

EASE 1 PREPARATION (GRADE 12) 2024/2025

1. Solve the equation $\log x = 1.94$ in 3 significant figures.

- A) $x = 87.0$
- B) $x = 87.1$
- C) $x = 87.2$
- D) $x = 87.3$

2. Solve the equation $10^x = 1573$ in 3 significant figures.

- A) $x = 3.20$
- B) $x = 3.19$
- C) $x = 3.21$
- D) $x = 3.18$

3. Solve the equation $\cot x = 3$, $-\pi \leq x \leq \pi$

Giving your answer to three significant figures

- A) $x = -2.82, 0.322$
- B) $x = -0.322, 2.82$
- C) $x = -2.83, 0.321$
- D) $x = -0.321, 2.83$

4. What is gradient of curve $y = 2(e^{2x} + 1)^3$ at point $(0, 16)$?

- A) $m = 38$
- B) $m = 40$
- C) $m = 48$
- D) $m = 50$

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5. What is derivative of $f(x) = \frac{e^{2x+1}}{e^x}$?

A) $f'(x) = e^x + e^{-x}$

B) $f'(x) = e^x - e^{-x}$

C) $f'(x) = e^x - e^x$

D) $f'(x) = e^{2x}$

6. Let's $y = 5e^{2x}$ is given, then $\frac{dy}{dx} = \dots$

A) $\frac{dy}{dx} = 10e^{3x}$

B) $\frac{dy}{dx} = \frac{5}{2}e^{2x}$

C) $\frac{dy}{dx} = 10e^x$

D) $\frac{dy}{dx} = 10e^{2x}$

7. What is solution of $(\log_2 x)^2 + 3 \log_2 x = 10$

A) $x = 32$ or $x = 4$

B) $x = \frac{1}{32}$ or $x = 4$

C) $x = -\frac{1}{32}$ or $x = 4$

D) $x = \frac{1}{32}$ or $x = \frac{1}{4}$

8. Solve $\log_3(x) + \log_3(4x) = 6$

A) $x = \frac{27}{4}$

B) $x = 9$

C) $x = \frac{27}{2}$

D) $x = -\frac{27}{2}$

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9. What is solution of the equation below?

$$\log_2(4x) = 5$$

A) $x = 8$

B) $x = 6$

C) $x = 4$

D) $x = 2$

10. Solve the inequality $4^x \times 4^{3-2x} \leq 1024$.

A) $x \leq -2$

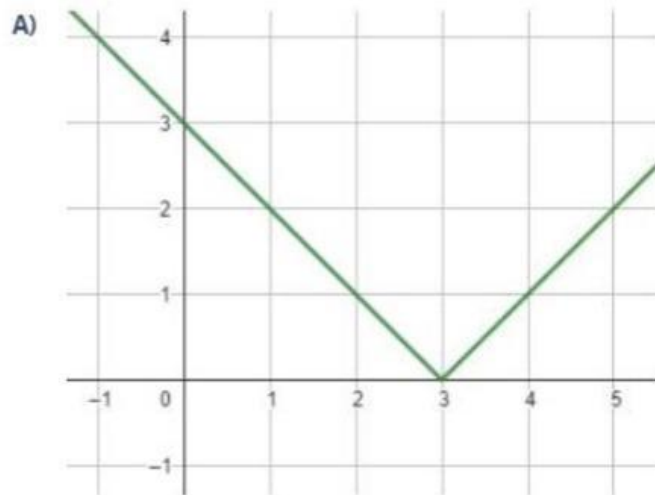
B) $x \geq -2$

C) $x \leq 2$

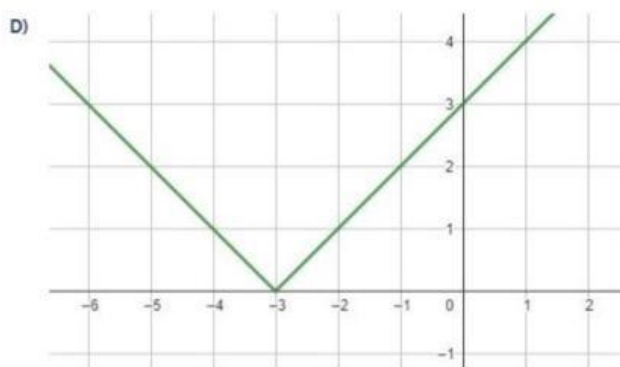
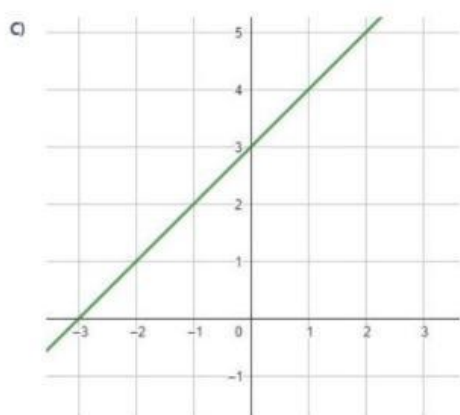
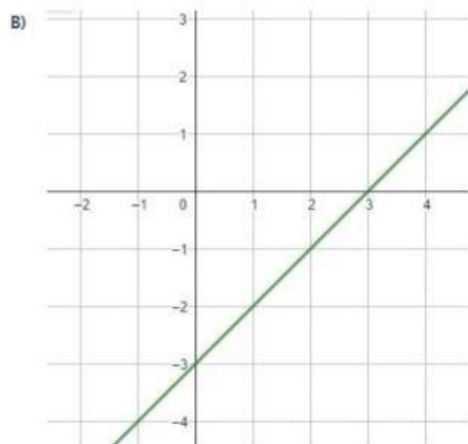
D) $x \geq 2$

11. Which one of these sketches represents this graph?

$$y = |x - 3|$$



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12. The variables x and y satisfy the equation $y = a(e^{-bx})$, where a and b are constants. The graph of $\ln y$ against x^2 is a straight line passing through the points $(0.55, 0.84)$ and $(1.72, 0.26)$.

Find the value of a correct to 2 decimal places.

- A) 3.04
- B) 3.50
- C) 0.34
- D) 0.50

13. Represent $6 \sin \theta - 4 \cos \theta$ in the form $R \sin(\theta - \alpha)$. All numbers must be written in 3 significant figures.

- A) $7.22 \sin(\theta - 33.6^\circ)$
- B) $7.21 \sin(\theta - 33.6^\circ)$
- C) $7.22 \sin(\theta - 33.7^\circ)$
- D) $7.21 \sin(\theta - 33.7^\circ)$

14. Find the equation of the tangent to the curve with equation $4x^3 - 3xy - y^2 = 25$ at the point $(2, -3)$.

- A) $x = 2$
- B) $y = 2$
- C) $x = 0$
- D) $y = 0$

15. Find the gradient of the curve $y = \frac{(x-2)^3}{\sqrt{x^2-4}}$ at the point where $x = -3$.

- A) 0
- B) $\frac{1}{2}$
- C) $\frac{2}{3}$
- D) $-\frac{1}{2}$

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16. Given that $\log_4 p = x$ and $\log_4 q = y$, express $\log_4 \sqrt[3]{p} + 5 \log_4 \sqrt{q}$ in terms of x and y .

A) $\frac{x}{3} + \frac{5y}{2}$

B) $\frac{y}{3} + \frac{5x}{2}$

C) $\frac{5xy}{6}$

D) $\frac{x}{2} + \frac{5y}{3}$

17. Find the derivative of $y = \frac{(x-2)^3}{\sqrt{x^2-4}}$.

A) $\frac{dy}{dx} = \frac{2(x-3)(x-2)^2}{(x+2)\sqrt{x^2-4}}$

B) $\frac{dy}{dx} = \frac{2(x-3)(x-2)^2}{(x-2)\sqrt{x^2-4}}$

C) $\frac{dy}{dx} = \frac{2(x+3)(x-2)^2}{(x+2)\sqrt{x^2-4}}$

D) $\frac{dy}{dx} = \frac{2(x-3)(x-2)}{\sqrt{x^2-4}}$

18. Find the gradient of the curve $2x^3 - y^3 = -6$ at point $(1, 2)$.

A) 0

B) $\frac{2}{3}$

C) 2

D) $\frac{1}{2}$

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19. Given that

$$|x - 4| = 2x + 1$$

What is/are the value(s) of x ?

- A) $x = -5$ or $x = 1$
- B) only $x = 1$
- C) only $x = -5$
- D) $x = -1$ or $x = 3$

20. Solve

$$|3x - 2| \geq |1 - 3x|$$

- A) $x \leq \frac{1}{2}$
- B) $-\frac{1}{2} \leq x$
- C) $x \leq -\frac{1}{2}$
- D) $x \geq \frac{1}{2}$

21. Represent $5 \cos \theta + 8 \sin \theta$ in the form $R \cos(\theta \pm \alpha)$. All numbers must be written in 3 significant figures.

- A) $9.43 \cos(\theta + 58.0^\circ)$
- B) $9.43 \cos(\theta - 58.0^\circ)$
- C) $9.43 \cos(\theta + 32.0^\circ)$
- D) $9.43 \cos(\theta - 32.0^\circ)$

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22. A radioactive isotope decays so that after t days and amount 0.82^t units remains. How many days does it take for the amount to fall to less than 0.15 units?

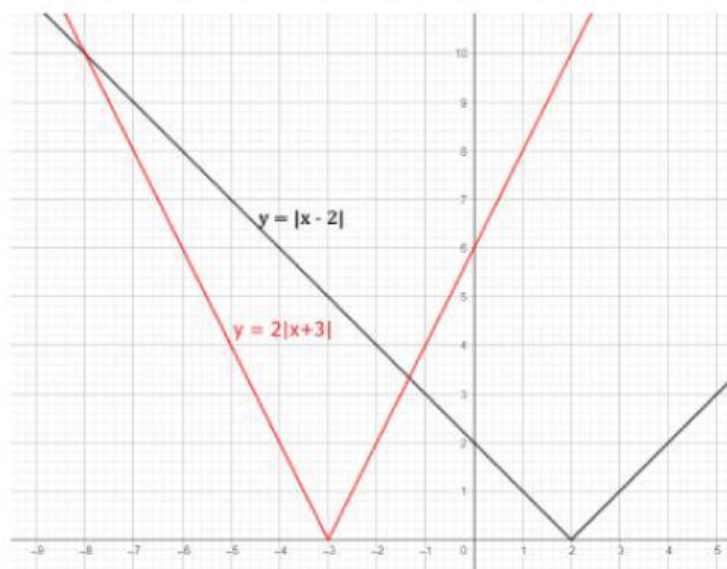
A) Approximately 10 days.
B) Approximately 9 days.
C) Approximately 8 days.
D) Approximately 7 days.

23. Solve the equation $\operatorname{cosec}(x - 30^\circ) = 2$ for $0^\circ \leq x \leq 360^\circ$

Giving your answer to three significant figures

A) 60°
B) 180°
C) $60^\circ, 120^\circ$
D) $60^\circ, 180^\circ$

24. The graphs of $y = |x - 2|$ and $y = 2|x + 3|$ are shown on the grid.



Write down the solution to the inequality $|x - 2| < 2|x + 3|$

A) $x < -\frac{4}{3}$ or $x > 8$

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B) $x < -8$ or $x > -\frac{4}{3}$

C) $-\frac{4}{3} < x < 8$

D) $-8 < x < \frac{4}{3}$

25. Given that $\log_2 p = x$, express $\log_2 \frac{p}{\sqrt[3]{p}}$ in terms of x .

A) $\frac{x}{3}$

B) $\frac{2x}{3}$

C) $-2x$

D) $2x$

26. Given that

$$e^{2x} + 2e^x - 15 = 0$$

What is the solution of the above equation?

A) $\ln 3$

B) $\ln 2$

C) $\ln 5$

D) $\ln 4$

27. Given that a and b are constants, use logarithms to change this non-linear equation into the form $Y = mX + c$.

$$y = a(x^{-c})$$

What is the value of m ?

A) $\log a$

B) $\log c$

C) $c \log x$

D) $-c$

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28. Given that

$$|x + 3| + |x + 5| = 10$$

What is/are the value(s) of x ?

- A) $x = 0$ or $x = 2$
- B) $x = -9$ or $x = 1$
- C) $x = -12$ or $x = 8$
- D) $x = 3$ or $x = 5$

29. Solve the inequality $0.2^x > 25$.

- A) $x < -2$
- B) $x > -2$
- C) $x > -0.5$
- D) $x < -0.5$

30. The variable x and y satisfy the equation $2^{3y} = w^{x+1}$. By taking natural logarithms, what is the exact value of w so the line will be parallel to $y = x$.

- A) $\ln 2$
- B) $\ln 8$
- C) 2
- D) 8

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31. Given that

$$|3x + 4| = |x + 5|$$

What is/are the value(s) of x ?

A) $x = -2$ or $x = 4$

B) $x = -\frac{9}{4}$ or $x = \frac{1}{2}$

C) $x = \frac{3}{2}$ or $x = \frac{12}{7}$

D) $x = -\frac{13}{8}$ or $x = \frac{5}{2}$

32. Find the gradient of the curve $\cos x + \sin y = 0$ at point $(0, \pi)$.

A) 0

B) 1

C) $\frac{1}{2}$

D) -1

33. Given that

$$2 \ln(y + 1) - \ln y = \ln(x + y)$$

What is the solution of the above equation?

A) $y = \frac{1}{x-2}$

B) $y = \frac{x}{x-1}$

C) $y = \frac{x+3}{x}$

D) $y = x + 5$

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34. Solve the equation $\log x = 2.25$ in exact form.

A) $x = 10\sqrt[4]{10}$

B) $x = 10\sqrt{10}$

C) $x = 100\sqrt[4]{10}$

D) $x = 100\sqrt{10}$

35. What is the range of function $f(x)$?

$$f(x) = |5 - 2x| + 3 \text{ for } 2 \leq x \leq 8$$

A) 3-12

B) 4-12

C) 3-14

D) 4-14

36. Solve

$$|2x + 3| \leq 4$$

A) $-\frac{7}{2} \leq x \leq \frac{1}{2}$

B) $-\frac{1}{2} \leq x \leq \frac{7}{2}$

C) $x \geq -\frac{7}{2}$ or $x \leq \frac{1}{2}$

D) $x \geq -\frac{1}{2}$ or

37. Simplify $\log_x x^5$.

A) 5

B) $\frac{1}{5}$

C) x^5

D) $5x$

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38. Use the product rule to differentiate $x\sqrt{x+3}$.

- A) $\frac{3x+6}{\sqrt{x+3}}$
- B) $\frac{2x+3}{2\sqrt{x+3}}$
- C) $\frac{3x+6}{2\sqrt{x+3}}$
- D) $\frac{2x+3}{\sqrt{x+3}}$

39. Solve $\log_3(x+5) = 2$.

- A) 1
- B) 2
- C) 3
- D) 4

40. Simplify $\log_x(x\sqrt{x})$.

- A) x
- B) $\sqrt{x}$
- C) $\frac{2}{3}$
- D) $\frac{3}{2}$

41. Find the gradient of the tangent to the curve $y = (x+2)^2(x-1)^4$ where the curve meets the y-axis.

- A) -16
- B) 16
- C) -12
- D) 12

42. Describe fully the combination of transformation that maps the graph of $y = |x|$ onto $y = |x-2| + 3$