Dr Oliver Mathematics
Mathematics: National Qualifications N5
2017 Paper 1: Non-Calculator
1 hour

The total number of marks available is 40.
You must write down all the stages in your working.

1. Given that (2)
$$f(x) = x^2 + 3x,$$
evaluate $f(-5)$.

2. The number of calls received by the police was recorded over 10 days. (2)
The results are shown below.

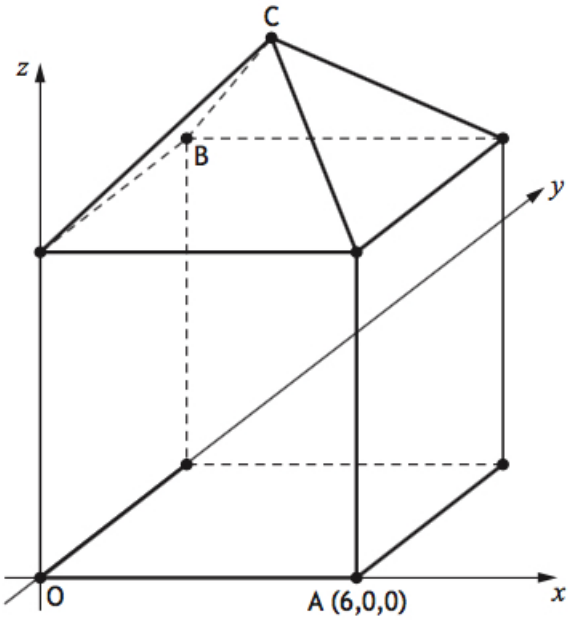
198 216 218 230 232 247 248 250 265 267

Find the semi-interquartile range of this data.

3. Evaluate (2)
$$1\tfrac{5}{6} \div \tfrac{3}{4}.$$
Give your answer in its simplest form.

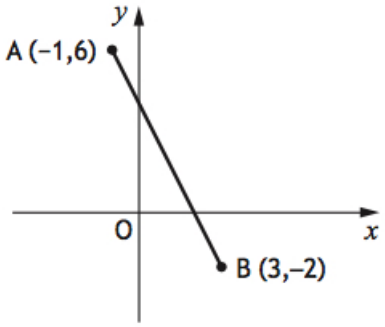
4. Expand and simplify (3)
$$(2x + 3)(x^2 - 4x + 1).$$

5. The diagram shows a square-based pyramid placed on top of a cube, relative to the coordinate axes. (2)



The height of the pyramid is half of the height of the cube.
A is the point $(6, 0, 0)$.
The point C is directly above the centre of the base.
Write down the coordinates of B and C.

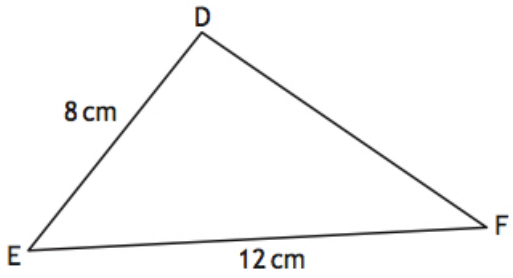
6. The diagram below shows the straight line joining points A and B. (3)



Find the equation of the line AB.
Give the equation in its simplest form.

7. In triangle DEF: (2)

- $DE = 8$ centimetres,
- $EF = 12$ centimetres, and
- $\sin DEF = \frac{2}{3}$.



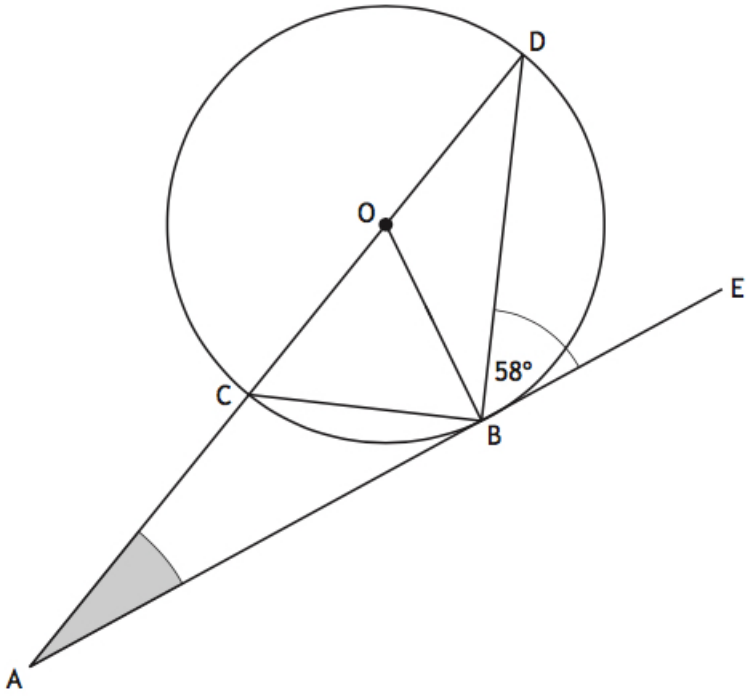
Calculate the area of triangle DEF.

8. Solve, algebraically, the inequality (3)

$$19 + x > 15 + 3(x - 2).$$

9. In the diagram shown below: (3)

- ABE is a tangent to the circle, centre O and
- Angle DBE is 58°.



Calculate the size of angle CAB.

10. Change the subject of the formula (3)

$$F = \frac{t^2 + 4b}{c}$$

to b.

11. Express (2)

$$\frac{3}{a^2} - \frac{2}{a},\ a \neq 0,$$

as a single fraction in its simplest form.

12. Gym members are asked to fill out a questionnaire to rate the quality of service provided. (4)
They are asked to give a rating on a scale of 1 to 6.
The ratings given by five members were as follows:

1 4 6 3 6

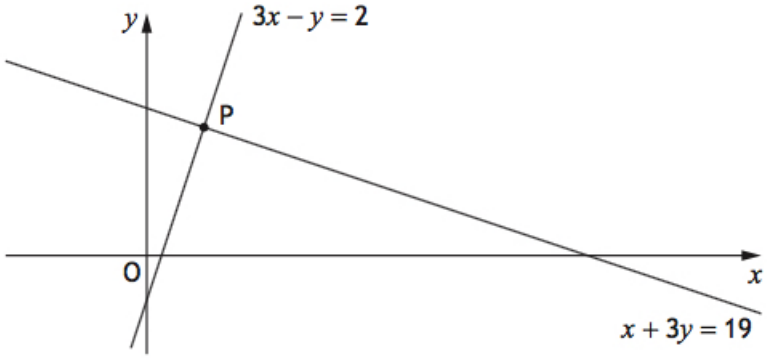
In its simplest form, the standard deviation of these ratings can be written as

$$\frac{a\sqrt{b}}{2}.$$

Find the values of a and b.

13. The graph below shows two straight lines with the equations: (3)

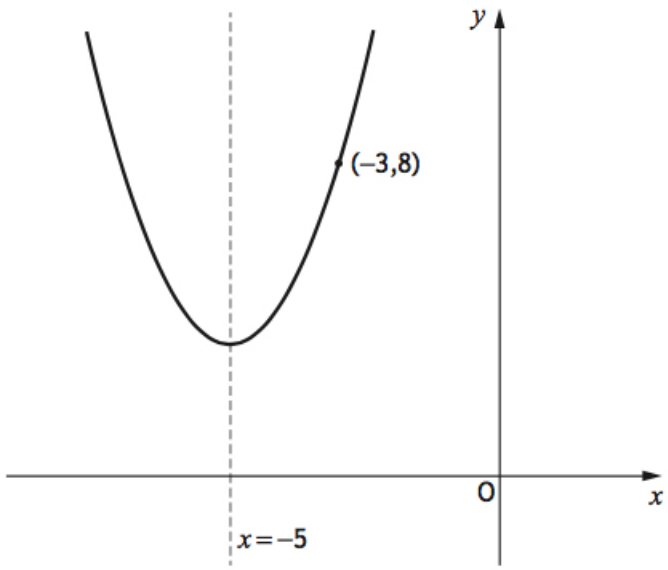
- $3x - y = 2$
- $x + 3y = 19$



The lines intersect at the point P.
Find, **algebraically**, the coordinates of P.

14. The graph below shows a parabola with equation of the form

$$y = (x + a)^2 + b.$$



The equation of the axis of symmetry of the parabola is $x = -5$.

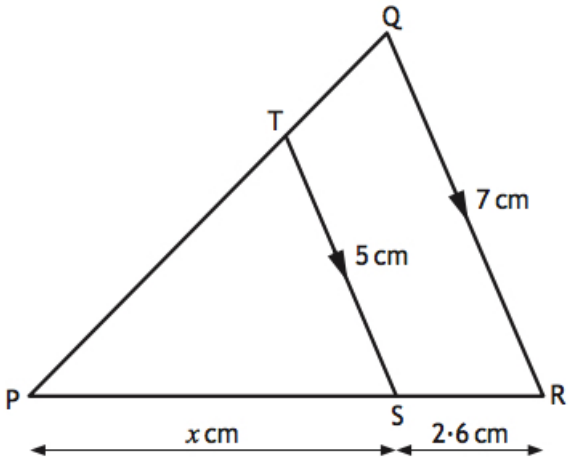
(a) State the value of a. (1)

The point $(-3, 8)$ lies on the parabola.

(b) Calculate the value of b. (2)

15. In the diagram below: (3)

- TS is parallel to QR,
- $TS = 5$ centimetres,
- $QR = 7$ centimetres, and
- $SR = 2.6$ centimetres,



The length of PS is x centimetres.
Calculate the value of x.