Maths Year 10 — Practice Exam 2 — Answers & Explanations

Answers to the 30 questions in the free preview.

Numeracy — non-calculator

1. Answer: 2
With 11 values the median is the sixth when they are ordered. Counting along the dot plot, the sixth value is 2.

2. Answer: 4
The ball is in the air until the curve returns to height zero, which the graph shows at t = 4 seconds.

3. Answer: 27
The area of a right-angled triangle is half the base times the height: $0.5 \times 9 \times 6 = 27$ cm².

4. Answer: 12
The interquartile range is Q3 − Q1 = 23 − 11 = 12.

5. C. 6.3
$6^2 = 36$ and $7^2 = 49$, so $\sqrt{40}$ lies between 6 and 7, much nearer 6. Checking, $6.3^2 = 39.69$.

6. C. $17
Substituting d = 7 gives C(7) = 2 × 7 + 3 = 17 dollars. Option B forgets the flagfall.

7. Answer: 9
The mode is the value occurring most often. Age 9 appears four times, more than any other age.

8. A. x = 4, y = 3
Adding the equations eliminates y: 3x = 12, so x = 4 and y = 4 − 1 = 3. Check: 2 × 4 + 3 = 11.

9. B. SAS
Two sides and the included angle is the SAS test. AAA only shows the triangles are similar.

10. B. nine times as large
Area scales with the square of the length factor, so tripling every side multiplies the area by $3^2 = 9$.

11. D. a strong negative association
As x increases, y decreases, and the points lie close to a straight line: a strong negative association.

12. A. −2
Gradient = (change in y) ÷ (change in x) = (−3 − 5) ÷ (3 − (−1)) = −8 ÷ 4 = −2.

13. C. 16π cm²
$SA = 4\pi r^2 = 4 \times \pi \times 4 = 16\pi$ cm². 32π/3 is the volume.

14. D. 1 : 27
The length ratio is 1 : 3, so the volume ratio is $1^3 : 3^3 = 1 : 27$ (8 cm³ and 216 cm³). 1 : 9 is the ratio of their surface areas.

15. Answer: 20
The curve peaks halfway between its two zeros at t = 0 and t = 4, so at t = 2, where the height is 20 × 2 − 5 × 4 = 20 metres.

16. C. $4x^2 - 12x + 9$
$(2x - 3)^2 = (2x)^2 - 2 \times 2x \times 3 + 3^2 = 4x^2 - 12x + 9$. Option B forgets the middle term.

17. Answer: 3/4
The tangent of the angle is the opposite side over the adjacent side, which is 6 ÷ 8 = 3/4.

18. C. one third of the cylinder
The cylinder has volume $\pi r^2 h$ and the cone has volume $(1/3)\pi r^2 h$, so the cone is exactly one third.

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19. A. $5\sqrt{2}$

$\sqrt{18} = 3\sqrt{2}$ and $\sqrt{8} = 2\sqrt{2}$, so the sum is $5\sqrt{2}$. Surds can only be added like this when the number under the root is the same.

20. A. $200

Substituting $x = 20$ gives $P(20) = 2 \times 400 - 30 \times 20 = 800 - 600 = 200$ dollars.

21. A. (3, 5)

Setting $x + 2 = -2x + 11$ gives $3x = 9$, so $x = 3$ and $y = 5$. Reading the graph, the lines cross at (3, 5).

22. C. $w = 2$ or $w = -3$, so the width is 2 m

Factorising gives $(w + 3)(w - 2) = 0$, so $w = -3$ or $w = 2$. A width cannot be negative, so the courtyard is 2 m by 3 m, giving the area of 6 m².

23. D. $y = (x + 1)(x - 3)$

x-intercepts at -1 and 3 give factors $(x + 1)$ and $(x - 3)$. Check the y-intercept: $(0 + 1)(0 - 3) = -3$.

24. C. 8

With eight values the median is the average of the fourth and fifth: $(7 + 9) \div 2 = 8$. Adding one large value moves the median only slightly, from 7 to 8, while the mean rises much more.

25. C. $y = -(x - 1)^2 + 4$

The curve opens downwards, so the coefficient is negative. Its turning point is at (1, 4), which gives $y = -(x - 1)^2 + 4$.

26. A. $2\sqrt{3}$

Multiplying top and bottom by $\sqrt{3}$ gives $6\sqrt{3}/3 = 2\sqrt{3}$.

27. A. 3/10

Only the 40 female students count, and 12 wear glasses: 12/40 = 3/10.

28. D. 4 : 25

Area scales with the square of the length ratio, so the areas are in the ratio $2^2 : 5^2 = 4 : 25$.

29. B. 1/4

The negative index means take the reciprocal, and the fractional index means the cube root squared: 8^(2/3) = $(\sqrt[3]{8})^2 = 2^2 = 4$, so 8^(−2/3) = 1/4.

30. A. 2π cm

60° is 1/6 of a full turn, so the arc is 1/6 of the circumference: $1/6 \times 2\pi \times 6 = 2\pi$ cm.

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PREVIEW

That’s the end of the preview answers

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