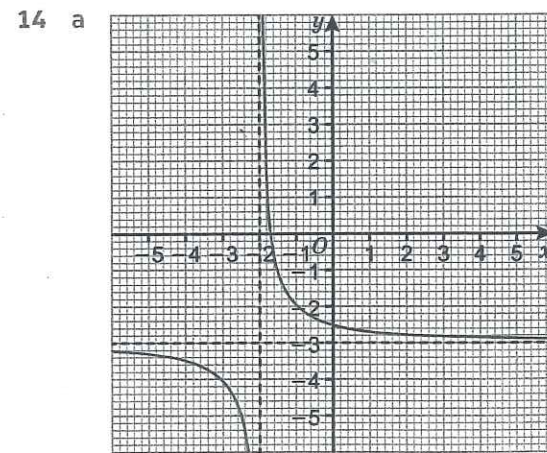




b $x = -2$ and $y = -3$

15 105 counts per second

16 a £178 658.24 b £15 000

19 Unit test

1 a $k = 600 \div 250 = 2.4$ [1]
 $T = 2.4 \times 400$ [1] = 960 s [1]

b $k = 1400 \times 360 = 504\,000$ [1]
 $T = 504\,000 \div 900$ [1] = 560 s [1]

2 a B [1] b C [1] c A [1] d F [1]

3 a $D = kt^2$ [1]
 $30 = k \times 402$
 $k = \frac{3}{160}$ [1]
 $D = \frac{3t^2}{160}$ [1]

b $D = 76.8$ [1]

c $t = 25.3$ (3 s.f.) [1]

4 a $y = \frac{k}{x^2}$ [1]
 $2.5 = \frac{k}{24^2}$
 $k = 1440$ [1]
 $y = \frac{1440}{x^2}$ [1]

b $y = 3.6$ [1]

c $x = 30$ [1]

5 a A = (-3, -9), B = (-6, 0), C = (0, 0) [1] b A = (3, 9), B = (6, 0), C = (0, 0) [1]

c A = (-1, 9), B = (-4, 0), C = (2, 0) [1] d A = (-3, 18), B = (-6, 0), C = (0, 0) [1]

e A = (-1, 9), B = (-2, 0), C = (0, 0) [1]

6 a Change in velocity = $720 - 620 = 100$ [1]

Acceleration = $\frac{100}{10}$ [1] = 10 m/s² [1]

b Tangent drawn [1]

Answers between 17 and 25 m/s² [1]

c Distance = area under the graph = $\frac{1}{2}(490 + 250) \times 10$ [1] = 3700 m [1] [Accept answers in the range 3650–3800]

7 a Graph sketched with correct shape and coordinates (0, 0) and (1, -1) labelled [1]

b Graph sketched with correct shape and coordinates (0, 3) and (1, 0) labelled [1]

8 a i $12 = ab^1$

$b = \frac{12}{a}$ [1]

$108 = ab^3$

$108 = a \times \left(\frac{12}{a}\right)^3$ [1]

$108 = a \times \frac{1728}{a^3}$

$108 = \frac{1728}{a^2}$

$a^2 = \frac{1728}{108}$

$a^2 = 16$

$a = 4$ [1]

ii $y = 4b^x$ [1]

$12 = 4 \times b^1$

$b = 3$ [1]

b $y = 324$ [1]

Sample student answer

a Where the curve crosses the y -axis and the x -axis, and where the minimum/maximum points are.

b The minimum point.

c The student could label the axes with an approximate scale to help count the number of units to be moved.