

Springs **ANSWERS**

Bands 1, 2, 3, 4, 5 · 10 questions · Free sample

Each picture asks its own question. A spring stretches in proportion to its load. Springs side by side share the load, so their stiffnesses add; springs one below another each carry all the weight below them, so their stretches add.

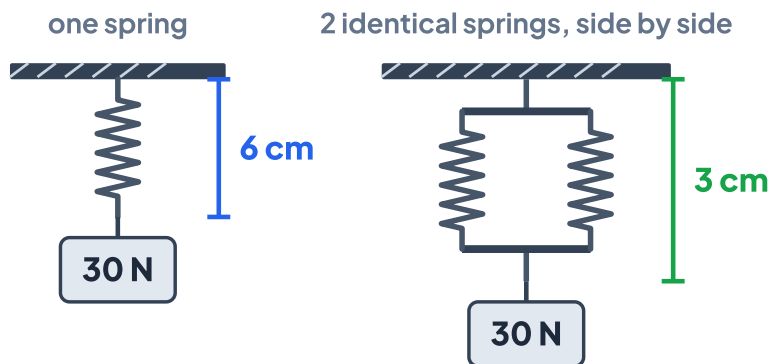
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1

Band 1

Answer: B

How far do the 2 identical springs stretch?



side by side share the load: $6 \div 2 = 3 \text{ cm}$

A

1 cm

Not what Hooke's law gives

B

3 cm

The answer

C

6 cm

The stretch it already had: a different load stretches it differently

D

12 cm

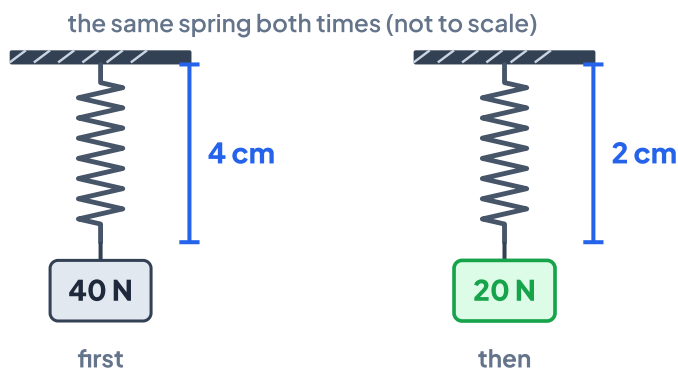
The other arrangement: side by side halves the stretch, one below another multiplies it

2

Band 1

Answer: C

Which weight stretches the same spring 2 cm?



10 N per cm, so 2 cm needs $2 \times 10 = 20$ N

A

2 N

The stretch itself
given as the weight

B

10 N

Not what Hooke's law
gives

C

20 N

The answer

D

38 N

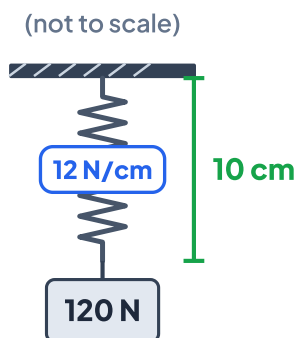
The load's difference
added to the stretch,
instead of keeping
the ratio

3

Band 2

Answer: D

How far does the weight stretch the spring?



$120 \text{ N} \div 12 \text{ N/cm} = 10 \text{ cm}$

A

5 cm

Not what Hooke's law
gives

B

8 cm

Not what Hooke's law
gives

C

9 cm

Not what Hooke's law
gives

D

10 cm

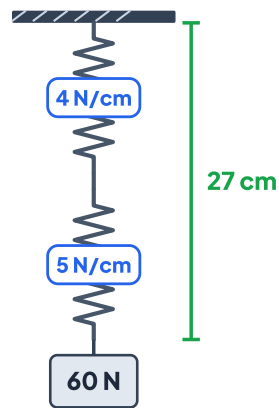
The answer

4

Band 2

Answer: B

How far do the springs stretch?



one below another: $60 \div 4 + 60 \div 5 = 15 + 12 = 27 \text{ cm}$

A

15 cm

One spring's stretch
on its own

B

27 cm

The answer

C

54 cm

Not what Hooke's law
gives

D

81 cm

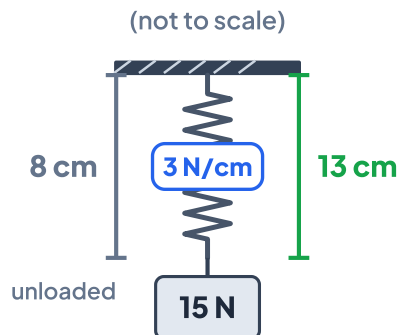
Not what Hooke's law
gives

5

Band 3

Answer: D

How long is the spring with the weight on?



stretch $15 \div 3 = 5 \text{ cm}$, so $8 + 5 = 13 \text{ cm}$

A

5 cm

The stretch, without
the spring's own
length

B

9 cm

Not what Hooke's law
gives

C

12 cm

Not what Hooke's law
gives

D

13 cm

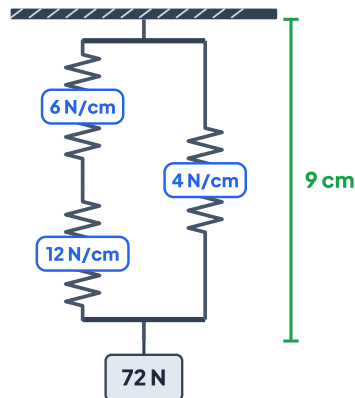
The answer

6

Band 3

Answer: B

How far do the springs stretch?



The pair one below another: 4 N/cm
Side by side with 4: $4 + 4 = 8 \text{ N/cm}$; $72 \div 8 = 9 \text{ cm}$

A

3 cm

Not what Hooke's law gives

B

9 cm

The answer

C

22 cm

Side by side and one below another swapped

D

36 cm

Every spring taken as one below another

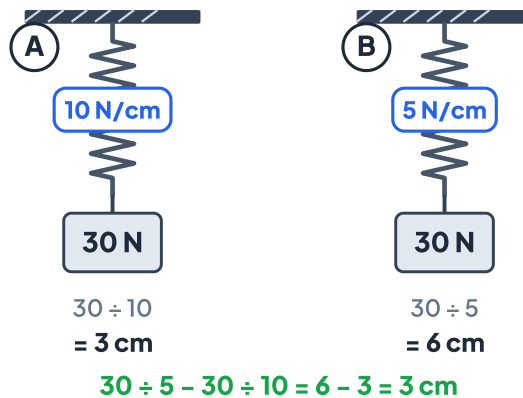
7

Band 4

Answer: C

The same weight hangs on each. How much further does the softer spring stretch?

(not to scale)



A

1 cm

Not what Hooke's law gives

B

2 cm

Not what Hooke's law gives

C

3 cm

The answer

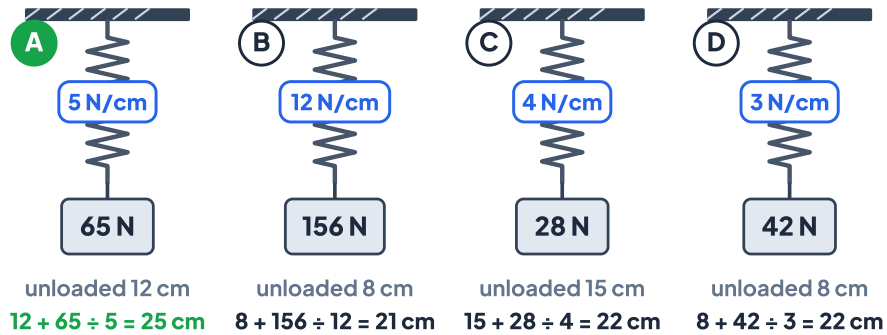
D

6 cm

How far the softer spring stretches, not how much further

Which spring is the longest with its weight on?

(not to scale)



Length = unloaded length + weight $\div$ stiffness

A

A

The answer (25 cm long)

B

B

The heaviest load, but a stiffer spring (21 cm long)

C

C

The longest spring unloaded, but it stretches less (22 cm long)

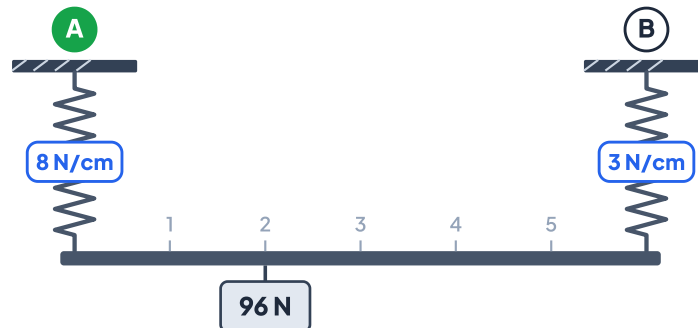
D

D

The one that stretches most, but it started shorter (22 cm long)

How far does spring A stretch?

(the beam is light; places counted from the left end; not to scale)



A carries $96 \times 4 \div 6 = 64$ N, B carries $96 \times 2 \div 6 = 32$ N

Spring A: $64 \div 8 = 8$ cm

A

8 cm

The answer

B

12 cm

The whole weight on one spring

C

16 cm

Not what Hooke's law gives

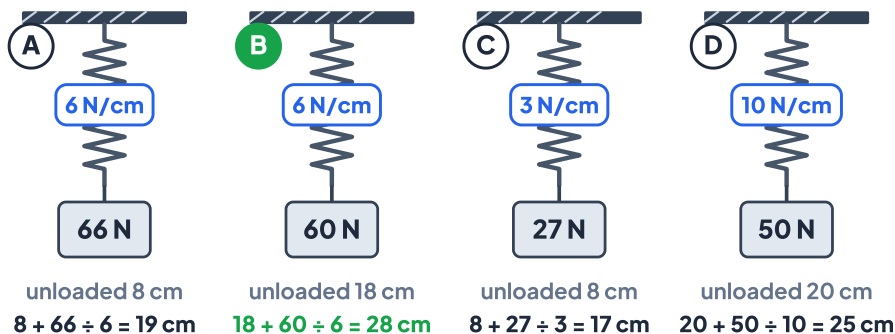
D

24 cm

Not what Hooke's law gives

Which spring is the longest with its weight on?

(not to scale)



Length = unloaded length + weight $\div$ stiffness

A

A

The one that stretches most, but it started shorter (19 cm long)

B

B

The answer (28 cm long)

C

C

Ends up shorter (17 cm long)

D

D

The longest spring unloaded, but it stretches less (25 cm long)

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