

Advanced Practice Test

All Topics

Year 10 Mathematics

Topics Included:

- Algebra
- Coordinate Geometry
- Trigonometry
- Curve Sketching
- Inequalities
- Series and Sequences

Name:



VERTEX
MATHEMATICS

Section I

10 marks

Attempt Questions 1–10

Allow about 15 minutes

- 1 Evaluate $|-5 - (-9) + 2|$.
(A) 4 (B) 6 (C) 10 (D) 12
- 2 Simplify $\log(45) - \log(9)$.
(A) $\log 5$ (B) $\log 36$ (C) $\log 9$ (D) $\log 15$
- 3 The number line shows a filled circle at 3 and an open circle at 7, with shading between. Which inequality is represented?
(A) $x \geq 3, x < 7$ (B) $x \leq 3$ (C) $x > 7$ (D) $3 \leq x < 7$
- 4 Find the midpoint of $(7, -1)$ and $(1, 5)$.
(A) $(4, 2)$ (B) $(8, 4)$ (C) $(3, 3)$ (D) $(4, -3)$
- 5 A principal of \$2500 is invested at 3.2% p.a. simple interest for 3 years. What is the interest earned?
(A) \$240 (B) \$160 (C) \$750 (D) \$100
- 6 Find the point of intersection of $y = -x + 6$ and $2x - y = 4$.
(A) $(1, 5)$ (B) $(2, 4)$ (C) $(3, 3)$ (D) $(4, 2)$
- 7 Which formula defines the sequence 5, 15, 45, ...?
(A) $5n$ (B) $5(3)^{n-1}$ (C) $15(3)^n$ (D) $5 \cdot 3n$
- 8 Solve $x^2 < 25$.
(A) $|x| > 5$ (B) $-5 < x < 5$ (C) $x \leq -5$ (D) $x \geq 5$
- 9 If $\cos \theta = \frac{7}{25}$ and θ is acute, find $\sin \theta$.
(A) $\frac{24}{25}$ (B) $\frac{7}{25}$ (C) $\frac{25}{7}$ (D) $\frac{24}{7}$

10 Which line passes through the point of intersection of $y = 2x + 3$ and $y = 9 - x$?

- (A) $3x - y = -3$ (B) $y = x + 1$ (C) $2x + y = 7$ (D) $x - 2y = 4$

Section II

40 marks

Attempt Questions 11–20

Allow about 75 minutes

Question 11 (6 marks)

- (a) Find the distance between $(3, -4)$ and $(9, 2)$. 2
- (b) Find the perpendicular distance from $(2, 7)$ to $3x + 4y = 24$. 2
- (c) Show that $(2, 1), (4, 5), (6, 9)$ are collinear. 2

Question 12 (6 marks)

The sequence $7, 13, 19, \dots$

- (a) Show the sequence is arithmetic. 2
- (b) Find T_n . 2
- (c) Find T_{25} . 2

Question 13 (6 marks)

- (a) Complete the square for $3x^2 - 18x + 27$. 2
- (b) Hence solve $3x^2 - 18x + 27 = 0$. 2
- (c) Solve $4x^2 - 4x - 5 = 0$ using the quadratic formula. 2

Question 14 (4 marks)

Let $f(x) = \frac{3}{x-2}$.

- (a) State the asymptotes. 2
- (b) Find the domain and range. 2
- (c) Hence, sketch $y = f(x)$. 2

Question 15 (4 marks)

Show that $g(x) = \frac{x^3 + x}{x^5 + x^3 + 1}$ is an odd function. 4

Question 16 (4 marks)

When $P(x) = 5x^3 - 2x + 7$ is divided by $x^2 + kx - 3$, the remainder is 35. Find k . 4

Question 17 (4 marks)

Given $\tan \theta = \frac{12}{5}$, where θ is acute:

(a) Find $\sin \theta$.

2

(b) Find $\cos \theta$.

2**Question 18 (4 marks)**

Equal monthly deposits are made at the beginning of each month into an account earning 4.5% p.a. compounded monthly. Find the monthly deposit required to accumulate \$200,000 in 5 years.

4**Question 19 (4 marks)**

Solve $\cos x = -0.4$ for $0^\circ \leq x \leq 360^\circ$, correct to the nearest minute.

4**Question 20 (4 marks)**

Solve $\frac{4n^2}{n^2 + 4} < 4$.

4

END OF EXAM

Nice work completing the test :)

Get your test marked for free!

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