DANEMATHICS
FREE CAPS MATHS RESOURCES

GRADE 8 · GEOMETRY OF STRAIGHT LINES

Angle Relationships: Straight, Intersecting & Perpendicular Lines

MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
37	1 hour	4

Name: ..... Class: .....

Date: .....

MARK ____ / 37

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 Angles on a straight line add up to ... (1)

A) 360° **B)** 270°

C) 90° **D)** **180°** ✓

> **Answer: D** — A straight line is half a full turn.
> - **A** — that is angles round a POINT
> - **B** — that is three right angles
> - **C** — that is a right angle

1.2 Angles round a point add up to ... (1)

A) **360°** ✓ **B)** 540°

C) 90° **D)** 180°

> **Answer: A** — A full turn is 360°.
> - **B** — that is the angle sum of a pentagon
> - **C** — that is a right angle
> - **D** — that is angles on a straight line

1.3 Two lines intersect. One angle is $65°$. The angle VERTICALLY OPPOSITE it is ... (1)

A) $295°$ **B)** **$65°$ ✓**

C) $115°$ **D)** $25°$

> **Answer: B** — Vertically opposite angles are EQUAL.
> - **A** — that is the reflex angle
> - **C** — that is the adjacent angle on the straight line
> - **D** — that is the complement

1.4 Two angles on a straight line are x and $3x$. The value of x is ... (1)

A) **$45°$ ✓** **B)** $30°$

C) $60°$ **D)** $90°$

> **Answer: A** — $x + 3x = 180°$, so $4x = 180°$.
> - **B** — divided 180 by 6
> - **C** — divided 180 by 3
> - **D** — divided 180 by 2

1.5 Two angles that add up to $90°$ are called ... (1)

A) adjacent **B)** **complementary ✓**

C) supplementary **D)** vertically opposite

> **Answer: B** — Complementary angles complete a right angle.
> - **A** — adjacent only means next to each other
> - **C** — supplementary angles add to $180°$
> - **D** — those are equal, not adding to $90°$

1.6 Perpendicular lines meet at ... (1)

A) **$90°$ ✓** **B)** $45°$

C) $180°$ **D)** $360°$

> **Answer: A** — Perpendicular means at right angles.
> - **B** — that is half a right angle
> - **C** — that is a straight line
> - **D** — that is a full turn

1.7 An angle of $130°$ is called ... (1)

A) reflex **B)** acute

C) **obtuse ✓** **D)** right

> **Answer: C** — An obtuse angle is between $90°$ and $180°$.
> - **A** — reflex is more than $180°$
> - **B** — acute is less than $90°$
> - **D** — a right angle is exactly $90°$

1.8 The SUPPLEMENT of $47°$ is ... (1)

A) $47°$ **B)** $313°$

C) $43°$ **D) $133°$ ✓**

> **Answer: D** — $180° - 47° = 133°$.
>
> - **A** — supplementary angles are not equal
> - **B** — that is the reflex angle
> - **C** — that is the COMPLEMENT

1.9 Three angles round a point are $90°$, $130°$ and x. Then x is ... (1)

A) $220°$ **B) $140°$ ✓**

C) $360°$ **D)** $40°$

> **Answer: B** — $360° - 90° - 130° = 140°$.
>
> - **A** — added the two given angles
> - **C** — forgot to subtract at all
> - **D** — used $180°$ instead of $360°$

1.10 Which statement about vertically opposite angles is TRUE? (1)

A) they add up to $180°$ **B)** they are always acute

C) they are equal ✓ **D)** they add up to $90°$

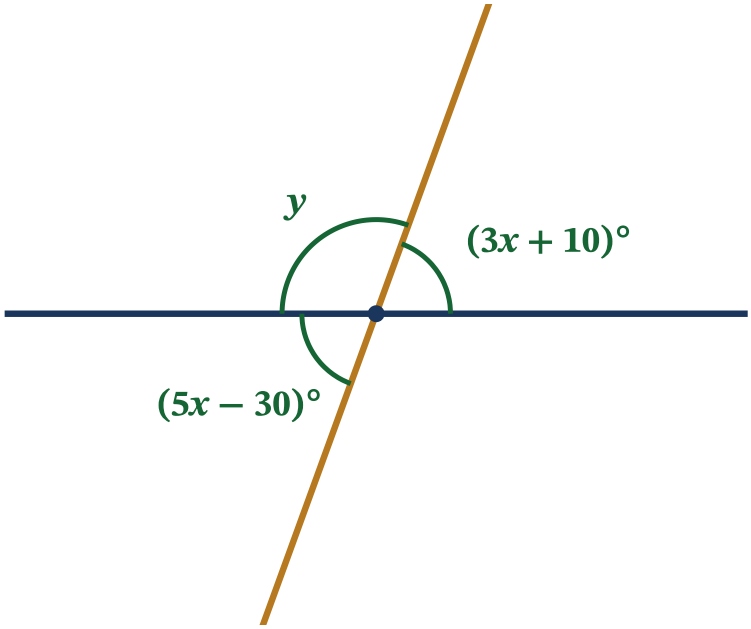
> **Answer: C** — When two lines cross, the angles opposite each other are equal.
>
> - **A** — that is true of angles on a straight line
> - **B** — they can be any size
> - **D** — that is complementary angles

ANSWER GRID — MARKING GUIDELINE

1.1	A	B	C	(D)
1.2	(A)	B	C	D
1.3	A	(B)	C	D
1.4	(A)	B	C	D
1.5	A	(B)	C	D
1.6	(A)	B	C	D
1.7	A	B	(C)	D
1.8	A	B	C	(D)
1.9	A	(B)	C	D
1.10	A	B	(C)	D

QUESTION 2 [10 MARKS]

In the diagram below, two straight lines intersect at O. *The diagram is not drawn to scale.*



2.1 Calculate the value of x. **(3)**

$(3x + 10)° = (5x - 30)°$ *(vertically opposite angles) (1)*
$40 = 2x$ *(1)*
$x = \mathbf{20}$ *(1)*

2.2 Hence determine the size of the angle marked $(3x + 10)°$. **(3)**

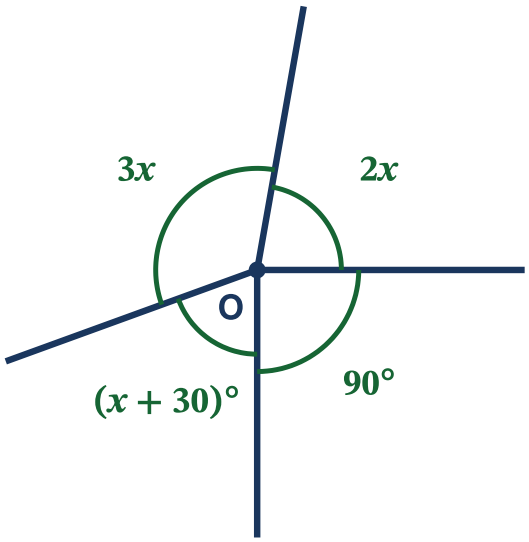
$= 3(20) + 10$ *(1)*
$= 60 + 10$ *(1)*
$= \mathbf{70°}$ *(1)*

2.3 Hence determine, with a reason, the size of y. **(4)**

$y = 180° - 70°$ *(angles on a straight line) (2)*
$= \mathbf{110°}$ *(1)*
(check: $70° + 110° = 180°$) *(1)*

QUESTION 3 [9 MARKS]

Four rays meet at the point O in the diagram below. *The diagram is not drawn to scale.*



3.1 Write down an equation in x and solve it. **(4)**

$2x + 3x + (x + 30°) + 90° = 360°$ *(angles round a point) (2)*
$6x + 120° = 360°$ *(1)*
$x = \mathbf{40°}$ *(1)*

3.2 Hence write down the size of each of the three unknown angles. **(3)**

$2x = \mathbf{80°}$ *(1)*
$3x = \mathbf{120°}$ *(1)*
$x + 30° = \mathbf{70°}$ *(1)*

3.3 Show that your four angles are correct. **(2)**

$80° + 120° + 70° + 90°$ *(1)*
$= \mathbf{360°}$, the angles round a point *(1)*

QUESTION 4 [8 MARKS]

Answer the following. Show all your working.

4.1 Two angles, $(2y - 10)°$ and $(y + 40)°$, are complementary. Calculate the value of y and the size of each angle. **(4)**

$(2y - 10) + (y + 40) = 90$ *(complementary angles add to 90°) (1)*
$3y + 30 = 90$ *(1)*
$y = \mathbf{20}$ *(1)*
The angles are $\mathbf{30°}$ and $\mathbf{60°}$ *(1)*

4.2 An angle is three times the size of its supplement. Calculate the size of the angle. **(4)**

> Let the angle be x, so its supplement is $(180° - x)$ *(1)*
> $x = 3(180° - x)$ *(1)*
> $x = 540° - 3x$, so $4x = 540°$ *(1)*
> $x = \mathbf{135°}$ *(check: $3 \times 45° = 135°$) (1)*

TOTAL: 37 marks

This question paper consists of 4 questions.

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