SENIOR MATHS – PACE and SCORE KEY ERRORS

Senior Maths 2

Review 1

Q11(b) – Answer should read: $y = \dfrac{x \sin b}{\sin a}$

Review 3

Q7(j) – Answer should read **"2nd and 4th quadrants"**, not **"1st and 3rd…"**. The sketch is correct.

Senior Maths 4

Exercise 1.6

Q2(a) – This is not a sum, just evaluating the nth term in a progression, so should be using:
$t_n = t_1 + (n-1)d$
$= 5 + 19 \times 10 = 195$ [You can test this by using t_2 and t_3 in the formula, which are already given.
Q2(b) – Each increment is the arithmetic difference, so during the 20th second it will increase by 10cm.

Exercise 2.5

Q1(e) – Calculation error: $-3^{12} = -531,441$, not 534,144
Final answer should be -531,440

Final Review

Q9(b) – Should read $2000 \times 1.1^8 = 4287$ (final answer is correct, but working is not)

Test

Q2 – Note that r could be positive or negative 3 (fourth root of 81), therefore 2 answers should be present:
$\dfrac{728}{9}$ or $-\dfrac{728}{18}$ Question should specify only positive r.
Also, working for sum shows 3^5 in brackets; should be 3^6.
Q6 – Should indicate that the interest rate is 6% **per annum**
Q7 – Score key should read: $\qquad S_\infty = \dfrac{t_1}{1-r}$

$$= \dfrac{100}{1-0.8}$$

$$= 500$$

Senior Maths 5

Final Review

Q 23 – a) 25.05   d) 15.4,21.25,25.05,27.15,37.0

Senior Maths 6

Exercise 1.3
Q1(f) - Question should read: $(x^3 + 5)^{\frac{7}{5}}$
As is, with x^2, final answer would be $\sqrt{27} = 5.196$

Exercise 3.2
Q4(c) - Working should read as follows, from after $\therefore$ Equation of the line…
(Note: the variable T should read Y for the first several lines)

$$\Rightarrow \quad \frac{Y-1.0741}{D-2.891} = \frac{1.0741+0.618}{2.891-1.7634}$$

$$\Rightarrow \quad \frac{Y-1.0741}{D-2.891} = \frac{1.6921}{1.1276}$$

$$\Rightarrow \quad Y - 1.0741 \approx 1.5(D - 2.891)$$

$$\Rightarrow \quad Y - 1.0741 \approx 1.5D - 4.338$$

$$\Rightarrow \quad Y \approx 1.5D - 3.264$$

$$\Rightarrow \quad \log_{10} T \approx 1.5 \log_{10} d - 3.264 \log_{10} 10$$

$$\Rightarrow \quad \log_{10} T \approx \log_{10} d^{1.5} - \log_{10} 10^{3.264} \text{ (This is the same now as in the key.)}$$

$$\Rightarrow \quad T = \log_{10} \left(\frac{d^{1.5}}{1836}\right)$$

$$\Rightarrow \quad T = \frac{d^{1.5}}{1836} \quad (\textbf{\textit{Now square both sides}})$$

$$\Rightarrow \quad T^2 = \frac{d^3}{1836^2}$$

$$\Rightarrow \quad 3{,}370{,}896 T^2 = d^3$$

This will affect the working in part (d), but not the final answer.

Q6(c) - Working should not have superscripted d after taking logs; i.e. should read:
$0.5 = 0.9^d \Rightarrow \log_{10} 0.5 = d \log_{10} 0.9$

Senior Maths 7

Exercise 1.2
Q1(b) $4232.50 (possible typo)

Review 3
Q11(b) – Key has typo. Last row, middle column should read $475.20, not $495.20

Exercise 2.6
Q 5 – Should read: 2.5 standard deviations (not 2.7)
∴ On 2nd test Pat's score = 26.2 – (**2.5 x 2.49) = 19.98**
∴ **She should be given 19.98 (or 20) marks**

Review 3
Q5(d) – Question asks for population estimators, so standard deviation should use (n-1) in the formula.

$$\hat{\sigma}^2 = \frac{\Sigma(x-\bar{x})^2}{n-1} = \frac{2}{6} = \frac{1}{3}$$

$\hat{\sigma} = 0.58$

Example
9a p6 Example (i) – Should read: Domain: 3, 4, 5 (even though 3 and **4** are repeated)

Final Review
Q 19(d) – The equation $x^2 + 5x – 6 = 0$ factorises to: $(x + 6)(x – 1) = 0$, so x = -6 or 1

Test – *Important! In this case, the key is correct, but the actual test has an error. If possible, correct the test before giving it.*

Q8 – Question should read: *f(x) = x² + (3 – a)x + (a + 2)*

If the student has answered the question as written in the test, the answers would be:
(a) $a = -\frac{5}{3} = -1\frac{2}{3}$
(b) $f(x) = x^2 - \frac{14}{3}x + \frac{1}{3}$
(i) $f(1) = 1^2 - 4\frac{2}{3} + \frac{1}{3} = -3\frac{1}{3}$
(ii) $f(6) = 6^2 - \frac{14}{3} \times 6 + \frac{1}{3} = 36 - 28 + \frac{1}{3} = 8\frac{1}{3}$
(iii) $f(1 + b) = b^2 - \frac{8b}{3} - \frac{10}{3}$

Please let me know if you disagree with these calculations.

(c) … $b^2 - \frac{8b}{3} - \frac{10}{3} = -\frac{10}{3} + b$

$b^2 - \frac{8b}{3} = b$ => $b^2 - \frac{8b}{3} = \frac{3b}{3}$ => $b^2 - \frac{11b}{3} = 0$

$b(b - \frac{11}{3}) = 0$

∴ $b = 0$ (reject) or $\frac{11}{3}$

Senior Maths 10

This PACE assumes the student can convert answers in degrees to degrees, minutes and seconds. It does not teach this.

Unit Circle
10a p7 – Special Angles & Unit Circle 270° = 3π/4 should be 3π/2 (for Unit Circle, it is correct on the circle diagram but incorrect after "We know"

Exercise 1.2
Q 2(a) – The key changes the question from adding $\frac{\pi}{2}$ to subtracting $\frac{\pi}{2}$. The answer is:

$150° + \frac{\pi}{2} = \frac{5\pi}{6} + \frac{3\pi}{6} = \frac{8\pi}{6} = = \frac{4\pi}{3}$

Exercise 1.3
Q 2(b) – Key calculates Cos⁻¹, not Sin⁻¹. Answer should be Cos⁻¹ (0.42) = 65.2° or 294.8°.

Q 3(c) – Working is correct; Answer is correct as $\frac{5\pi}{6}$, but this is in the 2ⁿᵈ Quadrant, not 1ˢᵗ.

Q 4(e) – Key has $\frac{7\pi}{4}$, not $\frac{5\pi}{4}$ as the question states. Answer should be 3ʳᵈ Quadrant → negative.

Review 1
Q9(h) – Key says 1. Correct answer is -1

Exercise 2.2
Q1 – The radius is 7.5 cm; the key uses the diameter for the radius. The answer should be 112.5cm².

Exercise 2.3
Q2 – The question is in centimetres, but the key has the answer in square metres. It should be in square centimetres.
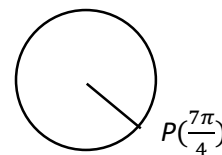
Review 2
Q2 – The question has 200m, but the key solution is based on 20m. 20m is more logical, but if the student works with 200m then the answer should be 191m.

.
Final Review
Q 3(c) – Score key shows $\sqrt{2}$, which should be $\sqrt{3}$. Final answer is correct.

Q 5(c) – Cosecθ is $\frac{1}{\sin\theta}$, so negative means 3rd or 4th quadrant = 196°36'06" or 343°23'54"

Q 8(c) – Should read: $\frac{8\pi + 3\pi - 14\pi}{12} = \frac{-3\pi}{12} = \frac{-\pi}{4} = \frac{7\pi}{4}$.

$P(\frac{7\pi}{4})$

Test
Q12 – Question refers to function y = 2 sin(x), but the table shows function y = sin 2x.
Score Key has table function label y = sin x, but values are given for y = 2 sin(x) as the original question states. Other answers show that y = 2 sin(x) is the function required.

Senior Maths 11

Exercise 2.1
Q 3(b) – Answer (v) is correct, as the explanation verifies.

Test
Q 1(a) – Answer should read x = 2 (i.e. positive)

Senior Maths 12

Exercise 1.3
Q 6(c) – The score key refers to computers – should read "surfboards".
$75x - 30x = 15,000$
$45x = 15,000$
$x = 333.33 \therefore$ annual production has to be 334 to break even.

Senior Maths 13

Exercise 2.3
Q 1 – c = 5
      a = 1
      b = 1 (keys says b = 0)
      d = 0
$\therefore$ y = sin(x) + 5

Senior Maths 15

Exercise 2.4
Q 1(e) – Key has incorrect sign. Should read (2nd line of working):
$= 3(3x + 5)\,(x - 2)^2 + 3(x - 2)^3 = (x - 2)^2\,(9x + 15 + 3x - 6)$
$= (x - 2)^2\,(12x + 9)$

Review 2
Q 4 – Key has mistake in working. Gradient of tangent is correct at m = -2.
$\therefore$ Equation is *y - 9 = -2(x - -2)*
            y – 9 = -2(x + 2)
            y – 9 = -2x – 4
              y = -2x – 4 + 9
              y = -2x + 5
Equation of tangent at *x = -2* is *y = -2x + 5*

Senior Maths 16

Review 2
Q 3(d) – Answer should read $\frac{\pi}{4}x^4 - x^2 + \frac{1}{2}x^{-2} + C$

Review 3
Q 1(b)(ii) – Working is right, but final answer should be 27.25, not 26.25.

Final Review
Q 5 (a) (i) $x_3 = 4.25$ s $f(x_3) = 6.0625;$ Total area = 10.625

Senior Maths 18

Exercise 3.1

Q 3(a) – Second last line of table: final answer should be 0.1296

Final Review
Q 8(c) – Correct answer is 0.9475

Senior Maths 19

Exercise 2.4

Q 2(e) – Working and answer should read:
$$\frac{f'(x)}{f(x)} = \frac{sinx - xcosx}{sin^2 x} \times \frac{sinx}{x} = \frac{sinx - xcosx}{xsinx}$$

Review 2

Q 3(c) – Should read: $y = ln(6 - x^2)$ – key starts with $ln(6 + x^2)$
$$\frac{dy}{dx} = \frac{1}{(6-x^2)} \times (-2)x$$
$$= \frac{-2x}{(6-x^2)}$$

Final Review

Q 1(c) – Answer in key is correct; solution step is correct. However the choice (ii) in the question is not quite correct. It should read: $\frac{6xcos2x - 6sin2x}{x^3}$
(i.e. first term multiplied by x)

Senior Maths 21

Final Review

Q 4(a) –The answer key looks like it's a typo. For Pr(z<0.7), the answer should be 0.7580.

Q 5(b) – For 5b, the z value for Pr(15) is 0.75 (z = (15-12)/4).
Since 12 is the mean, the curve should be shaded between the centreline of the distribution curve and P(15). The value is therefore 0.7734 - 0.5000 = 0.2734.

Test Key

Q 7 – Answer should read: X would almost certainly lie between **140** and 260.