



DEFENCE FORCE **RECRUITING**

**Alternative Education
Equivalency Scheme (AEES)**

**YEAR 10
ADVANCED
MATHEMATICS**

**Practice Test
Version 01**

Practice Test Instructions

1. There are 30 questions in this Practice test (and 30 questions in the final test).
2. There are five alternative answers marked A, B, C, D and E for every question.
3. Every question has only **ONE** correct answer.
4. Enter your answer selection on the answer sheet provided next to the question number.

Example:

Question 1. $4 + 3 =$

- A. 8
- B. 6
- C. 9
- D. 7
- E. 5

The correct answer is 7 which is printed next to **D**.

Enter 'D' on the Answer Sheet next to 'Question 1' as follows:

Question 1.	D
Question 2.	

5. Make sure you mark your answer against the corresponding question on the answer sheet provided, especially if you skip between questions.
6. Give yourself **30 minutes** to complete the Practice Test (as there are 30 minutes in the final test). We suggest setting up a test environment and timing yourself so it's similar to the final test.
7. Do not waste time if you do not know the answer. Move on to the next question and if you have time at the end of the test, go back to the questions you skipped.
8. Work as quickly and accurately as you can.
9. We strongly recommend using a silent, battery-operated, non-programmable scientific calculator. To obtain an accurate result, **no other resource or device should be used** for this Practice test.
10. Formulae are provided at the start of the Practice test (and in the final test booklet).
11. Diagrams are not necessarily drawn to scale.
12. After you finish the test, use the Answer Key provided to check your answers.
13. The score you achieve on the Practice test is an **indication** only of how you may perform on the final test.
14. The Practice test score cannot be used in place of sitting the final test.
15. The topics listed on the Answer Key can give you an indication of the areas you can improve.

FORMULAE SHEET

The following formulae may be used in your calculations:

Measurement

- Area of rectangle = $length \times width$
- Area of triangle = $\frac{1}{2} base \times height = \frac{1}{2} absinC$ (where C is the included angle)
- Area of a circle = $\pi \times radius^2$
- Circumference of a circle = $2\pi \times radius$
- Volume of a sphere = $\frac{4}{3} \pi \times radius^3$
- Surface area of a sphere = $4\pi \times radius^2$
- Volume of any regular prism = $area \text{ of base} \times height$
- Volume of any right pyramid = $\frac{1}{3} area \text{ of base} \times height$
- Volume of cylinder = $\pi r^2 \times h$ where r = radius, h = height
- Total surface area of cylinder = $2\pi r^2 + 2\pi rh$ where r = radius, h = height
- Volume of a cone = $\frac{1}{3} \pi r^2 h$

Units

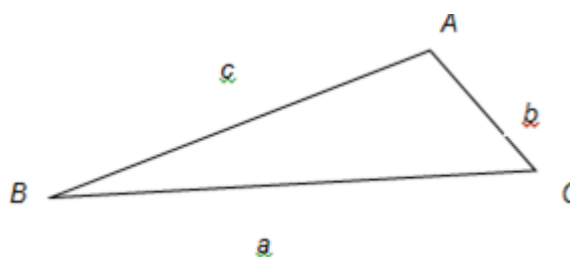
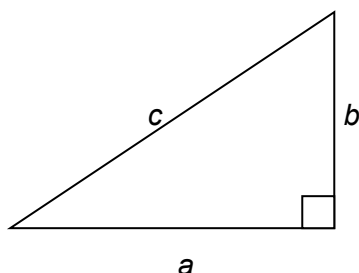
- 100 cm = 1 metre
- 1000 m = 1 kilometre
- 1000 cm³ = 1000 ml = 1 Litre

Temperature conversion formula

Degrees Celsius to degrees Fahrenheit: $^{\circ}F = (^{\circ}C \times 1.8) + 32$

Theorem of Pythagoras

- In any right-angled triangle: $c^2 = a^2 + b^2$



- In any triangle: $c^2 = a^2 + b^2 - 2absinC$

Equation of a Circle Centre

- Equation of a circle centre (0,0)

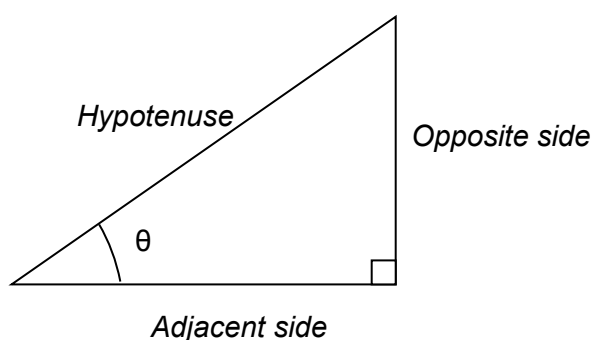
$$x^2 + y^2 = \text{radius}^2$$

Average daily rainfall (in a given month)

$$\bar{x} = \frac{\text{total rainfall for the month}}{\text{number of days in that month}}$$

Trigonometry

In any right-angled triangle:



$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

Sine Rule:

where a , b , and c are the lengths of the sides opposite angles at A, B and C, respectively

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Pi

$$\text{pi} = 3.14$$

Simple Interest formula

- $I = PRT$

Where:

P = principal

R = interest rate per year

T = number of years

Growth and decay formulae

- Simple growth or decay: $A = P(1 \pm ni)$
- Compound growth or decay: $A = P(1 \pm i)^n$

Where:

A = amount at the end of n years

P = principal

n = number of years

i = interest rate per year, $r\% = \frac{r}{100}$

Linear Relationships

- Distance between 2 points $d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$
- Coordinates of midpoint $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
- Gradient of a line = $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

Factor Theorem

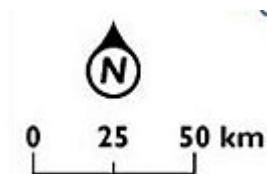
- The factor theorem states that a polynomial $f(x)$ has a factor $(x - k)$ if and only if $f(k) = 0$.

Remainder Theorem

- The remainder when $P(x)$ is divided by $(x - a)$ is equal to $P(a)$.

-
- Question 1.** A campsite is located on a bearing of $N20^{\circ}E$ from a bridge. What would be the bearing of the bridge from the campsite?
- A. $S70^{\circ}W$
 - B. $N70^{\circ}W$
 - C. $S20^{\circ}E$
 - D. $S20^{\circ}W$
 - E. $N70^{\circ}E$
- Question 2.** Find 60% of 200
- A. 1,200
 - B. 600
 - C. 120
 - D. 12
 - E. 60
- Question 3.** Evaluate $4.02 \times 6.2 + (1.05)^2 + 10$
- A. 126.03
 - B. 36.03
 - C. 35.97
 - D. 66.03
 - E. 75.97
- Question 4.** A man weighing 150 kg wants to lose 30 kg. What % of his body weight would he lose?
- A. 15%
 - B. 30%
 - C. 25%
 - D. 20%
 - E. 21%

Question 5. The legend from a map shows the scale to be 2.5cm : 50km. If a length on the map is 10cm, what distance does this represent?



- A. 25 km
- B. 100 km
- C. 250 km
- D. 125 km
- E. 200 km

Question 6. A light plane was flying at an altitude of 200 metres. If it started losing height at a rate of 1.5 metres/sec, what height would it be at after one minute?

- A. 180 m
- B. 110 m
- C. 190 m
- D. 120 m
- E. 90 m

Question 7. Find the total amount paid for:

- 2 ½ kg of tomatoes @ \$5.99 / kg
- 250 gram of ham @ \$13.99 / kg
- 12 bottles of water at \$1.90 each

- A. \$40.60
- B. \$38.30
- C. \$21.90
- D. \$51.70
- E. \$41.25

Question 8. A square area of lawn measures 8 metres x 8 metres. Approximately how many metres would a lawn mower travel if it mows a series of parallel strips ½ metre wide? (Ignore turns)

- A. 128
- B. 64
- C. 32
- D. 96
- E. 16

Question 9. A pesticide is to be mixed in the proportion of 10 ml for every 200 ml of water. How much should be added to 8 litres of water?

- A. 800 ml
- B. 400 ml
- C. 200 ml
- D. 160 ml
- E. 1,000 ml

Question 10. Fred owes \$5,000 on his credit card. The credit card company charges him interest of 20% per annum. Interest is calculated and added to the amount owing every month. Fred does not make any further purchases with it, but he forgets to make payments. How much will he owe on his credit card after 2 months?

- A. \$5,168.05
- B. \$5,618.00
- C. \$7,000.00
- D. \$5,060.18
- E. \$5,083.33

Question 11. Josh can read at 290 words per minute. How many minutes would it take him to read 20 pages averaging 900 words per page?

- A. 55
- B. 64
- C. 58
- D. 62
- E. 63

Question 12. The volume of a backpack would be closest to:

- A. 0.4 L
- B. 4 L
- C. 40 L
- D. 400 L
- E. 4,000 L



Question 13. A hiker walks 20 km due East then turns 270° anticlockwise and walks another 20 km. What would be his bearing from his starting point?

- A. $S45^\circ W$
- B. Due South
- C. $N45^\circ E$
- D. $N45^\circ W$
- E. $S45^\circ E$

Question 14. The painting of the Mona Lisa measures 77 cm x 53 cm. What area is this in square metres?

- A. 0.4
- B. 4.0
- C. 4000
- D. 400
- E. 40

Question 15. A book is 10 cm x 18 cm long and 2 cm thick. It has a protective paper 'jacket' over the entire cover which folds 5 cm under the front and back covers. How much paper is needed for the 'jacket'?

- A. 296 cm²
- B. 576 cm²
- C. 540 cm²
- D. 486 cm²
- E. 396 cm²



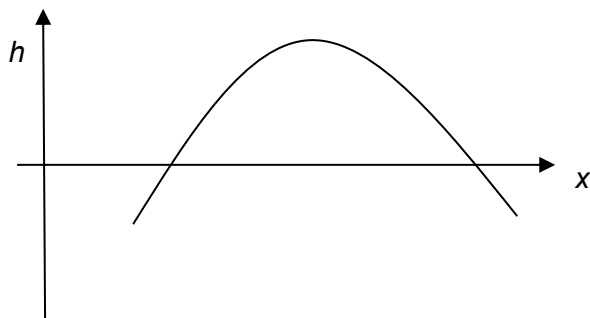
Question 16. The 'Great Pyramid of Giza' has a square base of side length 230.4 m and a height of 138.8 m. What is its approximate volume?

- A. 10 thousand cubic metres
- B. 300 thousand cubic metres
- C. ½ million cubic metres
- D. 1 ½ million cubic metres
- E. 2 ½ million cubic metres

Question 17. Simplify $\log_2 8 + \log_2 2$

- A. $\log_2 10$
- B. $\log_2 4$
- C. 4
- D. 5
- E. 6

Question 18 The graph represents the path of a ball kicked into the air with equation given by:
 $h = -(x - 1)(x - 5)$ where h = height and x = horizontal distance from a fixed point.



What would be the ball's maximum height above the fixed point?

- A. 5
- B. 4
- C. 6
- D. 3
- E. $2\frac{1}{2}$

Question 19. $\frac{y-2}{4} + \frac{3y-1}{2}$ simplified is:

- A. $\frac{4y-3}{2}$
- B. $\frac{5y-3}{2}$
- C. $\frac{5y-3}{4}$
- D. $\frac{7y-4}{2}$
- E. $\frac{7y-4}{4}$

Question 20. What is the temperature range between Moscow's average lowest temperature of -14°C and its average maximum temperature of 21°C ?

- A. 7°C
- B. 28°C
- C. 35°C
- D. 14°C
- E. 25°C

Question 21. Given $f(1) = 0$ for $f(x) = x^3 + 2x^2 - x - 2$, then the quadratic factor of $f(x)$ is

- A. $x^2 + 3x + 2$
- B. $x^2 - 3x - 2$
- C. $2x^2 - x - 2$
- D. $x^2 - 3x - 2$
- E. $2x^2 - x + 2$

Question 22. A 4 m x 3 m brick wall has a 0.5 m x 0.5 m window. What is the probability that a randomly thrown ball that hits the wall, does **not** hit the window?

- A. 0.96
- B. 0.02
- C. 0.95
- D. 0.92
- E. 0.98

Question 23. Simplify $\sqrt{(6^2 + 2^2)}$

- A. 16
- B. 4
- C. 2
- D. $2\sqrt{10}$
- E. $4\sqrt{10}$

Question 24. Four boys and three girls enter a competition which relies only on 'chance'. What is the probability that a girl wins first prize?

- A. $\frac{3}{4}$
- B. $\frac{4}{7}$
- C. $\frac{3}{7}$
- D. $\frac{1}{3}$
- E. $\frac{1}{7}$

Question 25. Factorise $3y(x + 4) - (x + 4)$

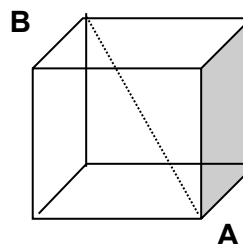
- A. $3y$
- B. $3y(x + 4)$
- C. $3y(x + 3)$
- D. $(3y - 1)(x + 4)$
- E. $3y - 1$

Question 26. A cost (C) of a mobile phone contract is a monthly fee of \$20 plus five cents times the number of minutes used (m) i.e. $C = 20 + 0.05m$. Which of the following would satisfy this equation?

- A. 3 hours 10 minutes for a cost of \$29.50
- B. 1 hour 50 minutes for a cost of \$25.00
- C. No calls for a cost of \$15
- D. 2 hours for a cost of \$26.50
- E. 2 hours 5 minutes for a cost of \$23.50

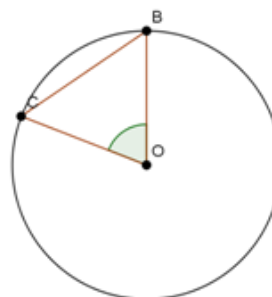
Question 27. A cube has side lengths of 1 unit. What is the length of a 'body diagonal'? (e.g. AB)

- A. $\sqrt{2}$
- B. $\sqrt{5}$
- C. 3
- D. 2
- E. $\sqrt{3}$



Question 28. Given 'O' is the centre of the circle and the shaded angle at O has magnitude 70° , what is the magnitude of angle B (i.e. $\angle CBO$)?

- A. 35°
- B. 40°
- C. 50°
- D. 55°
- E. 60°

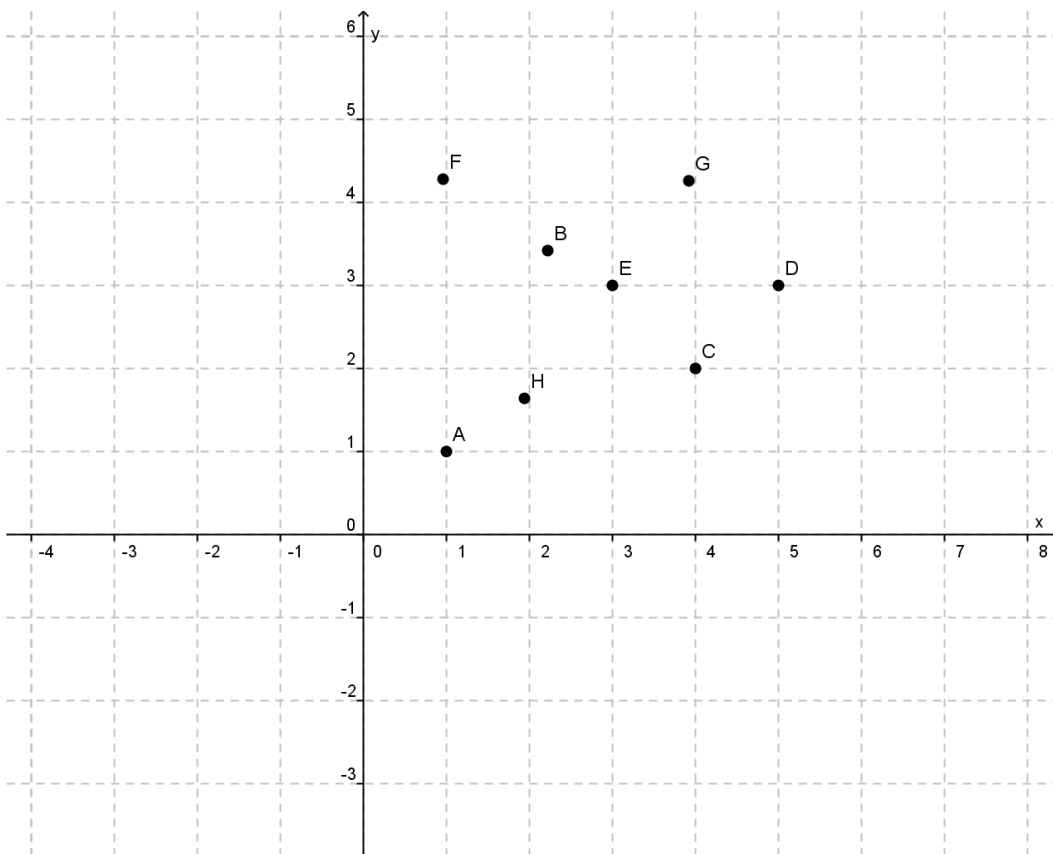


Question 29. A triangular 'Give Way' sign is an equilateral triangle of side length 50 cm. Its area is:

- A. 1558.8 cm^2
- B. 1082.5 cm^2
- C. 2500 cm^2
- D. 2165.1 cm^2
- E. 1250 cm^2

Question 30. A student recorded data onto the graph below. He decided to draw a 'visual line of best fit' through the points A and E. Using this line, what would be the value of y when $x = 6$?

- A. 6
- B. 5
- C. 4
- D. 6.5
- E. 5.5



END OF TEST

Year 10 Advanced Mathematics Practice Test Question Information and Answers

Question #	Answer	Topic Area
Q 1.	A	working with numbers (location & direction)
Q 2.	C	working with numbers (fractions, decimals, percentages)
Q 3.	B	working with numbers (computations)
Q 4.	D	working with numbers (fractions, decimals, percentages)
Q 5.	E	ratio & proportion
Q 6.	B	working with numbers (rates)
Q 7.	E	money & financial maths (money transactions)
Q 8.	A	working with numbers (computations)
Q 9.	B	ratio & proportion
Q 10.	A	money & financial maths (interest rates)
Q 11.	D	working with numbers (rates)
Q 12.	C	calculate & estimate measurements
Q 13.	E	working with numbers (location & direction)
Q 14.	A	calculate & estimate measurements
Q 15.	B	using units of measurement (area)
Q 16.	E	using units of measurement (volume)
Q 17.	C	real numbers (logarithms laws)
Q 18.	B	linear and non-linear relationships (polynomials)
Q 19.	E	patterns and algebra
Q 20.	C	using units of measurement (measure)
Q 21.	A	patterns and algebra
Q 22.	E	chance

Question #	Answer	Topic Area
Q 23.	D	real numbers (irrational numbers)
Q 24.	C	chance
Q 25.	D	patterns and algebra
Q 26.	A	linear and non-linear relationships (linear equations)
Q 27.	E	Pythagoras and trigonometry
Q 28.	D	geometric reasoning
Q 29.	B	Pythagoras and trigonometry
Q 30.	A	data representation and interpretation



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