

**KWAZULU NATAL EDUCATION
DEPARTMENT**

**STANMORE SECONDARY
SCHOOL**

GRADE 11

**MATHEMATICS
FIRST CONTROL
TEST 2021**

MARKS: 75

TIME: 90 MINUTES

EXAMINER : K.H.MOODLEY

MODERATOR : I. MANILALL

Question 1

1.1 Solve for x in each of the following:

1.1.1 $2x(x+1) = 6$ (3)

1.1.2 $x^2 - 5x \leq -6$ (3)

1.1.3 $5^x + 5^{x-1} = 30$ (3)

1.1.4 $\sqrt{2-x} = x + 4$ (3)

1.2 Solve for x and y simultaneously if:

$2x = y + 2$ and $2x^2 = 2 - y^2$ (6)

1.3 Prove that the equation $6x^2 + 2px - 3x - p = 0$ has rational roots for all rational values of p . (4)

[22]

Question 2

2.1 Simplify: [downloaded from stanmorephysics.com](http://stanmorephysics.com)

2.1.1 $\frac{3 \cdot 3^x - 4 \cdot 3^{x+2}}{3^x - 3^{x-1}}$ (4)

2.1.2 $\sqrt[3]{343x^{12}} + \sqrt[3]{64x^{12}}$ (3)

2.1.2 $\sqrt{3}(\sqrt{3} + \sqrt{6}) + \sqrt{2}$ (Answer in simplest surd form) (3)

[10]

Question 3

3.1 If $\cos 23^\circ = p$, express, **without the use of a calculator**, the following in terms of p :

3.1.1 $\cos 203^\circ$ (3)

3.1.2 $\sin 293^\circ$ (3)

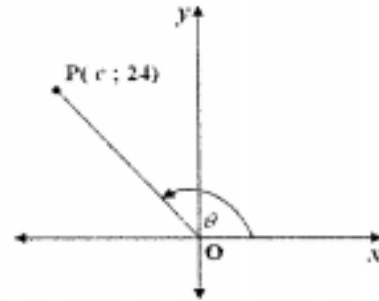
3.2 Simplify the following expression to a single trigonometric term

$$\frac{\sin(360^\circ - x) \cdot \tan(-x)}{\cos(180^\circ + x) \cdot (\sin^2 A + \cos^2 A)} \quad (6)$$

3.3 In the diagram alongside P is the point $(c ; 24)$.

θ is the angle of inclination of OP.

OP = 25 units



3.3.1 Calculate the numerical value of c . (2)

3.3.2 Determine, **without using a calculator**, the value of:

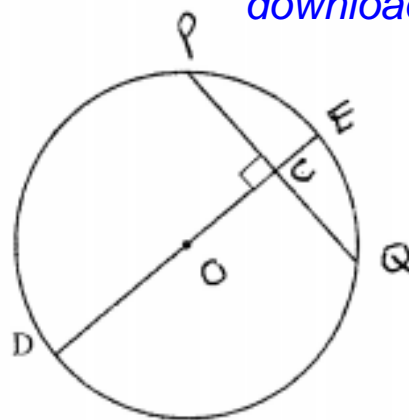
(a) $\sin \theta$ (2)

(b) $\tan (180^\circ + \theta)$ (2)

[18]

Question 4

4.1 In the diagram, O is the centre of the circle. The diameter DE is perpendicular to the chord PQ at C. DE = 20 cm and CE = 2 cm.



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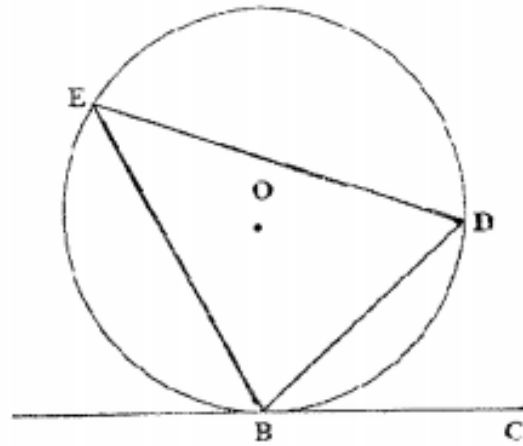
Calculate the length of the following with reasons:

4.1.1 OC (3)

4.1.2 PQ (4)

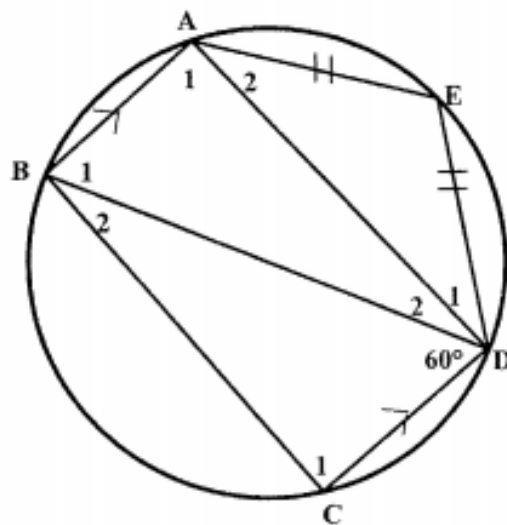
4.2 In the diagram below, O is the centre of circle EBD.

If BC is a tangent to the circle, then: $\widehat{DBC} = \widehat{E}$



(6)

4.3 In the diagram below BD is a diameter of the circle. BA || CD, AE = ED and $\widehat{BDC} = 60^\circ$. Calculate, stating reasons, the size of the following angles:



- 3.3.1 \widehat{C}_1
- 3.3.2 \widehat{B}_1
- 3.3.3 \widehat{E}
- 3.3.4 \widehat{D}_1

- (3)
- (3)
- (3)
- (3)