Area, Surface Area, Volume

Polygon area, prism reasoning, scale effects, and measurement formulas that matter.

Name _____ Date _____

32 main | 2-up grid | 12 pages | visible side quests

Completion Reward

Shown here as a small pack artifact, not a preview destination.

1. What does the volume formula for a prism measure?

A. How far around the prism it goes
B. How many cubic units fill the prism
C. Only the area of the top face
D. The angle of the prism

1.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

1.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

1.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

1.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

1.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

2. If every side length in a figure doubles, what happens to the area?

A. It doubles.
B. It becomes eight times as large.
C. It stays the same.
D. It becomes four times as large.

2.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

2.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

2.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

2.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

2.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

3. If every side length in a solid doubles, what happens to the volume?

A. It doubles.
B. It becomes four times as large.
C. It becomes eight times as large.
D. It stays the same.

3.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

3.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

3.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

3.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

3.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

4. Which statement is true?

A. Area and volume both use linear units.
B. Volume uses square units only.
C. Area uses square units and volume uses cubic units.
D. Perimeter uses cubic units.

4.1. Which quantity is measured in square units?

A. perimeter
B. area
C. volume
D. slope

4.2. Which quantity is measured in cubic units?

A. perimeter
B. area
C. volume
D. angle

4.3. A rectangle has length 7 and width 4. What is its perimeter?

A. 11
B. 22
C. 28
D. 49

4.4. A square has side length 9. What is its area?

A. 18
B. 36
C. 81
D. 162

4.5. A student reports a volume of 24 square units. What is the issue?

A. volume should use cubic units
B. 24 is too small
C. square units are always wrong
D. volume has no units

5. Which quantity is measured in square units?

A. Perimeter
B. Volume
C. Angle measure
D. Area

5.1. Which quantity is measured in square units?

A. perimeter
B. area
C. volume
D. slope

5.2. Which quantity is measured in cubic units?

A. perimeter
B. area
C. volume
D. angle

5.3. A rectangle has length 7 and width 4. What is its perimeter?

A. 11
B. 22
C. 28
D. 49

5.4. A square has side length 9. What is its area?

A. 18
B. 36
C. 81
D. 162

5.5. A student reports a volume of 24 square units. What is the issue?

A. volume should use cubic units
B. 24 is too small
C. square units are always wrong
D. volume has no units

6. Which formula gives the area of a trapezoid?

A. 1/2 * (b1 + b2) * h
B. b * h
C. 1/2 * b * h
D. l * w * h

6.1. Which formula gives the area of a trapezoid?

A. 1/2 (b1 + b2)h
B. bh
C. 1/2 bh
D. lwh

6.2. A trapezoid has bases 10 and 6 and height 4. What is its area?

A. 16
B. 24
C. 32
D. 64

6.3. Why are both bases used in trapezoid area?

A. the formula averages the two parallel bases
B. one base always disappears
C. height replaces one base
D. trapezoids are circles

6.4. In trapezoid area, the height must be:

A. parallel to the bases
B. perpendicular to the bases
C. the longest side
D. a diagonal

6.5. A trapezoid has bases 8 and 14 and height 5. What is its area?

A. 22
B. 45
C. 55
D. 110

7. A figure is dilated and you want the new area. What is the best next step?

A. Double the scale factor.
B. Square the scale factor.
C. Add the scale factor to the old area.
D. Use the old perimeter instead.

7.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

7.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

7.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

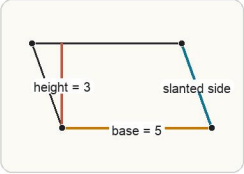
7.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

7.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

8. A student multiplies the base of a parallelogram by its slanted side to find area. What is wrong?



Area comes from base times perpendicular height. The slanted side is only useful if it also gives the true height.

A. Area should use the perimeter instead.
B. Area uses the perpendicular height, not the slanted side unless the slanted side is perpendicular.
C. Parallelograms do not have area.
D. The slanted side should always be added, not multiplied.

8.1. A parallelogram has base 8 and height 5. What is its area?

A. 13
B. 20
C. 40
D. 80

8.2. A student uses the slanted side of a parallelogram as the height. What is wrong?

A. height must be perpendicular to the base
B. slanted sides cannot be measured
C. parallelograms use 1/2 bh
D. nothing

8.3. Which formula gives the area of a parallelogram?

A. 1/2 bh
B. bh
C. 2pi r
D. lwh

8.4. To find parallelogram area, the height should be:

A. any side length
B. perpendicular to the base
C. the longest side
D. the diagonal

8.5. A parallelogram has base 12 and height 3. What is its area?

A. 15
B. 24
C. 36
D. 72

9. A student reports a volume of 24 square units. What is the issue?

A. Volume should be measured in degrees.
B. Square units are always larger than cubic units.
C. Only area can equal 24.
D. Volume should be measured in cubic units, not square units.

9.1. Which quantity is measured in square units?

A. perimeter
B. area
C. volume
D. slope

9.2. Which quantity is measured in cubic units?

A. perimeter
B. area
C. volume
D. angle

9.3. A rectangle has length 7 and width 4. What is its perimeter?

A. 11
B. 22
C. 28
D. 49

9.4. A square has side length 9. What is its area?

A. 18
B. 36
C. 81
D. 162

9.5. A student reports a volume of 24 square units. What is the issue?

A. volume should use cubic units
B. 24 is too small
C. square units are always wrong
D. volume has no units

10. A student uses the slanted side of a parallelogram as the height in the area formula. What is the problem?

A. The slanted side is always twice the base.
B. Parallelograms do not have area.
C. Height must be perpendicular to the base.
D. Area should use perimeter instead.

10.1. A parallelogram has base 8 and height 5. What is its area?

A. 13
B. 20
C. 40
D. 80

10.2. A student uses the slanted side of a parallelogram as the height. What is wrong?

A. height must be perpendicular to the base
B. slanted sides cannot be measured
C. parallelograms use 1/2 bh
D. nothing

10.3. Which formula gives the area of a parallelogram?

A. 1/2 bh
B. bh
C. 2pi r
D. lwh

10.4. To find parallelogram area, the height should be:

A. any side length
B. perpendicular to the base
C. the longest side
D. the diagonal

10.5. A parallelogram has base 12 and height 3. What is its area?

A. 15
B. 24
C. 36
D. 72

11. A student says if every side length triples, the area also triples. What is the problem?

A. Area scales by the cube of the scale factor, so it should be multiplied by 27.
B. Area does not change under dilation.
C. Area scales by the square of the scale factor, so it should be multiplied by 9.
D. Only volume changes under dilation.

11.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

11.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

11.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

11.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

11.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

12. A rectangle has length 7 and width 4. What is its perimeter? Answer with a number.

12.1. Which quantity is measured in square units?

A. perimeter
B. area
C. volume
D. slope

12.2. Which quantity is measured in cubic units?

A. perimeter
B. area
C. volume
D. angle

12.3. A rectangle has length 7 and width 4. What is its perimeter?

A. 11
B. 22
C. 28
D. 49

12.4. A square has side length 9. What is its area?

A. 18
B. 36
C. 81
D. 162

12.5. A student reports a volume of 24 square units. What is the issue?

A. volume should use cubic units
B. 24 is too small
C. square units are always wrong
D. volume has no units

13. A square has side length 9. What is its area? Answer with a number.

13.1. Which quantity is measured in square units?

A. perimeter
B. area
C. volume
D. slope

13.2. Which quantity is measured in cubic units?

A. perimeter
B. area
C. volume
D. angle

13.3. A rectangle has length 7 and width 4. What is its perimeter?

A. 11
B. 22
C. 28
D. 49

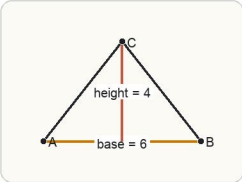
13.4. A square has side length 9. What is its area?

A. 18
B. 36
C. 81
D. 162

13.5. A student reports a volume of 24 square units. What is the issue?

A. volume should use cubic units
B. 24 is too small
C. square units are always wrong
D. volume has no units

14. What is the area of the triangle in the figure? Answer with a number.



Triangle area is one-half the product of a chosen base and its perpendicular height.

14.1. A triangle has base 10 and height 6. What is its area?

A. 16
B. 30
C. 60
D. 120

14.2. Which explanation is best for triangle area?

A. use base x height
B. use 1/2 x base x height
C. use 2 x base x height
D. use base + height

14.3. Before using A = 1/2 bh, what must you identify correctly?

A. the perimeter
B. a perpendicular height
C. the slanted side only
D. the midpoint

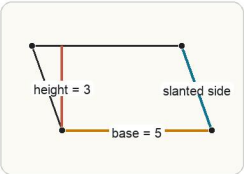
14.4. A student says triangle area is base x height. What is missing?

A. the one-half factor
B. the radius
C. the circumference
D. nothing

14.5. A triangle with base 12 and height 5 has area:

A. 17
B. 30
C. 60
D. 120

15. What is the area of the parallelogram in the figure? Answer with a number.



A parallelogram's area uses the base and the perpendicular height, not the slanted edge length.

15.1. A parallelogram has base 8 and height 5. What is its area?

A. 13
B. 20
C. 40
D. 80

15.2. A student uses the slanted side of a parallelogram as the height. What is wrong?

A. height must be perpendicular to the base
B. slanted sides cannot be measured
C. parallelograms use 1/2 bh
D. nothing

15.3. Which formula gives the area of a parallelogram?

A. 1/2 bh
B. bh
C. 2pi r
D. lwh

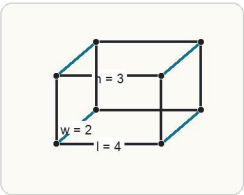
15.4. To find parallelogram area, the height should be:

A. any side length
B. perpendicular to the base
C. the longest side
D. the diagonal

15.5. A parallelogram has base 12 and height 3. What is its area?

A. 15
B. 24
C. 36
D. 72

16. What is the volume of the rectangular prism in the figure? Answer with a number.



Volume multiplies the three dimensions because it counts how many unit cubes fit inside the prism.

16.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

16.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

16.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

16.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

16.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

17. A prism has base area 12 and height 5. What is its volume? Answer with a number.

17.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

17.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

17.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

17.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

17.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

18. A triangle has base 10 and height 6. What is its area? Answer with a number.

18.1. A triangle has base 10 and height 6. What is its area?

A. 16
B. 30
C. 60
D. 120

18.2. Which explanation is best for triangle area?

A. use base x height
B. use 1/2 x base x height
C. use 2 x base x height
D. use base + height

18.3. Before using A = 1/2 bh, what must you identify correctly?

A. the perimeter
B. a perpendicular height
C. the slanted side only
D. the midpoint

18.4. A student says triangle area is base x height. What is missing?

A. the one-half factor
B. the radius
C. the circumference
D. nothing

18.5. A triangle with base 12 and height 5 has area:

A. 17
B. 30
C. 60
D. 120

19. A parallelogram has base 8 and height 5. What is its area? Answer with a number.

19.1. A parallelogram has base 8 and height 5. What is its area?

A. 13
B. 20
C. 40
D. 80

19.2. A student uses the slanted side of a parallelogram as the height. What is wrong?

A. height must be perpendicular to the base
B. slanted sides cannot be measured
C. parallelograms use 1/2 bh
D. nothing

19.3. Which formula gives the area of a parallelogram?

A. 1/2 bh
B. bh
C. 2pi r
D. lwh

19.4. To find parallelogram area, the height should be:

A. any side length
B. perpendicular to the base
C. the longest side
D. the diagonal

19.5. A parallelogram has base 12 and height 3. What is its area?

A. 15
B. 24
C. 36
D. 72

20. A rectangular prism has length 4, width 3, and height 2. What is its volume? Answer with a number.

20.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

20.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

20.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

20.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

20.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

21. Student A says the area of a triangle is base * height. Student B says it is 1/2 * base * height. Who is correct?

A. Student B
B. Student A
C. Both students
D. Neither student

21.1. A triangle has base 10 and height 6. What is its area?

A. 16
B. 30
C. 60
D. 120

21.2. Which explanation is best for triangle area?

A. use base x height
B. use 1/2 x base x height
C. use 2 x base x height
D. use base + height

21.3. Before using A = 1/2 bh, what must you identify correctly?

A. the perimeter
B. a perpendicular height
C. the slanted side only
D. the midpoint

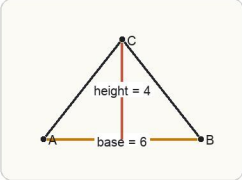
21.4. A student says triangle area is base x height. What is missing?

A. the one-half factor
B. the radius
C. the circumference
D. nothing

21.5. A triangle with base 12 and height 5 has area:

A. 17
B. 30
C. 60
D. 120

22. Before using A = 1/2 bh, what must you identify correctly?



Before using A = 1/2 bh, make sure the height is perpendicular to the base rather than just another side of the figure.

A. Any two sides of the triangle
B. The triangle's perimeter
C. A base and its perpendicular height
D. The midpoint of the base

22.1. A triangle has base 10 and height 6. What is its area?

A. 16
B. 30
C. 60
D. 120

22.2. Which explanation is best for triangle area?

A. use base x height
B. use 1/2 x base x height
C. use 2 x base x height
D. use base + height

22.3. Before using A = 1/2 bh, what must you identify correctly?

A. the perimeter
B. a perpendicular height
C. the slanted side only
D. the midpoint

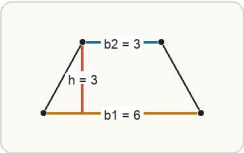
22.4. A student says triangle area is base x height. What is missing?

A. the one-half factor
B. the radius
C. the circumference
D. nothing

22.5. A triangle with base 12 and height 5 has area:

A. 17
B. 30
C. 60
D. 120

23. What is the area of the trapezoid in the figure? Answer with a number.



Trapezoid area uses the average of the two bases and then multiplies by the height.

23.1. Which formula gives the area of a trapezoid?

A. 1/2 (b1 + b2)h
B. bh
C. 1/2 bh
D. lwh

23.2. A trapezoid has bases 10 and 6 and height 4. What is its area?

A. 16
B. 24
C. 32
D. 64

23.3. Why are both bases used in trapezoid area?

A. the formula averages the two parallel bases
B. one base always disappears
C. height replaces one base
D. trapezoids are circles

23.4. In trapezoid area, the height must be:

A. parallel to the bases
B. perpendicular to the bases
C. the longest side
D. a diagonal

23.5. A trapezoid has bases 8 and 14 and height 5. What is its area?

A. 22
B. 45
C. 55
D. 110

24. A cube has edge length 4. What is its surface area? Answer with a number.

24.1. Surface area measures:

A. space inside a solid
B. the total area covering the outside
C. one side length only
D. the line around one face

24.2. A cube has edge length 4. What is its surface area?

A. 16
B. 24
C. 64
D. 96

24.3. A prism has dimensions 2 by 2 by 3. What is its surface area?

A. 12
B. 20
C. 32
D. 52

24.4. Surface area is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

24.5. If a problem asks for the outside covering of a prism, you need:

A. volume
B. surface area
C. perimeter
D. slope

25. A triangle has area 10. A similar triangle is made with scale factor 3. What is the new area? Answer with a number.

25.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

25.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

25.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

25.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

25.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

26. A trapezoid has bases 10 and 6 and height 4. What is its area? Answer with a number.

26.1. Which formula gives the area of a trapezoid?

A. 1/2 (b1 + b2)h
B. bh
C. 1/2 bh
D. lwh

26.2. A trapezoid has bases 10 and 6 and height 4. What is its area?

A. 16
B. 24
C. 32
D. 64

26.3. Why are both bases used in trapezoid area?

A. the formula averages the two parallel bases
B. one base always disappears
C. height replaces one base
D. trapezoids are circles

26.4. In trapezoid area, the height must be:

A. parallel to the bases
B. perpendicular to the bases
C. the longest side
D. a diagonal

26.5. A trapezoid has bases 8 and 14 and height 5. What is its area?

A. 22
B. 45
C. 55
D. 110

27. A rectangular prism has dimensions 2 by 2 by 3. What is its surface area? Answer with a number.

27.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

27.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

27.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

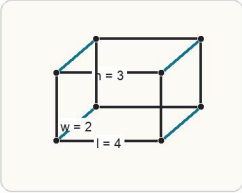
27.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

27.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

28. What is the surface area of the rectangular prism in the figure? Answer with a number.



Surface area comes from adding the areas of every outside face, not from multiplying the three dimensions together.

28.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

28.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

28.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

28.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

28.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

29. A rectangular prism has dimensions 4 by 3 by 2. What is its surface area? Answer with a number.

29.1. The volume formula for a prism measures:

A. distance around the base
B. space inside the solid
C. surface covering only
D. one edge length

29.2. A prism has base area 12 and height 5. What is its volume?

A. 17
B. 35
C. 60
D. 120

29.3. A rectangular prism has length 4, width 3, and height 2. What is its volume?

A. 9
B. 12
C. 24
D. 36

29.4. Which expression gives prism volume?

A. Bh
B. 2pi r
C. 1/2 bh
D. lw + h

29.5. Volume is measured in:

A. linear units
B. square units
C. cubic units
D. degrees

30. A solid is enlarged by scale factor 2. If the original volume is 5, what is the new volume? Answer with a number.

30.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

30.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

30.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

30.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

30.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

31. A triangle has area 12. A similar triangle is made with scale factor 3. What is the new area? Answer with a number.

31.1. If every side length of a figure doubles, the area is multiplied by:

A. 2
B. 3
C. 4
D. 8

31.2. If every side length of a solid doubles, the volume is multiplied by:

A. 2
B. 4
C. 6
D. 8

31.3. If every side length triples, the area is multiplied by:

A. 3
B. 6
C. 9
D. 27

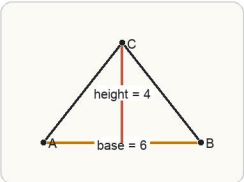
31.4. If every side length triples, the volume is multiplied by:

A. 3
B. 6
C. 9
D. 27

31.5. A student says if every side length triples, the area also triples. What is wrong?

A. area scales with the square, not the first power, of the scale factor
B. tripling is impossible
C. area never changes
D. volume should be used

32. Which explanation is best for finding the area of a triangle?



A triangle is half of a matching parallelogram with the same base and height, which is why the formula includes one-half.

A. Use base plus height because area is one-dimensional.
B. Use one-half times base times height because a triangle is half of a matching parallelogram.
C. Use length times width because every shape is a rectangle.
D. Use the slope formula because triangles have vertices.

32.1. A triangle has base 10 and height 6. What is its area?

A. 16
B. 30
C. 60
D. 120

32.2. Which explanation is best for triangle area?

A. use base x height
B. use 1/2 x base x height
C. use 2 x base x height
D. use base + height

32.3. Before using A = 1/2 bh, what must you identify correctly?

A. the perimeter
B. a perpendicular height
C. the slanted side only
D. the midpoint

32.4. A student says triangle area is base x height. What is missing?

A. the one-half factor
B. the radius
C. the circumference
D. nothing

32.5. A triangle with base 12 and height 5 has area:

A. 17
B. 30
C. 60
D. 120