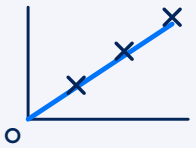
DIRECT PROPORTION GRAPHS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

Some graphs make a straight line that starts at 0.
This happens when two amounts grow at the same rate, like 1 bag = 5 sweets, 2 bags = 10 sweets ...



1 Each car has 4 wheels. Complete the table.

 = 4 wheels

CARS	0	1	2	3	4	5
wheels	0	4				

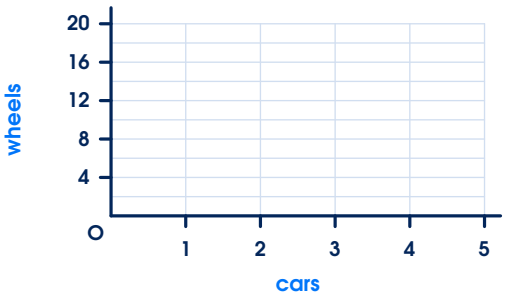
2 Draw a graph of cars and wheels on the grid.

a) Plot the points from Question 1.

b) Join them with a ruler.

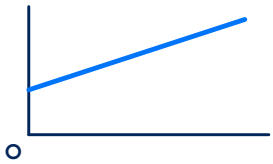
c) Is it a straight line? YES NO

d) Does it start at 0? YES NO

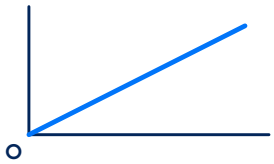


3 Which graph is a straight line that starts at 0? Circle its letter.

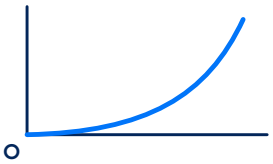
A



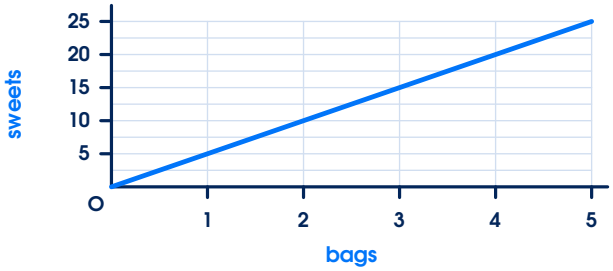
B



C



4 Each bag has 5 sweets. Use the graph.



a) 3 bags = _____ sweets

b) 25 sweets = _____ bags

DIRECT PROPORTION GRAPHS

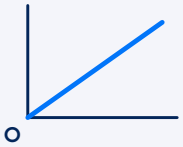
SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

Two quantities are in direct proportion when their graph is a straight line through the origin (0, 0).

Label both axes and choose a sensible scale.

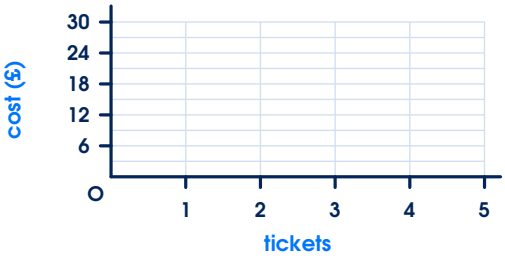


1 Cinema tickets cost £6 each.

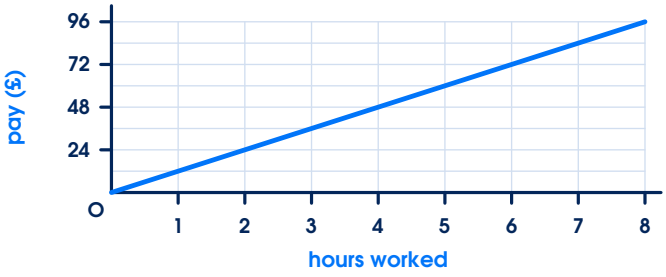
a) Complete the table.

TICKETS	0	1	2	3	4	5
cost (£)	0	6				

b) Plot the points and join them with a ruler.



2 Sam earns the same amount for every hour he works.



a) Pay for 4 hours = £ ☐

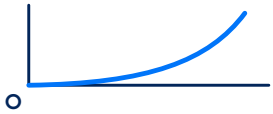
b) £84 takes ☐ hours

c) Use a) to find the pay for 20 hours.

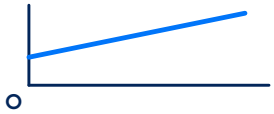
☐ (4 hours = ☐ / 20 hours = ☐) ☐

3 Circle the graph that shows direct proportion.

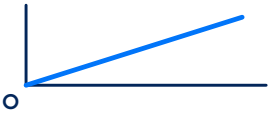
A



B



C



Explain why the other two graphs do not show direct proportion.

.....

4 Lily plots the points (1, 3), (2, 6) and (3, 10). Could they show direct proportion?

YES NO Explain: .....

DIRECT PROPORTION GRAPHS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

A direct proportion graph is a straight line through (0, 0): y ÷ x is the same for every point.

FLUENCY

1 Which tables show x and y in direct proportion? Circle YES or NO.

A

x	2	5	8
y	7	17.5	28

YES NO

B

x	3	6	9
y	10	20	25

YES NO

C

x	4	10	14
y	6	15	21

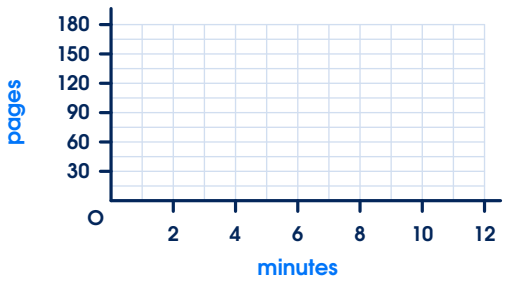
YES NO

2 A printer prints 60 pages every 4 minutes.

a) Complete the table.

MINUTES	0	4	8	12
pages	0	60		

b) Draw the graph.

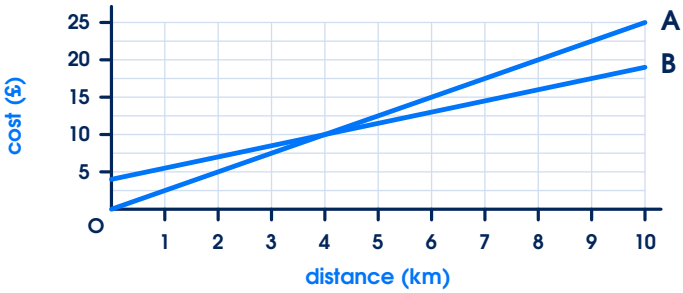


c) Pages in 10 minutes: ____

d) Time for 105 pages: ____ min

REASONING

3 The graph shows the cost of journeys with two taxi firms, A and B.



a) Which firm's cost is in direct proportion to distance? Explain.

.....

b) For what distance do both firms cost the same? ____

4 Amir says, "Both rows go up by 1, so this is direct proportion." Is he right?

x	1	2	3
y	4	5	6

YES NO

Explain: .....

.....

DIRECT PROPORTION GRAPHS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) A straight-line graph shows direct proportion. ALWAYS SOMETIMES NEVER

b) A direct proportion graph passes through (0, 0). ALWAYS SOMETIMES NEVER

c) If (a, b) lies on a direct proportion graph, then (2a, 2b) lies on it too. ALWAYS SOMETIMES NEVER

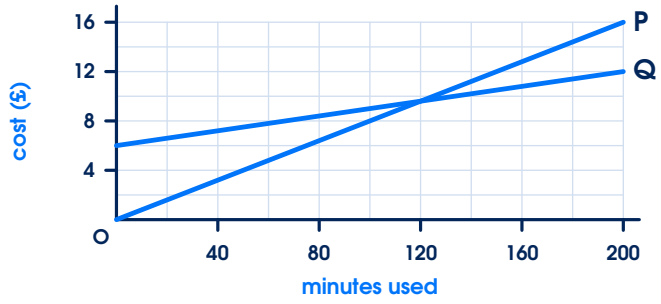
PROBLEM SOLVING

2 A spring stretches 3 cm for every 50 g hung on it. Stretch is directly proportional to mass.

a) How far does it stretch with 175 g? ____

b) What mass makes it stretch 13.2 cm? ____

3 Phone plan P costs 8p a minute. Plan Q costs £6 a month plus 3p a minute.



a) Which plan is in direct proportion to minutes? ____

b) Minutes when they cost the same: ____

c) Cost at that point: £ ____

★ CHALLENGE FOR ALL

4 A(6, 9) and B(x, 24) are points on the graph of a direct proportion.

a) Find the value of x. ____

b) Point C is on the same line. Its coordinates add up to 75. Find C. ____

DIRECT PROPORTION GRAPHS – ANSWERS

ANSWERS

BUILDING BLOCKS

1 8, 12, 16, 20
2 Points (0, 0), (1, 4), (2, 8), (3, 12), (4, 16), (5, 20) joined · c) YES · d) YES
3 B
4 a) 15 sweets · b) 5 bags

SUPPORT

1 a) 12, 18, 24, 30 · b) straight line from (0, 0) to (5, 30)
2 a) £48 · b) 7 hours · c) × 5 on both sides: £240
3 C · A is curved; B does not start at (0, 0)
4 No – 3 ÷ 1 = 3 and 6 ÷ 2 = 3, but 10 ÷ 3 is not 3, so the points are not on one straight line through (0, 0)

CORE

1 A: YES (y = 3.5x) · B: NO · C: YES (y = 1.5x)
2 a) 120, 180 · b) straight line from (0, 0) to (12, 180) · c) 150 pages · d) 7 minutes
3 a) Firm A: its line is straight and goes through (0, 0); B starts at £4 · b) 4 km (both £10)
4 No – y ÷ x is not the same (4 ÷ 1 = 4 but 5 ÷ 2 = 2.5). Doubling x from 1 to 2 should double y, but 4 only goes up to 5

GREATER DEPTH

1 a) Sometimes, e.g. y = 2x (true), y = x + 3 (false) · b) Always · c) Always
2 a) 10.5 cm · b) 220 g
3 a) Plan P (straight line through O) · b) 120 minutes (where the lines cross) · c) £9.60
4 a) y = 1.5x, so x = 16 · b) x + 1.5x = 75, so C(30, 45)