Corbettmaths

# 100 Days to Go
# GCSE Higher
# Revision Questions

## Part 3

100 Days to Go

Answers

See 9 Days to Go

1. (a) Simplify

$$\frac{x^2 - 4x - 32}{5x^2 - 41x + 8}$$

17 Days to Go

$$\frac{(x+4)(x-8)}{(5x-1)(x-8)}$$

$$\frac{x+4}{5x-1}$$

.....

**(3)**

(b) Express as a single fraction

$$\frac{9}{x-3} - \frac{2}{x+1}$$

$$\frac{9(x+1)}{(x-3)(x+1)} - \frac{2(x-3)}{(x-3)(x+1)}$$

$$\frac{9(x+1) - 2(x-3)}{(x-3)(x+1)}$$

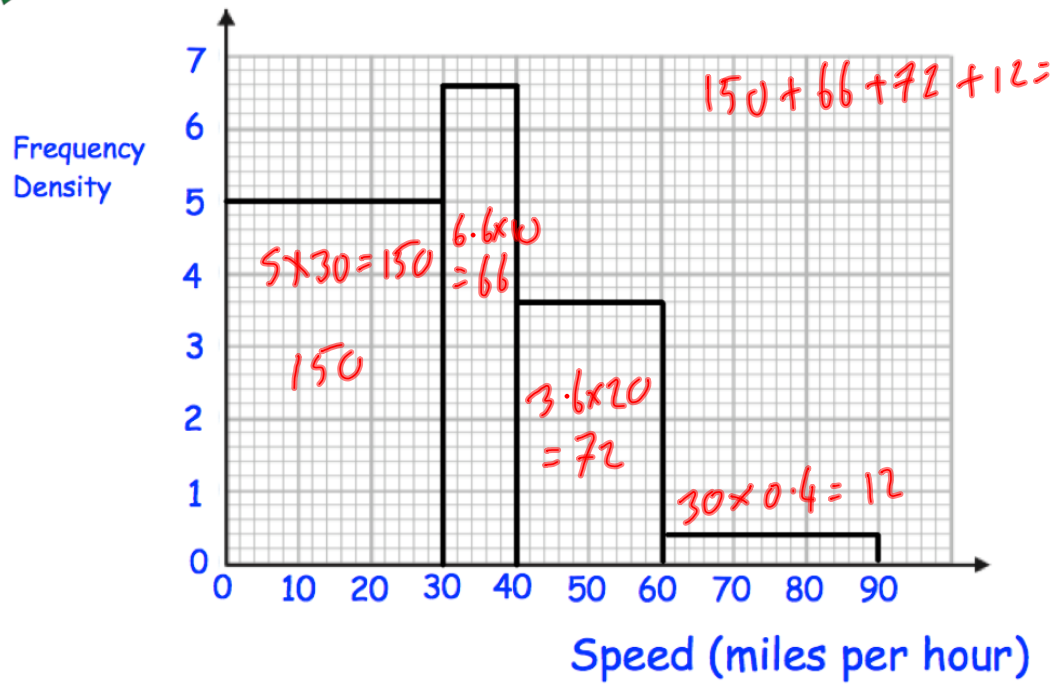
$$\frac{9x+9-2x+6}{(x-3)(x+1)}$$

$$\frac{7x+15}{(x-3)(x+1)}$$

.....

**(3)**

2. The histogram shows information about the speeds, in miles per hour, that cars travelled through a village.




Work out the percentage of cars that travelled 30mph or less.

$\frac{150}{300} = 50\%$

75 Days to Go

50%

.....

**(3)**

3. H is directly proportional to the cube of c.
When H = 480, c = 2

(a) Express H in terms of c.

$H \propto c^3$

$H = k \times c^3$

$480 = k \times 2^3$

$480 = k \times 8$

$k = 60$

42 Days to Go

$H = 60 \times c^3$

H = $60c^3$
**(3)**

(b) Find the value of H when c = 5

$H = 60c^3$

$H = 60 \times 5^3$

$H = 7500$

H = 7500
**(1)**

(c) Find the value of c when H = 30000

$H = 60c^3$

$30000 = 60 \times c^3$

$500 = c^3$

$\sqrt[3]{500} = 7.937...$

c = 7.937
**(1)**

4. Find the exact value of Sin(45°) + Sin(60°)

$\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}$

$\frac{\sqrt{2}+\sqrt{3}}{2}$

12 Days to Go

.....

**(3)**

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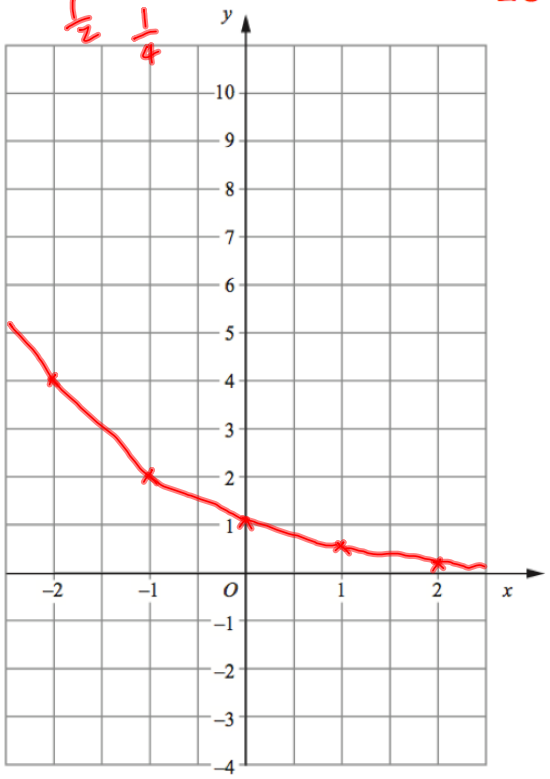
5. Draw the graph of $y = \left(\frac{1}{2}\right)^x$ for values of x from $-2$ to $2$

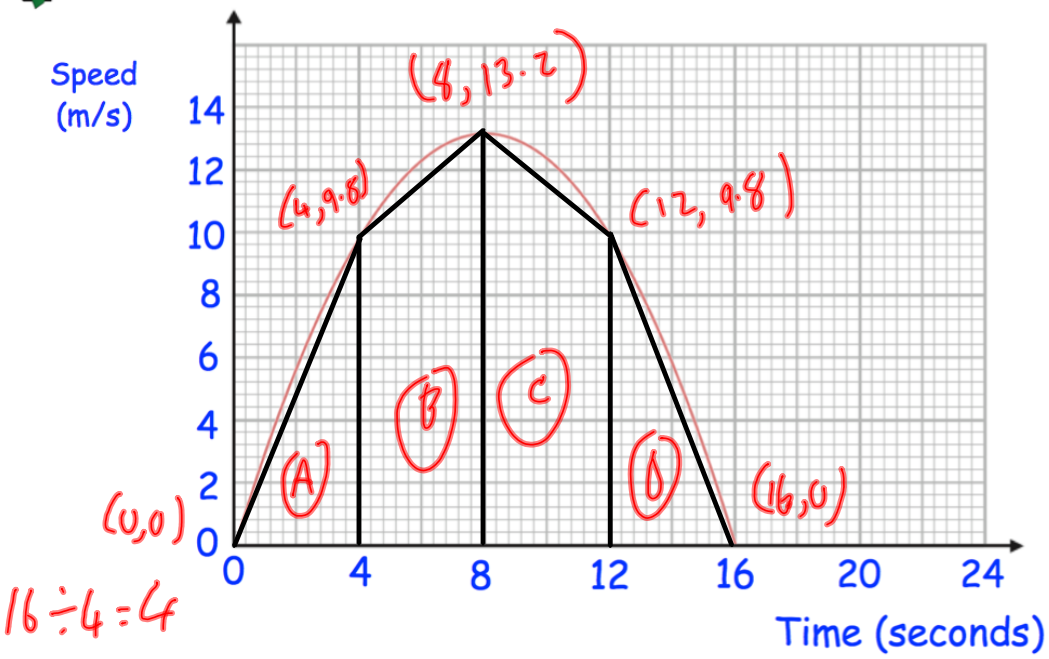
| x | -2 | -1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| y | 4 | 2 | 1 | $\frac{1}{2}$ | $\frac{1}{4}$ |

20 Days to Go




**(2)**

6. Here is a speed-time graph for a toy rocket.




(a) Work out an estimate for the distance the rocket travelled in the 16 seconds.
Use 4 strips of equal width.

A $\frac{1}{2}(4 \times 9.8) = 19.6$

B $\frac{1}{2}(9.8 + 13.2) \times 4 = 46$

C = 46 D = 19.6

30 Days to Go

$19.6 + 19.6 + 46 + 46$

$= 131.2$

.....m

**(3)**

(b) Is your answer to (a) an underestimate or an overestimate of the actual distance the rocket travelled?
Give a reason for your answer

An underestimate as the actual graph is above our shapes.

**(1)**

7. The first 5 terms in a number sequence are

| | | | | | | |
|---|---|---|---|---|---|---|
| | 14 | 11 | 8 | 5 | 2 | ... ... |
| -3n | -3 | -6 | -9 | -12 | -15 | |

37 Days to Go

(a) Work out the *n*th term of the sequence.

$-3n+17$

$-3n+17$

.....

**(2)**

(b) Find the 50th term of the sequence.

$-3\times50+17$

$-150+17=-133$

$-133$

.....

**(2)**

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8. The functions f(x) and g(x) are given by the following:

28 Days to Go

$$f(x) = 8x + 3$$

$$g(x) = 2x - 1$$

(a) Find $f^{-1}(x)$

$y=8x+3$

$-3 \quad -3$

$y-3=8x$

$\div 8 \quad \div 8$

$\frac{y-3}{8}=x$

$f^{-1}(x)=\frac{x-3}{8}$

.....

**(2)**

(b) Find $g^{-1}(x)$

$y=2x-1$

$+1 \quad +1$

$y+1=2x$

$\div 2 \quad \div 2$

$\frac{y+1}{2}=x$

$g^{-1}(x)=\frac{x+1}{2}$

.....

**(2)**

9. Write $x^2 + 4x + 7$ in the form $(x + a)^2 + b$, where a and b are constants.

$(x+2)^2 - 4 + 7$

18 Days to Go

$(x+2)^2 + 3$

$(x+2)^2 + 3$

**(3)**

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10. The mass of $3m^3$ of tin is 21840kg.

(a) Work out the density of tin.

14 Days to Go

$d = \frac{m}{v}$

$= \frac{21840}{3}$

7280 kg/m³

**(2)**

The density of lead is 11400kg/m³.

(b) Work out the difference in mass between $5m^3$ of tin and $5m^3$ of lead.

$m = d \times v$

$= 7280 \times 5$

$= 36400\text{kg}$

$11400 \times 5$

$= 57000\text{kg}$

$57000 - 36400 =$

20600 kg

**(3)**

11.


$S = \frac{d}{t}$

$t = \frac{d}{S}$

15 Days to Go

A village is 20 miles from Belfast.

Conor drives from the village to Belfast at 50mph
Kelly drives from the village to Belfast at 60mph

Work out how much longer the journey takes Conor.
Give your answer in minutes.

Conor $\frac{20}{50} = 0.4$ hrs

24 mins

Kelly $\frac{20}{60} = \frac{1}{3}$ hrs

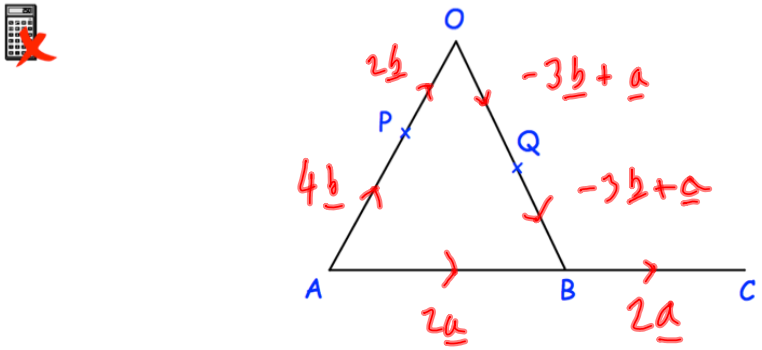
20 mins

4

.....minutes

**(3)**

12.




AOB is a triangle.
P is a point on AO.

16 Days to Go

$\overrightarrow{AB} = 2a$ $\overrightarrow{AO} = 6b$ AP:PO = 2:1

(a) Find the vector $\overrightarrow{OB}$ in terms of **a** and **b**

$\overrightarrow{OB} = \overrightarrow{OA} + \overrightarrow{AB}$

$= -6b + 2a$

$-6b + 2a$

**(1)**

Q is the midpoint of OB.
B is the midpoint of AC.

Show PQC is a straight line.

$\overrightarrow{QC} = \overrightarrow{QB} + \overrightarrow{BC}$

$= -3b + a + 2a$

$= -3b + 3a$

$\overrightarrow{PQ} = \overrightarrow{PO} + \overrightarrow{OB}$

$= 2b + (-3b + a)$

$= -b + a$

$\overrightarrow{QC} = 3\overrightarrow{PQ}$

$\therefore$ they are parallel.

**(3)**

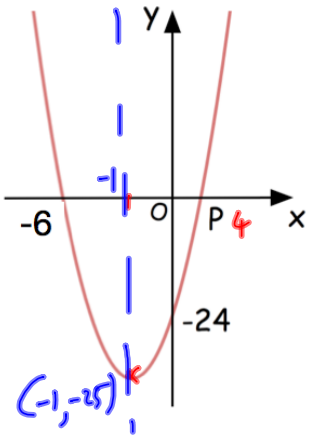
as they are parallel and pass through Q.
PQC is a straight line.

13. Below is a sketch of the graph $y = x^2 + bx + c$

$y = x^2 + 2x - 24$

The curve passes through the points $(-6,0)$, $(0, -24)$ and $(P, 0)$

$0 = (x+6)(x-4)$




$-24 = 0^2 + b \times 0 + c$

$-24 = c$

$y = (-1)^2 + 2(-1) - 24$

$y = 1 + (-2) - 24$

$y = -1 - 24$

$y = -25$

19 Days to Go

Work out the coordinates of the turning point of the graph.

$y = x^2 + 2x - 24$

$y = (x+1)^2 - 1 - 24$

$y = (x+1)^2 - 25$

$(-1, -25)$

.....

**(5)**

14. S is a geometric sequence

The first three terms of S are (x + 24), x and (3x - 32), where x is positive.

(a) Find the value of x.

11 Days to Go

$\frac{x}{x+24} = \frac{3x-32}{x}$

$x^2 = (3x-32)(x+24)$

$x^2 = 3x^2 + 72x - 32x - 768$

$x^2 = 3x^2 + 40x - 768$

$0 = 2x^2 + 40x - 768$

$0 = x^2 + 20x - 384$

$0 = (x-12)(x+32)$

$x = 12$ or ~~$x = -32$~~

.....

**(3)**

(b) Find the 5th term of S

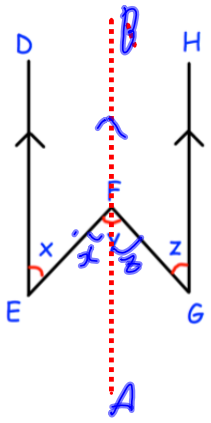
36 $\xrightarrow{\times\frac{1}{3}}$ 12 $\xrightarrow{\times\frac{1}{3}}$ 4 $\xrightarrow{\times\frac{1}{3}}$ $\frac{4}{3}$ $\xrightarrow{\times\frac{1}{3}}$ $\frac{4}{9}$

$\frac{4}{9}$

.....

**(1)**

15. In the diagram below, the lines ED and GH are parallel.




13 Days to Go

Prove that x + z = y

$\angle DEF = \angle EFA = x^\circ$ as alternate angles are equal.

$\angle AFG = \angle HGF = z^\circ$ as alternate angles are equal.

$\therefore x + z = y$

**(3)**