

Level 3 Algebra - Direct and Inverse Proportion

June 2013 - Question 11

Jan 2014 - Question 17

Jan 2015 - Question 17

June 2015 - Question 3

Jan 2016 - Question 19

June 2016 - Question 6

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June 2017 - Question 11

Jan 2018 - Question 11

June 2018 - Question 4

Jan 2019 - Question 11

June 2019 - Question 9

Jan 2020 - Question 15

Jan 2021 - Question 10

Jan 2022 - Question 9

June 2022 - Question 12

Jan 2023 - Question 6

June 2023 - Question 11

Jan 2024 - Question 12

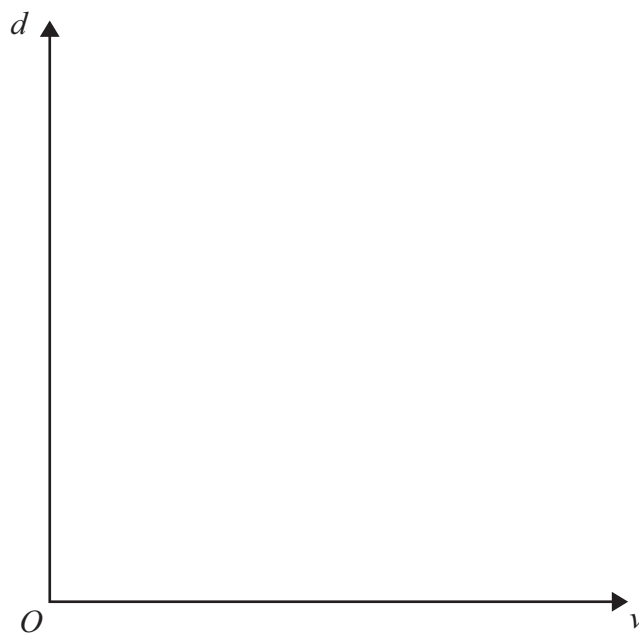
11 The braking distance, d metres, for a car to stop is directly proportional to the square of its speed v km/h.

For a car travelling at 30 km/h the braking distance is 6 metres.

(a) Find a formula for d in terms of v .

$$d = \dots\dots\dots (3)$$

(b) Sketch the graph of d against v .



(1)

(c) Calculate the value of d when $v = 60$

$$\dots\dots\dots (2)$$



(d) Calculate the value of v when $d = 96$

.....
(2)

(Total for Question 11 is 8 marks)



17 V is directly proportional to the cube of x .

When $x = 3$, $V = 54$

Find a formula for V in terms of x .

.....
(Total for Question 17 is 3 marks)



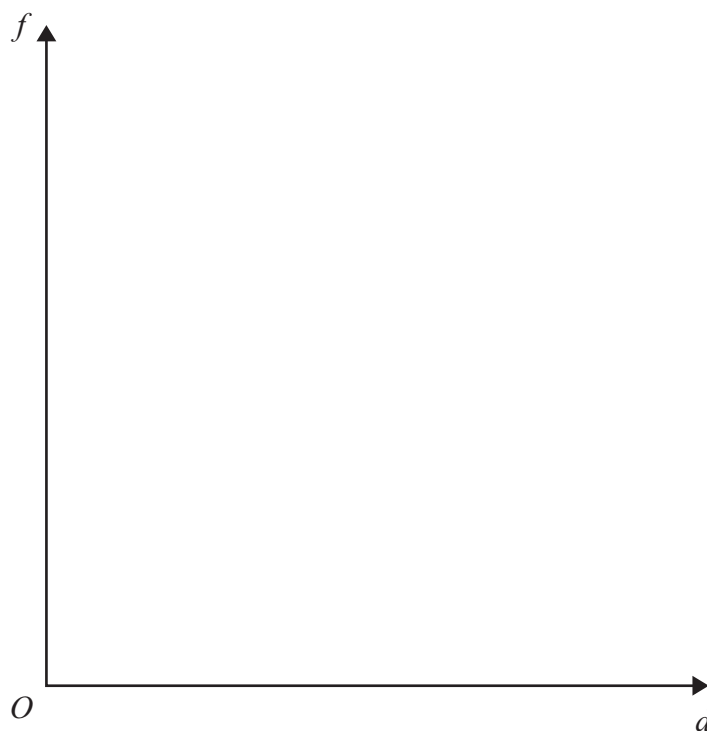
17 f is inversely proportional to d .

When $d = 20, f = 64$

(a) Find a formula for f in terms of d .

.....
(3)

(b) Sketch the graph of f against d for positive values of d .



(1)

(Total for Question 17 is 4 marks)



3 T is proportional to the square of v .

When $v = 3$, $T = 117$

(a) Find a formula for T in terms of v .

.....
(3)

(b) Calculate the possible values of v when $T = 52$

.....
(3)

(Total for Question 3 is 6 marks)

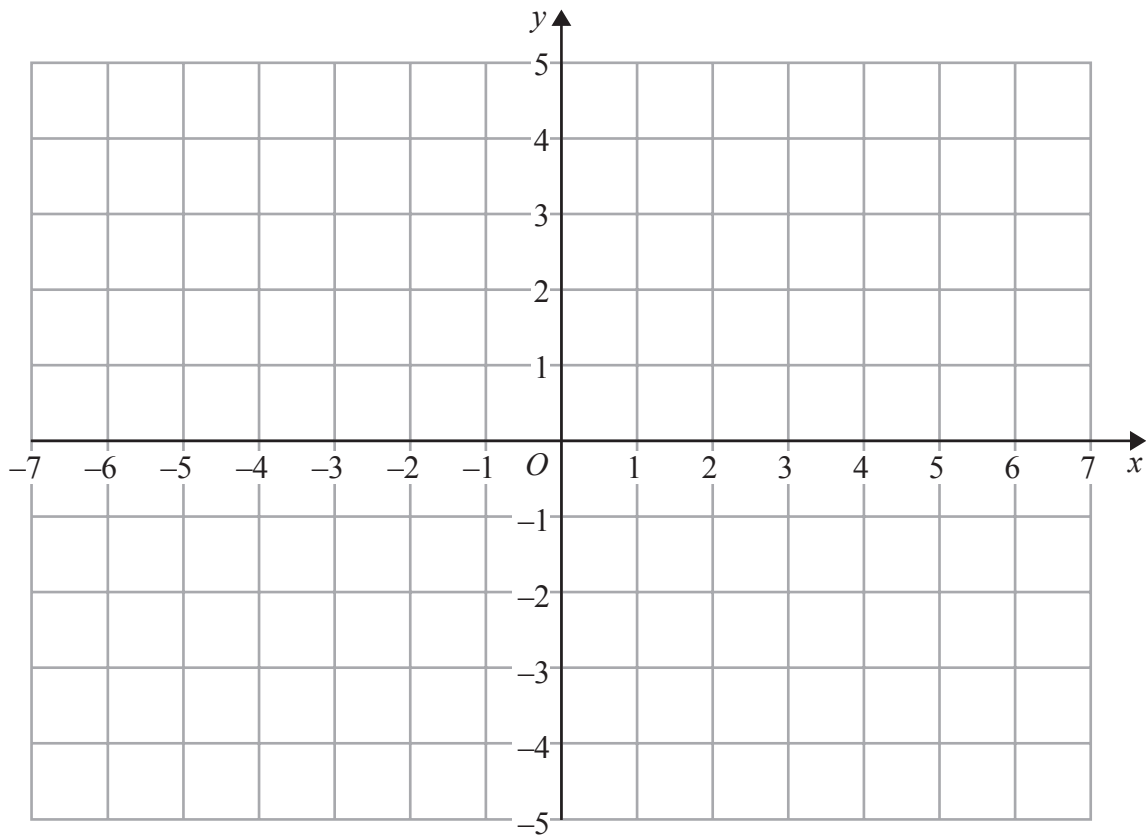


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(b) On the grid below, draw the graph of $y = h(2x)$



(2)

(Total for Question 18 is 4 marks)

19 p is proportional to d^3

When $d = 2$, $p = 48$

Find a formula for p in terms of d

(Total for Question 19 is 2 marks)



6 T is inversely proportional to the cube of x .

When $x = 3$, $T = \frac{1}{54}$

(a) Find a formula for T in terms of x .

.....
(3)

(b) Calculate the value of x when $T = 4$

.....
(2)

(Total for Question 6 is 5 marks)



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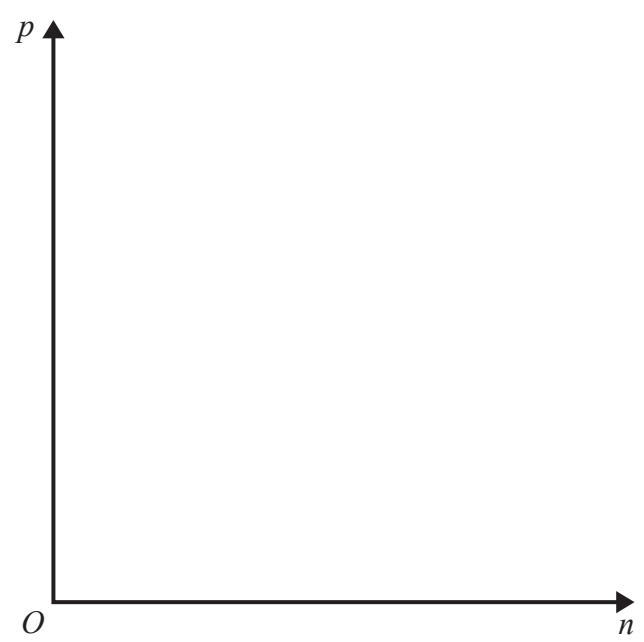
17 p is inversely proportional to the square root of n .

When $n = 36$, $p = 5$

(a) Find a formula for p in terms of n .

.....
(3)

(b) Sketch the graph of p against n for $n > 0$



(1)

(Total for Question 17 is 4 marks)



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11 W is inversely proportional to the square of t .

When $t = 2$, $W = 63$

(a) Find a formula for W in terms of t .

.....
(3)

(b) Calculate the possible values of t when $W = 28$

.....
(2)

(Total for Question 11 is 5 marks)



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11 m is proportional to the square of h .

When $h = 0.5$, $m = 10$

(a) Find a formula for m in terms of h .

.....
(3)

(b) Calculate the values of h when $m = 160$

.....
(2)

(Total for Question 11 is 5 marks)



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4 F is inversely proportional to the square of d .

When $d = 5, F = 8$

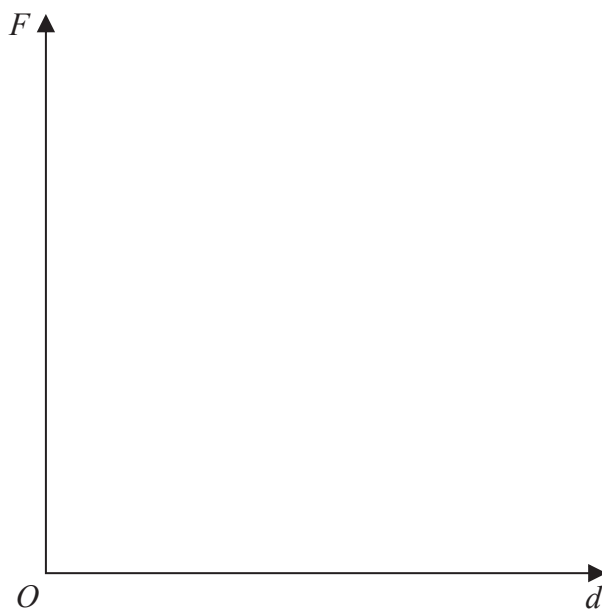
(a) Find a formula for F in terms of d .

.....
(3)

(b) Calculate the value of F when $d = 20$

.....
(1)

(c) On the axes below, sketch the graph of the relationship between F and d , for $d > 0$



(1)

(Total for Question 4 is 5 marks)



11 T is inversely proportional to \sqrt{f}

When $f = 25$, $T = 2$

(a) Find a formula for T in terms of f

.....
(3)

(b) Calculate the value of T when $f = 400$

.....
(2)

(Total for Question 11 is 5 marks)

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9 h is directly proportional to the cube of x .

When $x = 3$, $h = 108$

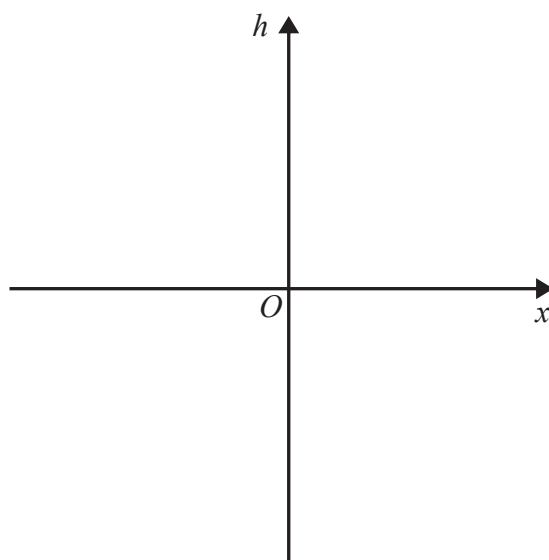
(a) Find a formula for h in terms of x .

.....
(3)

(b) Calculate the value of x when $h = -32$

.....
(2)

(c) Using the axes below, sketch the graph of h against x .



(1)

(Total for Question 9 is 6 marks)



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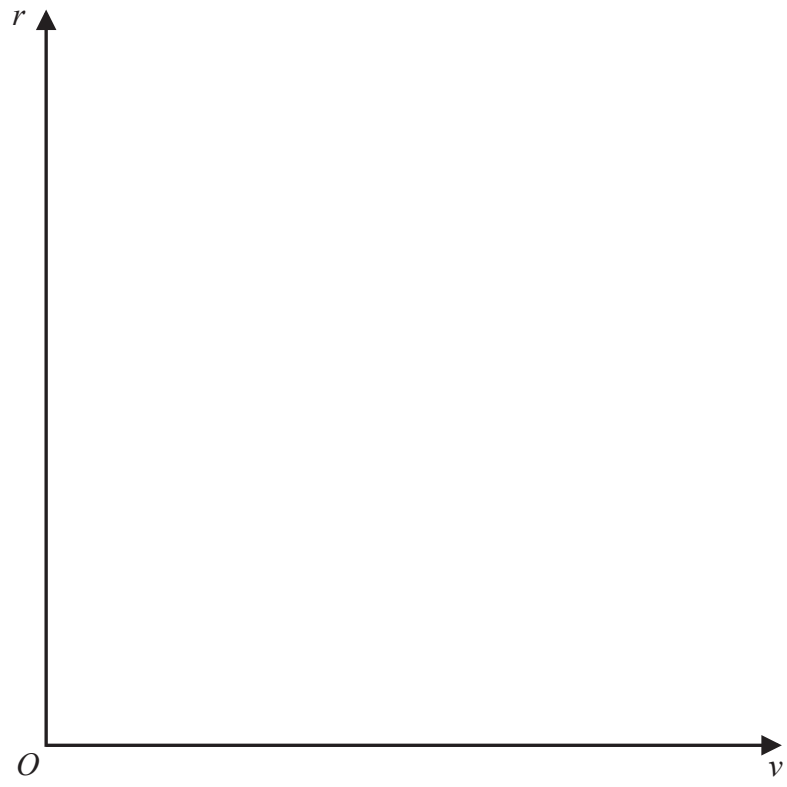
15 r is proportional to the cube root of v .

$$r = 15 \text{ when } v = 27$$

(a) Find a formula for r in terms of v .

.....
(3)

(b) Sketch the graph of r against v for $v \geq 0$



(1)

(Total for Question 15 is 4 marks)



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10 y is inversely proportional to the cube of x .

$y = 2$ when $x = 3$

(a) Find a formula for y in terms of x .

.....
(3)

(b) Calculate the value of x when $y = 9$

Write your answer in the form $b^{\frac{1}{n}}$ where n and b are integers.

.....
(2)

(Total for Question 10 is 5 marks)



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9 f is inversely proportional to d .
 $f = 20$ when $d = 0.25$

(a) Find a formula for f in terms of d .

.....
(3)

$$w = \frac{3}{(2 - u)^2}$$

(b) Make u the subject of the formula.

.....
(3)

(Total for Question 9 is 6 marks)



- 12 The average speed, v km/h, for a journey of a given distance is inversely proportional to the time, t hours, taken to complete the journey.

When $v = 60$, $t = 4$

- (a) Find a formula for v in terms of t .

.....
(3)

- (b) Calculate the value of t when $v = 80$

.....
(2)

- (c) Using the axes below, sketch the graph of v against t .



(1)

(Total for Question 12 is 6 marks)



6 y is directly proportional to x .

When $x = 8$, $y = 32$

(a) Find a formula for y in terms of x .

.....
(2)

p^2 is inversely proportional to r^3 for $p > 0$

When $p = 3$, $r = 2$

(b) Work out the value of p when $r = 3^{\frac{1}{3}}$

Give your answer in the form \sqrt{a} where a is an integer.

.....
(4)

(Total for Question 6 is 6 marks)



11 p is directly proportional to \sqrt{n}

When $n = 100$, $p = 5$

(a) Find a formula for p in terms of n .

.....
(3)

(b) Calculate the value of n when $p = 20$

.....
(2)

(Total for Question 11 is 5 marks)

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12 The time taken, t hours, to complete a journey of a given distance is inversely proportional to the average speed, v km/h, for that journey.

When $t = 5$, $v = 60$

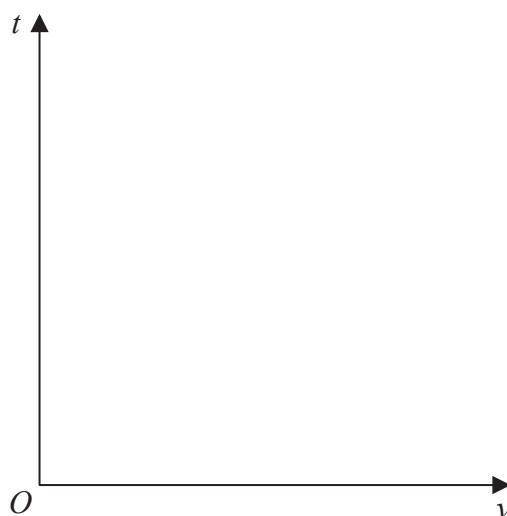
(a) Find a formula for t in terms of v .

.....
(3)

(b) Find the value of v when $t = 6$

.....
(2)

(c) Sketch the graph of t against v .



(1)

(Total for Question 12 is 6 marks)

