# Year **11**

## Topics 1 - 6
## Practice Exam

**1 Hour 30 min**

| **Name:** | |
| --- | --- |
| **Teacher:** | |
| **Score:** | /77        % |

## Instructions

- Use black or blue ball-point pen.
- Answer all the questions in the spaces provided; blank paper is provided if needed.
- You will need: **ruler, protractor, pencil, compass, calculator**

## Information

- The marks for each question are shown in brackets.
- The total marks available for this exam is 77.

## Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Calculators are allowed in this paper.

**Add**vanceMaths recommends the Casio Classwiz fx-991

**Designed by Imad Raheel**

1. Rearrange the following to make x the subject of the formula.

(a)  $2x + 4 = ax + 3$

$$x = \frac{1}{a - 2}$$  3

(b)  $y = x^2 + 6x + 20$

$$x = -3 \pm \sqrt{y - 11}$$  4

2. Convert $0.\dot{7}\dot{3}$ into a fraction.
Show your complete algebraic working.

$$\frac{73}{99}$$

...................  4

3. A car is travelling along a road, at a constant speed of 70 km/h, correct to the nearest 5 km/h.
The distance that it must travel to reach its destination is 132.1 km, correct to 4 significant figures.
How long will the car take, giving your answer to a suitable degree of accuracy.

$$\text{Lower Bound} = \frac{132.05}{72.5} = 1.82137 \ldots hours$$

$$\text{Upper Bound} = \frac{132.15}{67.5} = 1.95777 \ldots hours$$

Both round to 2 hours.

2 hours

4. Sari writes an equation originally in the form $x^2 + ax + b$ as $(x - 6)^2 + 4$.

  $(a)$ Find the values of a and b.

$$x^2 - 12x + 40$$

a = ...$-12$...
b = ...$40$...          3

  $(b)$ Hence, solve $(x - 6)^2 + 4 = 13$.

$$(x - 6)^2 = 9$$
$$(x - 6) = \pm 3$$
$$x = 6 \pm 3$$
$$x = 3, x = 9$$

$x = 3, x = 9$
...................          3

5. Ali is planning his finances.

($a$) If he saved \$432 in a bank, at an interest rate of 4.3% for 20 years. How much interest will he have gained over 20 years?

$$I = 432 \times 1.043^{20} - 432$$

.................... \$570  4

($b$) A ladder is resting against a wall. The floor and the wall are perpendicular to each other.
The base of the ladder is 2.5 metres away from the wall, and the ladder is at an angle of 65° from the floor.

How far up the wall does the ladder reach?

$$opp = 2.5 \times \tan(65)$$
$$opp = 5.36m$$

.................... $5.36m$  3

6. An arithmetic series has the $n^{th}$ term of 2n + 5.
   Find the sum of the of all the terms between the $50^{th}$ and $100^{th}$ terms.

$a_{51} = 107$

$a_{99} = 203$

$S_n = \left(\dfrac{a_{51} + a_{99}}{2}\right) \times n$

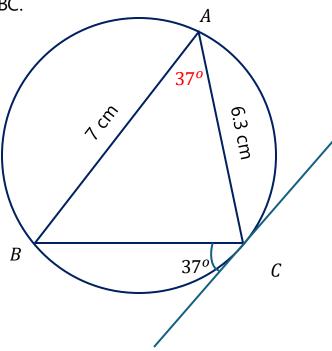$S_n = \left(\dfrac{107 + 203}{2}\right) \times 48$

$S_n = 7440$

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7. A triangle, ABC, is inscribed inside a circle. C is the point where a tangent meets the circle.
AB has length 7 cm, and AC has length 6.3 cm.
Find the length of BC.
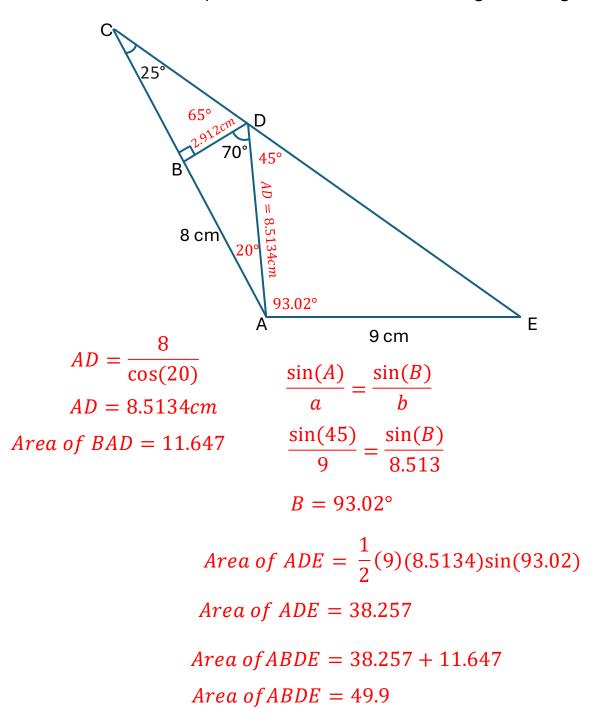


Cosine Rule

$$a^2 = b^2 + c^2 - 2bc \cos(A)$$

$$a^2 = 7^2 + 6.3^2 - 2(7)(6.3) \cos(37)$$

$4.27 cm$

5

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8. In triangle ACE shown below, AE = 9 cm.
   The point B lies on AC and the point D lies on CE so that ∠DBC = 90° , ∠BCD = 25° , ∠BDA = 70° and AB = 8 cm.
   Find the area of the quadrilateral ABDE, correct to 3 significant figures.
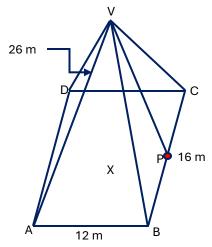


$$AD = \frac{8}{\cos(20)}$$

$$AD = 8.5134 cm$$

$$Area\ of\ BAD = 11.647$$

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b}$$

$$\frac{\sin(45)}{9} = \frac{\sin(B)}{8.513}$$

$$B = 93.02°$$

$$Area\ of\ ADE = \frac{1}{2}(9)(8.5134)\sin(93.02)$$

$$Area\ of\ ADE = 38.257$$

$$Area\ of\ ABDE = 38.257 + 11.647$$

$$Area\ of\ ABDE = 49.9$$

49.9
.....................cm² 6

9. The figure shows a roof shaped like a right pyramid on a horizontal rectangular base ABCD, where;
   AB = 12 m, BC = 16 m and AV = 26 m.



($a$)  Find the height of the pyramid.

$24m$

.................... m   5

(*b*)  Find the size, in degrees, of angle AVC.

45.2°
........................    5

(*c*)  A line goes from V to P, the midpoint of BC. Find the length of the line.

24.7
................... m    5

10. Prove that the sum of any 4 consecutive odd integers is a multiple of 4.

Four consecutive integers: $2n + 1, 2n + 3, 2n + 5, 2n + 7$

$\text{Sum} = 2n + 1 + 2n + 3 + 2n + 5 + 2n + 7$

$\text{Sum} = 8n + 16$

$\text{Sum} = 4(2n + 4)$

As required.

11. Solve the following, showing all your working.

(a)  $6x^2 + 13x = 2(x - 2)$

$$x = \frac{-4}{3}, x = \frac{-1}{2}$$
.................    4

(b)  $3x^2 + 5x - 2 = 0$

$$x = -2, x = \frac{1}{3}$$
.................    4

(c)  Write $30 - 12x - 2x^2$ in the form $a(x + b)^2 + c$.

$$-2(x + 3)^2 + 48$$
.................    3

12. In an arithmetic series N, the sum of the first 24 terms is nine times the sum of the first 2 terms.
    Given than $S_{90} = x$ and $S_{20} = y$, what is the value of $\frac{x}{y}$?

$$S_{24} = 9S_2$$

$$\frac{24}{2}(2a + 23d) = 9 \times \frac{2}{2}(2a + d)$$

$$8a + 92d = 6a + 3d$$

$$2a = -89d$$

$$S_{90} = \frac{90}{2}(2a + 89d)$$

$$S_{90} = \frac{90}{2}(-89d + 89d)$$

$$S_{90} = \frac{90}{2}(0)$$

$$S_{90} = 0$$

$$x = 0 \qquad\qquad \frac{x}{y} = 0$$

$$\frac{x}{y} = 0$$

.................... 6

-------------------------------- END OF EXAM --------------------------------

**Total marks available:** 90                     *Remember to re-check your answers*

# Blank Paper

Use this page and the next for extra space if needed. Please clearly specify the question number.

# Blank Paper

# Post-exam reflection sheet

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| Q | Marks | What Went Well? | Even better if |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |

# Self-reflection

**How did you revise for the exam?** *(tick all that you did)*

Reading class notes ○   Online practice ○   Doing practice question ○

○ Getting help from your teacher   ○ Recapping the previous exam

Study group (with friends) ○   Reading textbooks ○   Watching videos ○

**Were these revision techniques useful?** *(circle your answer)*

😎 Yes          🙄 A bit          😌 No

**How could you revise more effectively next time?**

_____

_____

**List three topics from this test that you are good at, and three that need more work**

1.

2.

3.

4.

5.

6.

*"Failure is the stepping stone to success"*

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