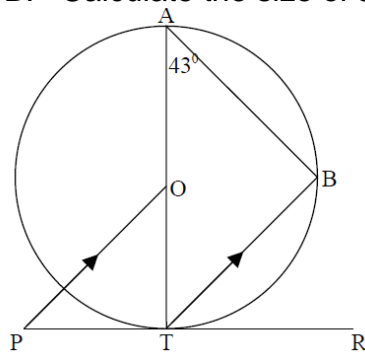
3. In the diagram below OB is a radius of the circle and BC is a tangent to the circle.
Calculate the size of angle BCA .



4. In the diagram below AC is a diameter of the circle and CD is a tangent to the circle.
Calculate the size of angle DAB .



5. In the diagram below PTR is a tangent to the circle centre O .
 PO is parallel to TB . Calculate the size of angle OPT .



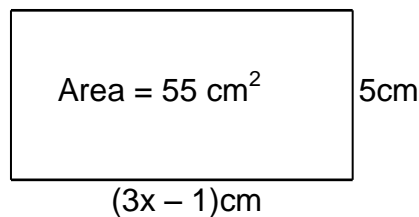
3. Scientific Notation

- Write these numbers in full
(a) 3.14×10^6 (b) 9×10^9 (c) 2.2×10^{-3} (d) 7×10^{-1}
- Write these numbers in scientific notation
(a) 175 000 (b) 640 000 000 (c) 0.000 4 (d) 0.000 000 28
- A computer can perform 4.7×10^8 calculations per second.
How many calculations can this computer perform in one minute?
- The population of California, the most populous state in the USA, is approximately 4×10^7 .
The population of the USA is approximately 3×10^8 .
How many times larger is the population of the USA than California?

4. Equations

- Solve (a) $3x + 5 = 13$ (b) $9y - 1 = 2y + 3$

- Make an equation and solve it to find the value of x.



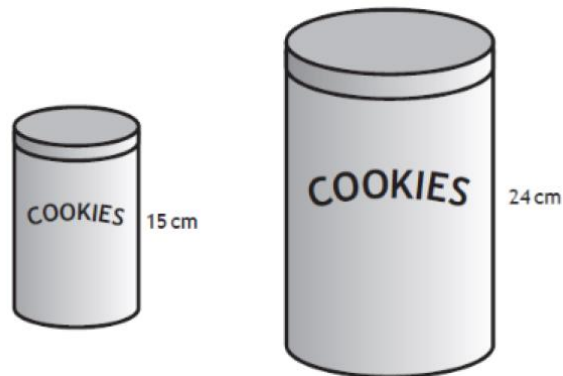
- Jack and Jill have equal amounts of money.
Jack buys 7 packets of fruit gums and then has 22p left.
Jill buys 3 packets of fruit gums and then has £1.30 left.
Make an equation and solve it to find the cost of one packet of fruit gums

5. Averages

- Colin and Paul each played eight games of cricket.
Colin's mean score was 59 runs and his range was 102 runs.
Paul's mean score was 65 runs and his range was 52 runs.
Write two comments comparing Colin's performance with Paul's.
- Emma's marks in six tests were 35 37 40 42 43 and 79.
Find her (a) median (b) mean mark.
(c) Which of these two averages is more representative of her marks?
Give a reason for your answer.

6. Similarity

1. These two cookie jars are mathematically similar.

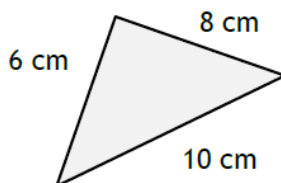


- (a) Find the enlargement scale factor in its simplest form.
(b) Find the reduction scale factor in its simplest form.

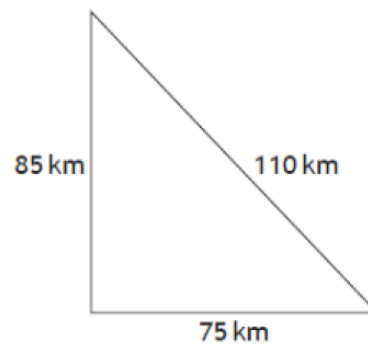
7. Pythagoras' Theorem

1. Are the triangles shown below right-angled?
Show working to justify your answers.

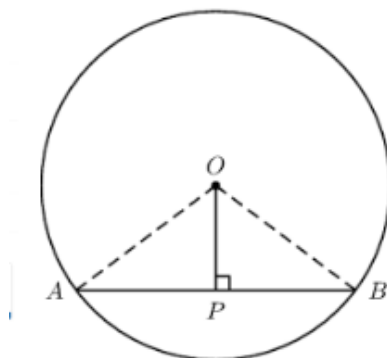
(a)



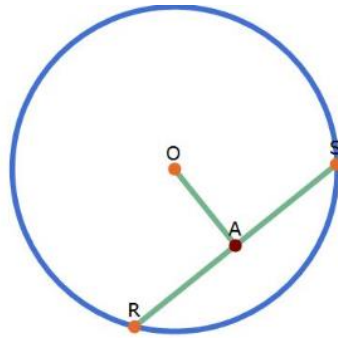
(b)



2. The diagram shows a circle, centre O , with radius 15 cm and chord AB of length 24 cm. Calculate the length of line OP .



3. The diagram shows a circle, centre O. Chord RS is 1.5 m long and the line OA is 40 cm long. Calculate the length of OS, the radius of the circle.



8. Proportion

1. It took six men 30 minutes to cut the grass at their local football pitch. How long would five men have taken working at the same rate?
2. Victoria takes 28 minutes to cycle to work at an average speed of 24km/h. How long would she take to travel to work at an average speed of 16km/h?
3. A house has increased in value by 15% over the last four years. It is now worth £207 000. What was it worth four years ago?
4. A car has decreased in value by 20% since last year. It is now worth £9 600. What was its value a year ago?

ANSWERS

1. Patterns and Relationships

1. (a)

x	-1	0	1	2	3	4	5
y	8	3	0	-1	0	3	8

(b) Ask your teacher to check your graph.

2. (a)

x	-4	-3	-2	-1	0	1	2
y	5	0	-3	-4	-3	0	5

(b) Ask your teacher to check your graph.

2. Angles

1. $\text{EFG} = 74^\circ$ 2. $c = 90^\circ, d = 55^\circ$ 3. $\text{BCA} = 18^\circ$ 4. $\text{DAB} = 62^\circ$ 5. $\text{OPT} = 43^\circ$

3. Scientific Notation

1. (a) 3 140 000 (b) 9 000 000 000 (c) 0.0022 (d) 0.7
2. (a) 1.75×10^5 (b) 6.4×10^8 (c) 4×10^{-4} (d) 2.8×10^{-7}
3. 2.82×10^{10} 4. 7.5

4. Equations

1. (a) $\frac{8}{3}$ (b) $\frac{4}{7}$ 2. $5(3x - 1) = 55; x = 4$ 3. $7p + 22 = 3p + 130; 27 \text{ pence}$

5. Averages

1. Paul scored more runs on average. Paul's scoring was more consistent.
2. (a) 41 (b) 46 (c) The median because it was closer to most of the marks.

6. Similarity

1. (a) $\frac{8}{5}$ or 1.6 (b) $\frac{5}{8}$ or 0.625

7. Pythagoras' Theorem

- 1.(a) $6^2 + 8^2 = 100$
 $10^2 = 100$
so $6^2 + 8^2 = 10^2$
hence the triangle is right-angled
- (b) $75^2 + 85^2 = 12850$
 $110^2 = 12100$
so $75^2 + 85^2 \neq 110^2$
hence the triangle is not right-angled
2. 9 cm 3. 85 cm

8. Proportion

1. 36 minutes 2. 42 minutes 3. £180 000 4. £12 000