Marking Scheme
Secondary 3 End-Of-Year Examination
SEC 3EXP 2021 P1
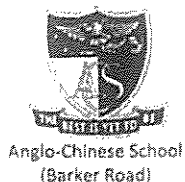
Anglo-Chinese School
(Barker Road)

1	(a)	0.3943			
	(b)	0.394			
2	(a)	$2^2 \times 3^3 \times 11$			
	(b)	The power of the prime bases are not multiples of 3.			
3		New $Y = \dfrac{k}{27x^3}$ $= \dfrac{1}{27}\left(\dfrac{k}{x^3}\right)$ $\dfrac{1}{27} \times 18 = \dfrac{2}{3}$			
4	(a)	3			
	(b)	$y = 0.5^x$			
5		Let x be the original amount of revenue. $100\% - 60\% = 40\%$ $x = 5000 \div \left(\dfrac{40}{100}\right)$ $\dfrac{40}{100}x = 5000$ $= 12500$		Ans: $12500	
6	(a)	$\sin \angle SPQ = \dfrac{8}{12}$ $= \dfrac{2}{3}$			
	(b)	$\cos \angle SQR = -\cos \angle SQP$ $= -\dfrac{8}{12}$ $= -\dfrac{2}{...}$			
7	(a)	$\dfrac{6}{17}$			
	(b)	$\dfrac{n}{2+3(n-1)} = \dfrac{n}{3n-3+2} = \dfrac{n}{3n-1}$			
8		The axis does not start from zero. It may cause people to think that the percentage of respondents who likes Xphone is three times more than the percentage of respondents who likes Starphone.			
9	(a)	$-\dfrac{1}{2} < 3x-4$ $3x-4 \le 8$ $3x-4 > -\dfrac{1}{2}$ $3x \le 12$ $3x > \dfrac{7}{2}$ $x \le 4$ $x > \dfrac{7}{6}$ $\therefore \dfrac{7}{6} < x \le 4$			
	(b)				

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10	(a)	$3.93 \times 10^6 - 3.81 \times 10^6$			
		$= 120000$			
		$= 1.2 \times 10^5$			
	(b)	$\dfrac{1.01 \times 10^6 - 9.54 \times 10^5}{1.01 \times 10^6} \times 100\%$			
		$= 5.5445$			
		$= 5.54\% (3sf)$			
11		$(n-2) \times 180 = 125 + 120 + 140 + 155 + 135(n-4)$			
		$180n - 360 = 540 + 135n - 540$			
		$n = 8$			
12	(a)	1:40000			
	(b)	$1\,cm : 0.4\,km$ Area on map $= \dfrac{1.37}{0.16} \times 1\,cm^2$			
		$1\,cm^2 : 0.16\,km^2$ $= 8.5625\,cm^2$			
13	(a)	Construction (Refer to drawing attached)			
	(b)	1 perpendicular bisector			
		Point of intersection of 3 perpendicular bisectors			
14	(a)	$87.5g \le$ mass $< 88.5g$			
	(b)	$\dfrac{88.5}{99.5}$			
		$= 0.889447$			
		$= 0.889g/cm^3 (3sf)$			
15	(a)	$x - 6x + \left(-\dfrac{6}{2}\right)^2 + 6 - \left(-\dfrac{6}{2}\right)^2$		To find y-intercept, When x=0, $y = (0-3)^2 - 3$ $= 6$	
		$= (x-3)^2 - 3$		To find x-intercepts, When y=0, $(x-3)^2 - 3 = 0$ $(x-3)^2 = 3$ $x-3 = \pm\sqrt{3}$	
	(b)			$x-3 = \sqrt{3}$ or $x-3 = -\sqrt{3}$ $x = \sqrt{3}+3$ $x = -\sqrt{3}+3$ $= 4.7321$ $= 1.2679$ $= 4.73$ $= 1.27$ $(3s.f.)$ $(3s.f.)$	

16	(a)	$10xy - 12x + 15y - 18$			
		$= 2x(5y - 6) + 3(5y - 6)$			
		$= (2x + 3)(5y - 6)$			
	(b)	$xy^3 - x^3y$			
		$= xy(y^2 - x^2)$			
		$= xy(y - x)(y + x)$			
17	(a)	$9q^4 r^{-4}$			
		$= \dfrac{9q^4}{r^4}$			
	(b)	$7^k = 7^{\frac{3}{2}}$			
		$k = \dfrac{3}{2}$			
18	(a)	$\dfrac{80}{360} \times 2\pi(1.6)$			
		$= 2.234$			
		$= 2.23 \text{ m } (3s.f.)$			
	(b)	Let the intersection of AB and PC be X.			
		$\cos 40° = \dfrac{PX}{1.6}$			
		$PX = 1.6\cos 40° = 1.22567$			
		Height of C above the ground			
		$= 0.5 - (1.6 - 1.22567)$			
		$= 0.12567$			
		$= 0.126 \ (3s.f.)$			
		No the ball will not collide with the statue because the height of C above the ground is 0.126m, more than the height of the statue.			

19	$\sqrt{x^2 + y^2} = 5$			
	$y = -\dfrac{4}{3}x$			
	$x^2 + (-\dfrac{4}{3}x)^2 = 25$			
	$x^2 = 9$			
	$x = 3$ or -3 $\rightarrow Q(3,0)$		Since point P is on the positive Y-axis,	
	$\sqrt{3^2 + y^2} = 5 \qquad y^2 = 16$		$\therefore P(0,4)$	
	$9 + y^2 = 25 \qquad y = \pm\sqrt{16} = \pm 4$			
20 (a)	The van was travelling at constant speed of 18 m/s.			
(b)	Let x be the speed of the van at 14.5 s.			
	$\dfrac{x}{18-14.5} = \dfrac{18}{4}$			
	$x = 15.75$			
	$\therefore$ Speed of van = 15.75 m/s.			
(c)	Total distance travelled			
	$= \dfrac{1}{2} \times (18+8) \times 18$			
	$= 234$ m			

Total time taken = 18 s

Avg. speed $= \dfrac{234 \text{ m}}{18 \text{ s}}$

$= 13$ m/s

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13   The diagram below shows a map of Singapore. Joe is staying at point A, Elliot is staying at point B and Thaddeus is staying at point C.

Using suitable methods of construction with a ruler and a pair of compasses,
(a)   locate where Elliot is staying and label it with 'B' given that $\angle BAC = 50°$ and $\angle ACB = 53°$, and   [1]

(b)   find the best place for Joe, Elliot and Thaddeus to meet so that everyone travels an equal distance to the meeting place. Label the best place with 'M'.   [2]

Answer (a), (b)

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