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CONSOLIDATION



Learner Note: In this consolidation session, Financial Maths and Trigonometry will be assessed.

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1

- 1.1 Nicholas decides to invest money into the share market in order to save up R800 000 in ten years time. He believes that he can average a return of 18% per annum compounded monthly. Starting immediately, he starts making monthly payments into a share market account.
- 1.1.1 How much must Nicholas invest per month in order to obtain his R800 000? (5)
- 1.1.2 At the end of the ten-year period, Nicholas decides not to spend the R800 000 but to rather invest it at an interest rate of 18% per annum compounded half-yearly. How much money will he have then saved four years later? (4)
- 1.2 Bonolo borrows money from the bank in order to finance a new home. She takes out a twenty year loan and begins to make monthly payments of R6000 per month starting in one month's time. The current interest rate is 15% per annum compounded monthly. Calculate how much the new home originally cost. (4)

QUESTION 2

- 2.1 If $13\sin\theta - 5 = 0$ where $\theta \in [90^\circ; 360^\circ]$ and $5\cos\beta + 4 = 0$ where $\tan\beta > 0$, calculate without the use of a calculator and with the aid of diagrams the value of the following:
- 2.1.1 $\sin(\theta - \beta)$ (9)
- 2.1.2 $\tan(90^\circ + \theta)$ (5)
- 2.2 Simplify without using a calculator:
- 2.2.1 $\cos(50^\circ + x)\cos(20^\circ + x) + \sin(50^\circ + x)\sin(20^\circ + x)$ (3)
- 2.2.2 $\cos(-140^\circ)\cos 740^\circ - \sin 140^\circ\sin(-20^\circ)$ (6)

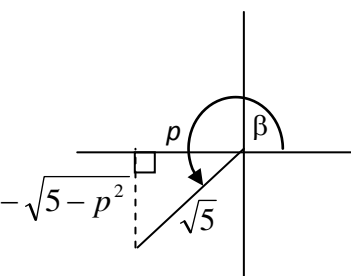
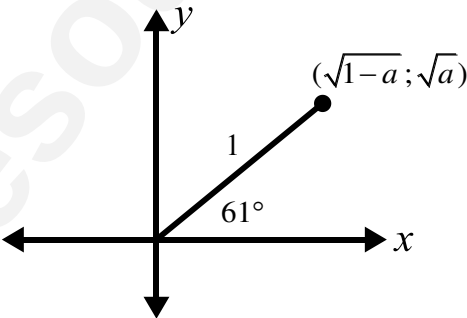
SECTION D: HOMEWORK**Question 1**

- (a) Suppose that you won R3000 000 in the Lotto. You then invested the money in a bank in order to receive monthly payments starting in one month's time. How much will you receive each month if the interest rate is 15% per annum compounded monthly and you wish to receive these payments for a period of ten years? (5)
- (b) Mr Mogodi's motor car which cost R350 000 depreciates at a rate of 10% per annum on the reducing balance method. Calculate how long it will take for the car to depreciate to a value of R200 000 under these conditions. (5)

Question 2

- (a) Determine the value of $\frac{\sin 36^\circ}{\sin 12^\circ} - \frac{\cos 36^\circ}{\cos 12^\circ}$ without using a calculator. (4)
- (b) Prove the following using identities: $\frac{\sin(180^\circ - \theta) - \sin(360^\circ - 2\theta)}{1 + \cos(180^\circ + \theta) + \cos(-2\theta)} = \tan(\theta - 180^\circ)$ (9)

SECTION E: SOLUTIONS TO SESSION 21 HOMEWORK

1(a)	$\cos \beta = \frac{p}{\sqrt{5}}$ $x = p$ $r = \sqrt{5}$ $p^2 + y^2 = (\sqrt{5})^2$ $\therefore y^2 = 5 - p^2$ $\therefore y = -\sqrt{5 - p^2}$ $\therefore \tan \beta = \frac{-\sqrt{5 - p^2}}{p}$ 	✓ diagram ✓ Pythagoras ✓ $y = -\sqrt{5 - p^2}$ ✓ $\tan \beta = \frac{-\sqrt{5 - p^2}}{p}$
1(b)	$\cos 2\beta = 2\cos^2 \beta - 1$ $= 2\left(\frac{p}{\sqrt{5}}\right)^2 - 1$ $= \frac{2p^2}{5} - 1$	✓ $\cos 2\beta = 2\cos^2 \beta - 1$ ✓ $2\left(\frac{p}{\sqrt{5}}\right)^2 - 1$ ✓ $\frac{2p^2}{5} - 1$
2	$\sin 61^\circ = \frac{\sqrt{a}}{1}$ $x^2 + (\sqrt{a})^2 = (1)^2$ $\therefore x^2 = 1 - a$ $\therefore x = \sqrt{1 - a}$  $\cos 73^\circ \cos 15^\circ + \sin 73^\circ \sin 15^\circ$ $= \cos(73^\circ - 15^\circ)$ $= \cos 58^\circ$ $= 2\cos^2 29^\circ - 1$ $= 2\sin^2 61^\circ - 1$ $= 2(\sqrt{a})^2 - 1$ $= 2a - 1$	✓ diagram ✓ $x = \sqrt{1 - a}$ ✓ $\cos 58^\circ$ ✓ $2\cos^2 29^\circ - 1$ ✓ $2\sin^2 61^\circ - 1$ ✓ $2a - 1$