Intermediate 2 Units 1, 2, 3   Paper 1 2004

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1. Given the data of marks for a class test.

5	9	10	4	5	5	6	10	5	8
5	7	4	9	7	5	4	6	5	7

(a)   Constructing a Cumulative Frequency Table we get:

Number	Frequency	Cumulative Frequency
4	3	3
5	7	10
6	2	12
7	3	15
8	1	16
9	2	18
10	2	20

(b)   The probability of a pupil getting a mark higher than 7 is $\dfrac{5}{20} = \dfrac{1}{4}$

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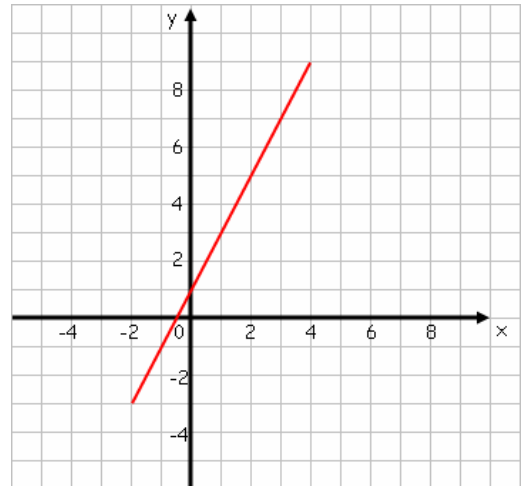Created by
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2.   Given the diagram.

(a)   The equation of the straight line is:

Gradient is $\dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{9-1}{4-0} = \dfrac{8}{4} = 2$
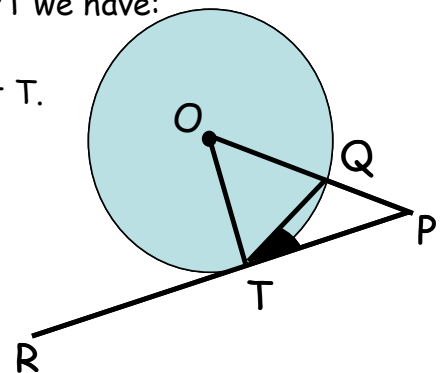
c = y intercept = 1

Line has equation $y = 2x + 1$

Q3.   Given RP is a tangent to the circle, centre O, with point of contact T. The shaded angle PTQ = 24°. To calculate angle OPT we have:

By statement above triangle PTO is right angled at T.

Angle OTQ = 90° – 24° = 66°

Since OT = OQ, triangle OQT is isosceles.
Angle OQT is 66°.

Since OQP is a straight line angle PQT = 180° – 66° = 114°

By the properties of a triangle, angle TPQ = 180° – 114° – 24° = 42°.

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4.   Given the dot-plot diagram.
      The plot represents the number of chocolates in a sample of 25.

(a)   Calculating the median, lower and upper quartiles we have:

$median = 50$ (**13th value**) $lower = \dfrac{49+49}{2} = 49$ $upper = \dfrac{51+52}{2} = 51.5$

(b)   Drawing a box-plot we get:

(c)   The semi–interquartile range in part (b) is (51.5 – 49) ÷ 2 = 1.25.
       In a second sample of boxes, the semi-interquartile range is 1.5.

       The first sample is less spread out / more consistent that the
       second sample.

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5.   Given the diagram and that the logo is made up of 3 identical parabolas. Also the first parabola has equation $y = (x + 2)^2 - 16$.
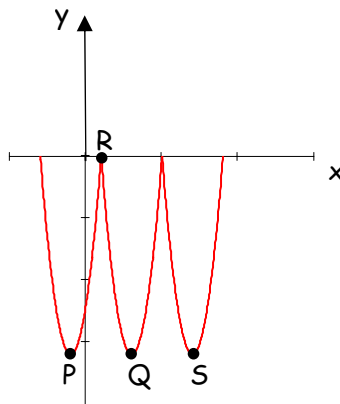
(a)   The point P is given by (b, c) = (-2, -16).

(b)   Given that R is the point (2, 0) and using symmetry the second parabola has minimum turn point Q (6, -16).

(c)   The equation of the parabola with minimum turning point S is:

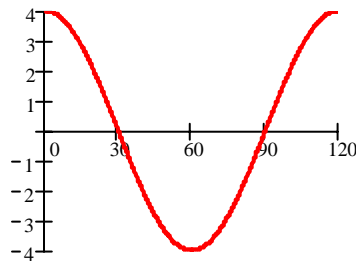By symmetry the coordinates of S are (14, -16).

The equation of parabola is $y = (x - 14)^2 - 16$.

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6.   (a)   Given part of the graph of y = b cos ax°

From graph a = 3 (3 cycles in 360°)   b = 4

(b)   Expressing $\sqrt{12} + 5\sqrt{3} - \sqrt{27}$ as a surd in its simplest form we get:

$$\sqrt{12} + 5\sqrt{3} - \sqrt{27}$$
$$= \sqrt{4}\sqrt{3} + 5\sqrt{3} - \sqrt{9}\sqrt{3}$$
$$= 2\sqrt{3} + 5\sqrt{3} - 3\sqrt{3}$$
$$= 4\sqrt{3}$$