

Scoil Mhuire V- Hons Maths:17/18

Problem Set 10 – For Tuesday March 20th.

1. (i) Given that k is real, find the set of value of k for which the equation $(1 + 2k)x^2 - 10x + (k - 2) = 0$ has real roots.

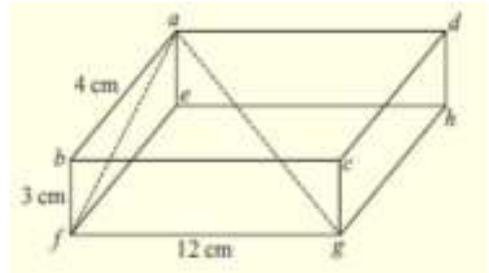
- (ii) Solve the following simultaneous equations for $x, y \geq 0$

$$2 \log y = \log 2 + \log x \quad \text{and} \quad 2^y = 4^x$$

- (iii) Solve the equation $2^{2^{x+1}} - 15(2^x) = 8$

2. The diagram shows a rectangular box. Rectangle $abcd$ is the top of the box and rectangle $efgh$ is the base of the box. $|ab| = 4$ cm, $|bf| = 3$ cm and $|fg| = 12$ cm.

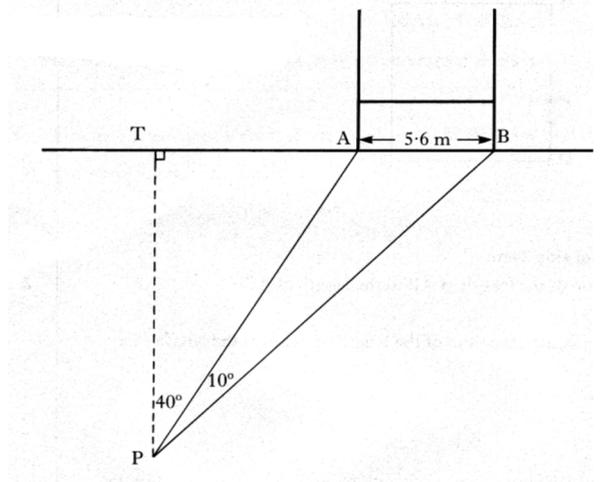
- (i) Find $|af|$.
 (ii) Find $|ag|$.
 (iii) Find the measure of the acute angle between $[ag]$ and $[df]$.



Give your answer correct to the nearest degree.

3. A quadratic function has roots 2 and -3. It also contains the point (1, -12). Evaluate the function.

4. The diagram shows the goalposts on a rugby field. To take a kick at goal, a player moves from T to position P . $[TP]$ is perpendicular to $[TB]$.



$$|\angle TPA| = 40^\circ \quad \text{and} \quad |\angle APB| = 10^\circ$$

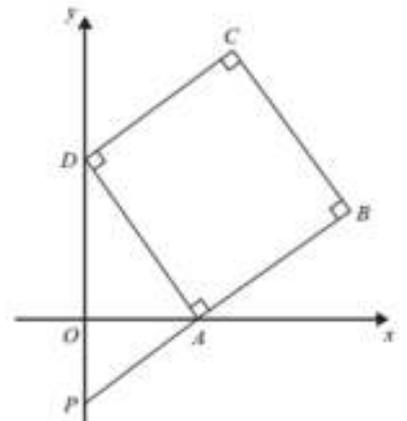
The distance $|AB|$ between the goal posts is 5.6 metres.

Find the distance from T to P .

5. (i) Factorise $z^3 - 1$

- (ii) Hence, or otherwise, solve the equation $z^3 - 1 = 0$

6. $ABCD$ is a square. P and D are points on the y -axis. A is a point on the x -axis. PAB is a straight line. The equation of the line that passes through the points A and D is $y = -2x + 6$.



Find the length of PD .

Some Answers: [2.] (i) 5 cm (ii) 13 cm (iii) 45° [3.] $f(x) = 3x^2 + 3x - 18$