

Mathematics Answer Sheet 1

Sheet 1

1. $x = \sqrt{\frac{b}{a-c^2d}}$.
2. $(p^2 + q) + 2p\sqrt{q}$,
 $(p^2 + 3pq) + (3p^2 + q)\sqrt{q}$.
4. $32 - 240x + 720x^2 - 1080x^3 + 810x^4 - 243x^5$.
5. $A = 44, B = 924, C = 12320$.
7. 1215.
10. $\frac{1}{3}, 1$.
11. $3x^2 - 3x - 2 = 0$.
12. $k \leq -6$ or $k \geq 2$, (a) -155 ,
(b) $x^2 - 14x - 479 = 0$.
13. $x^4 + 3x^3 - 2x + 1$.
14. $(x - 4)(x^2 - 4x + 13), 4$.
15. $(x - 2)(x - 3)(2x + 1)$.
16. $a = -1, b = 4$.
17. $k = 9$.
18. $-\frac{2}{(1+x)^2} + \frac{3}{1+3x}$.
19. $\frac{1}{1-2x} - \frac{2x}{1+x^2}$.
20. $(x^2 + 2\sqrt{3}x + 4)(x^2 - 2\sqrt{3}x + 4)$,
 $\frac{x+2\sqrt{3}}{16\sqrt{3}(x^2+2\sqrt{3}x+4)} - \frac{x-2\sqrt{3}}{16\sqrt{3}(x^2-2\sqrt{3}x+4)}$.
21. $1 - \frac{1}{x^2} - \frac{2}{3(x+1)} - \frac{1-2x}{3(x^2-x+1)}$.

Sheet 2

1. $a = 25, d = -3, (b) S = -3810$.
2. $n = 33, d = \frac{7}{2}, S = 1450$.
3. $\frac{1}{3}n(4n^2 - 1)$.
4. (a) $f^{-1}(x) = \frac{2x+1}{x-3}, x \neq 3$.
(b) $f(f(x)) = \frac{10x+1}{x+5}, x \neq -5, x \neq 2$.
5. (a) $x \geq 0$, (b) 0, 8,
(c) i. 2, 6, ii. 1, $-\frac{4}{3}$.
6. (a) $\mathbb{R}, y \geq -\frac{1}{4}$, (b) $x \leq 1$ or $x \geq 2$,
 $y \geq 0$, (c) $\mathbb{R}, y \geq 0$.
7. (a) $-\frac{2}{3} < x < 2$, (b) $x < \frac{1}{2}$.
8. (a) $-\frac{\pi}{3} + n\pi$, (b) $\pm\frac{\pi}{6} + n\pi$,
(c) $\frac{\pi}{2} + 6n\pi$ and $\frac{5\pi}{2} + 6n\pi$.
9. (a) $\frac{2}{7}n\pi$, (b) $\frac{1}{2}(4n - 1)\pi$ and
 $\frac{1}{10}(4n + 1)\pi$, (c) $\frac{1}{18}(2n + 1)\pi$.
10. 0.524, 2.618, 3.386, 6.034.
11. 26.6, 90, 206.6, 270.
12. $(n \pm \frac{1}{6})\pi$.
13. $\cos 4x = 2 \cos^2 2x - 1$
 $= 8 \sin^4 x - 8 \sin^2 x + 1$,
 $\sin x = \pm \frac{1}{2} \sqrt{2 \pm \sqrt{2(1+a)}}$.
14. 1.231, 3.142, 5.052.
15. $R = 5, \alpha = 0.6435$. (a) i. 1.80, 5.77,
ii. 0.21, 0.64, 2.31, 4.40.
(b) max 1 when $\theta = 3.785$,
min $\frac{1}{11}$ when $\theta = 0.644$.