Mechanics I MCQ Unit 01: Statics

Author: Stephanie Redfern

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Stephanie Redfern, Ranjeet (Ron) Agarwala, and Dr. Steve Gibbs. Mechanics I. The Saylor Foundation, http://www.saylor.org/courses/me102/

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Table of Contents

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1. Unit 01: Statics

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4. Chapter: Unit 01: Statics

1. Unit 01: Statics Questions

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4.1.1. The pin-connected truss shown in the figure below is anchored at po...

Author: Stephanie Redfern

The pin-connected truss shown in the figure below is anchored at points F and D. All acute angles in the truss are 45 degrees. For the conditions shown, what is the load in the member BF?

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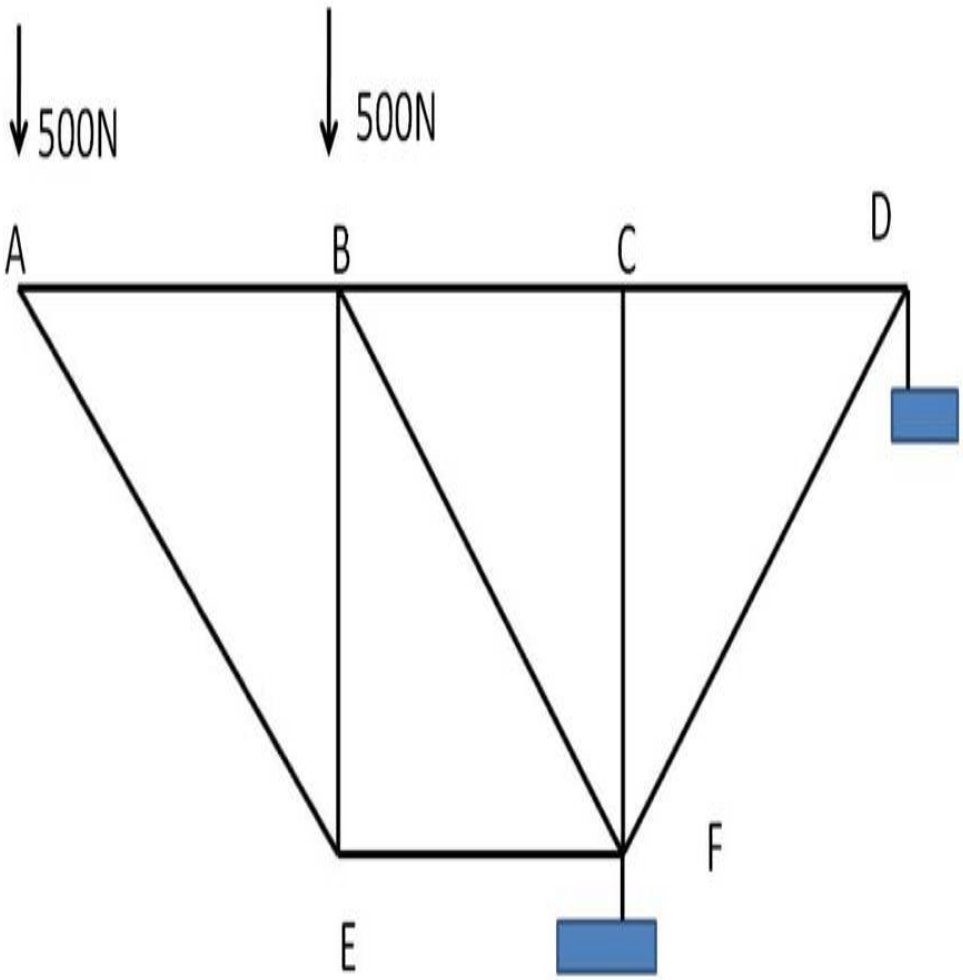

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Please choose only one answer:

- 500 N, tension
- 1000 N, compression
- 1414N, compression
- 1414 N, compression
- 1414 N, tension

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4.1.2. Which of the following best describes a couple as used in mechanics?

Author: Stephanie Redfern

Which of the following best describes a couple as used in mechanics?

Please choose only one answer:

- A moment resulting from forces with resultant force acting on the system
- A pair of forces acting in conjunction with no net moment
- A pair of moments that cancel one another
- A pair of forces that produce zero net force and zero net torque
- The reduction of all forces acting on a system to a pair of forces and moments

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4.1.3. Sometimes you may be able to see a brace used in fencing near corne...

Author: Stephanie Redfern

Sometimes you may be able to see a brace used in fencing near corners or in the middle of a long section (like shown in the figure below). In this problem, you will consider only the tension of the fence on one side of the brace. For the conditions shown, what are the forces F1 and F2?

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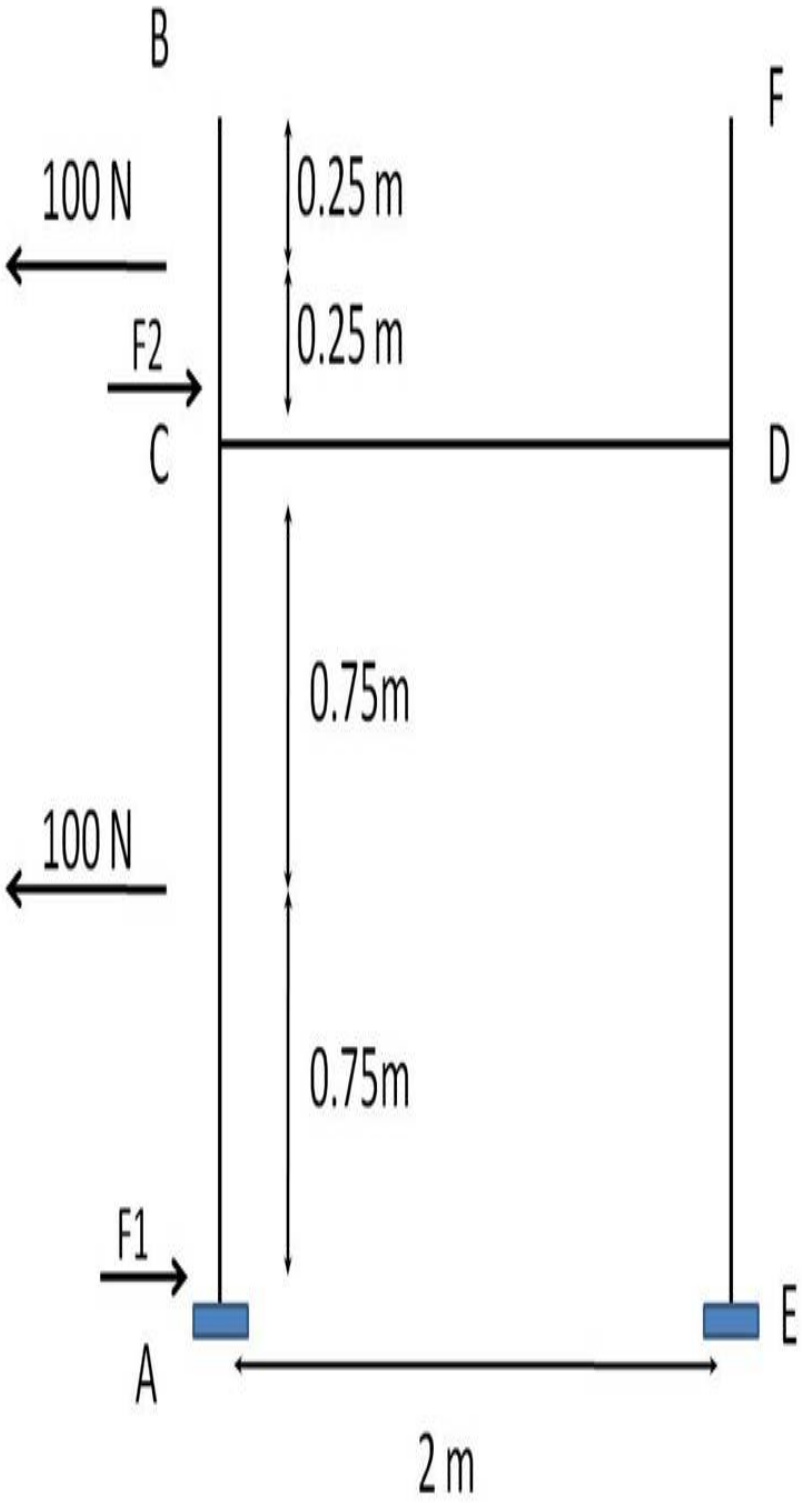

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Please choose only one answer:

- 150N, 50 N
- 33 N, 167 N
- 133N, 67 N
- 50 N, 150 N
- 133 N, 7 N

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4.1.4. A weight is hung from two hooks such that the wire forms a isoscele...

Author: Stephanie Redfern

A weight is hung from two hooks such that the wire forms a isosceles triange in which the angle alpha is 75 degrees as depicted in the schematic below.

What is the horizontal component of force exerted on the hook at point B for the load shown?

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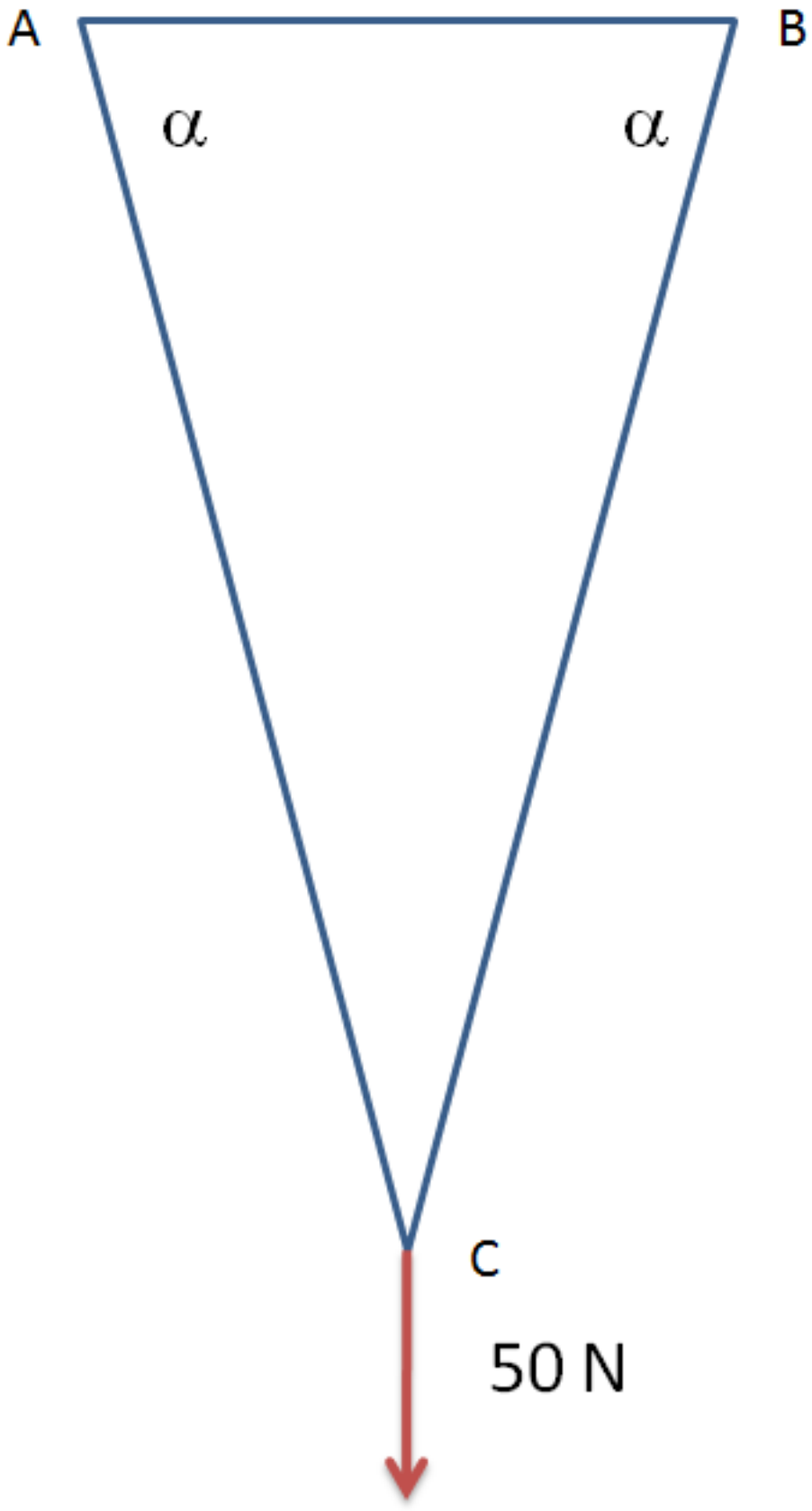

Please choose only one answer:

- 50 N

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- 10 N
- 13 N
- 7 N
- 3 N

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4.1.5. A weight is hung from two hooks such that the wire forms a isoscele...

Author: Stephanie Redfern

A weight is hung from two hooks such that the wire forms a isosceles triange in which the angle alpha is 75 degrees as depicted in the schematic below.

What is the tension in segment AB for the load shown?

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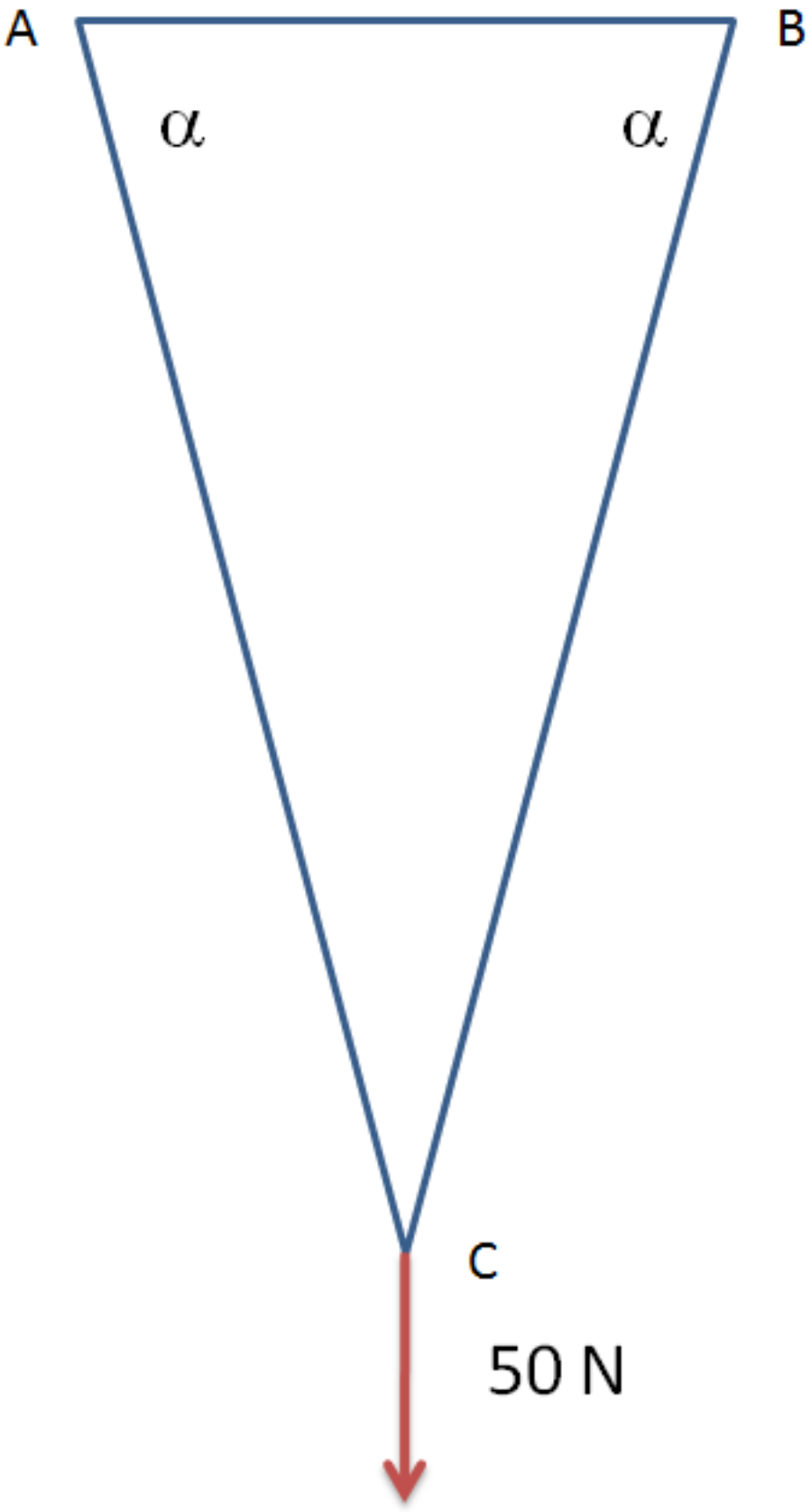

Please choose only one answer:

- 50 N

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- 100 N
- 26 N
- 103 N
- 46 N

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4.1.6. For the vectors A= 4 i + 2 j + 8 k and B = 3i -2 j - 7 k, where i, ...

Author: Stephanie Redfern

For the vectors A= 4 i + 2 j + 8 k and B = 3i -2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following tasks. Calculate ||A|| and ||B||.

Please choose only one answer:

- 7.87, 9.16
- 9.16, 7.87
- 10.82, 9.17
- 84, 61.9
- 61.9, 84

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4.1.7. For the vectors A 4 i + 2 j + 8 k and B= 3i - 2 j - 7 k, where i, j...

Author: Stephanie Redfern

For the vectors A 4 i + 2 j + 8 k and B= 3i - 2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following task. Calculate A • B.

Please choose only one answer:

- 54
- -48
- 48
- 44
- 12

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4.1.8. For the vectors A= 4 i + 2 j + 8 k and B = 3i-2 j - 7 k, where i, j...

Author: Stephanie Redfern

For the vectors A= 4 i + 2 j + 8 k and B = 3i-2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following task. From the formula A · B = cos(q) ||A|| ||B||, calculate q.

Please choose only one answer:

- 2.3 radians
- 84.3 degrees
- 0.843 degrees
- 38.4 degrees
- 3.84 radians

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4.1.9. For the vectors A= 4 i + 2 j + 8 k and B = 3i -2 j - 7 k, where i, ...

Author: Stephanie Redfern

For the vectors A= 4 i + 2 j + 8 k and B = 3i -2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following task. Calculate A x B.

Please choose only one answer:

- -14 k + 52 j+ 2i
- -14 k - 52 j+ 2i
- -14 k + 12 j + 2i
- -14 k + 52 j- 2i
- 14 k- 52 j - 2i

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4.1.10. For the vectors A= 4 i + 2 j + 8 k and B = 3 i -2 j - 7 k, where i,...

Author: Stephanie Redfern

For the vectors A= 4 i + 2 j + 8 k and B = 3 i -2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following task. Calculate B x A.

Please choose only one answer:

- -14 k + 52 j+ 4i
- -12 k - 52 j+ 2i
- 14 k - 52 j - 2i
- -14 k + 52 j- 2i
- -14 k+ 52 j + 2i

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4.1.11. For the vectors A= 4 i + 2 j + 8 k and B = 3 i -2 j - 7 k, where i,...

Author: Stephanie Redfern

For the vectors A= 4 i + 2 j + 8 k and B = 3 i -2 j - 7 k, where i, j, and k are unit vectors in a rectangular coordinate system, perform the following task. From the formula ||A x B|| = ||A|| ||B|| sin(q), calculate q.

Please choose only one answer:

- 38.4 degrees
- 84.3 degrees
- 0.843 degrees
- 0.85 radians
- 3.84 radians

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4.1.12. You find experimentally that the force required to start sliding mo...

Author: Stephanie Redfern

You find experimentally that the force required to start sliding motion of a block of mass 20 kg on a horizontal surface is 12 N. If the same surface is inclined to a 30 degree slope with respect to gravity, what force (in addition to gravity) is required to initiate sliding motion of the object?

Please choose only one answer:

- 0 N
- 196 N
- 12 N
- 108 N
- 170 N

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4.1.13. Convert 1000 kg ft /(hr[sup]2[/sup] m[sup]2[/sup]) to units of psi.

Author: Stephanie Redfern

Convert 1000 kg ft /(hr[sup]2[/sup] m[sup]2[/sup]) to units of psi.

Please choose only one answer:

- 0.035
- 14.7
- 100
- 0.015
- 108

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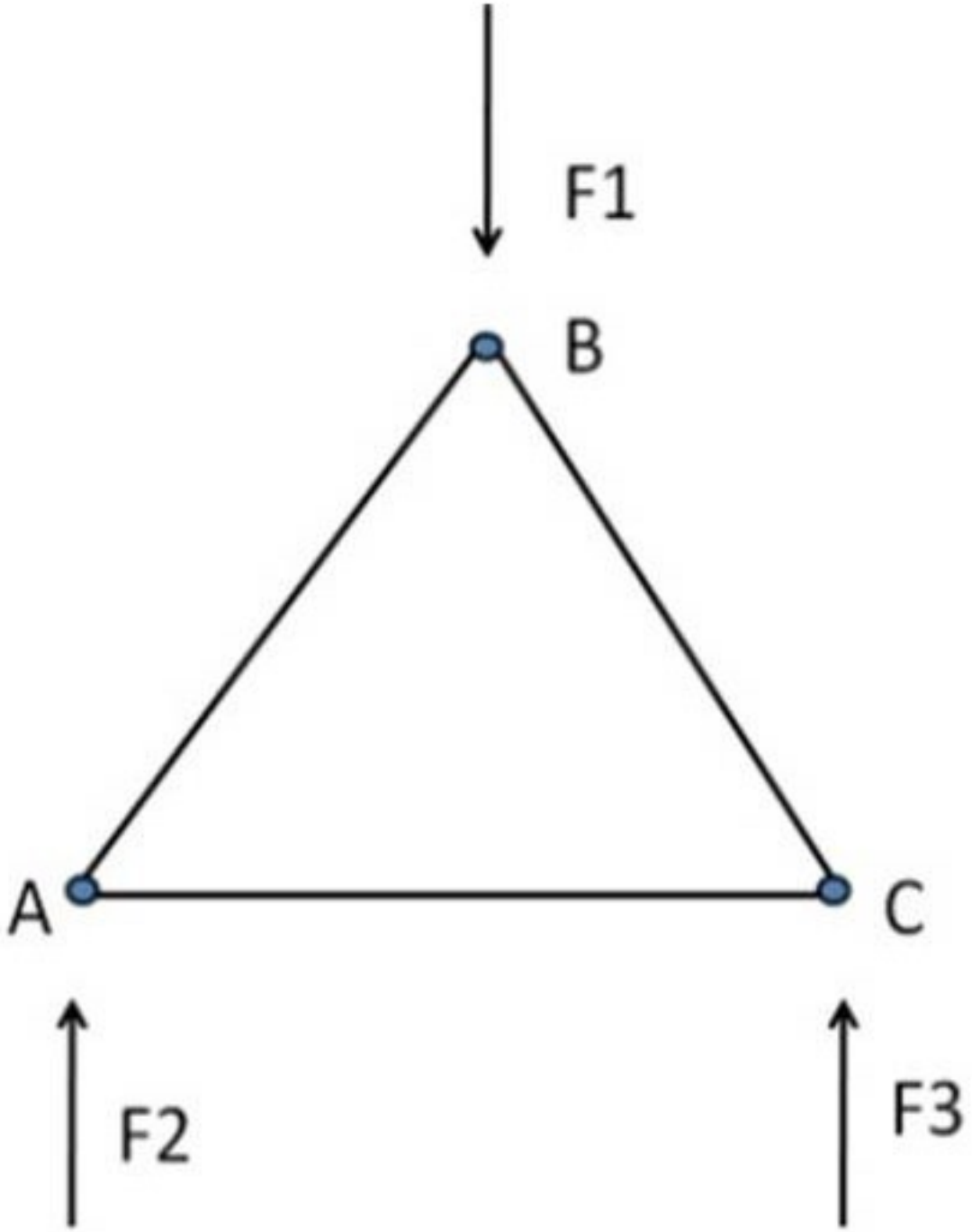
4.1.14. For the pin-connected structure below, the internal angles are all ...

Author: Stephanie Redfern

For the pin-connected structure below, the internal angles are all 60 degrees and the structure is supported from below by a flat table. If the load F1 is 10 N, then what is the force in the member BC?



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Please choose only one answer:

- 5N, compression
- 10N, compression
- 6.66N, compression
- 5.77N, compression

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