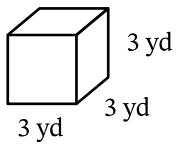
Find the surface area.

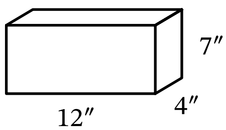
1.



Area of each face: 3 yd × 3 yd = 9 yd²

Surface Area: 6 (9 yd²) = 54 yd²

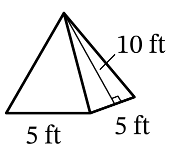
2.



Front (and Back): 7 in × 12 in = 84 in²
Right (and Left): 7 in × 4 in = 28 in²
Top (and Bottom): 7 in × 4 in = 28 in²

Surface Area: 2 (84 in²) + 2 (28 in²) + 2 (48 in²) =
168 in² + 56 in² + 96 in² = 320 in²

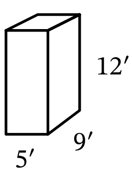
3.



Area of each triangular face: $\frac{1}{2}$ × 5 ft × 10 ft = $\frac{1}{2}$ × 50 ft² = 25 ft²
Area of square base: 5 ft × 5 ft = 25 ft²

Surface Area: 4 ($\frac{1}{2}$ × 5 ft × 10 ft) + (5 ft × 5 ft) =
4 (25 ft²) + 25 ft² =
100 ft² + 25 ft² = 125 ft²

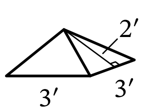
4.



Front (and Back): 5 ft × 12 ft = 60 ft²
Right (and Left): 9 ft × 12 ft = 108 ft²
Top (and Bottom): 5 ft × 9 ft = 45 ft²

Surface Area: 2 (60 ft²) + 2 (108 ft²) + 2 (45 ft²) =
120 ft² + 216 ft² + 90 ft² = 426 ft²

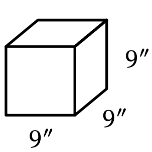
5.



Area of each triangular face: $\frac{1}{2}$ × 3 ft × 2 ft = $\frac{1}{2}$ × 6 ft² = 3 ft²
Area of square base: 3 ft × 3 ft = 9 ft²

Surface Area: 4 (3 ft²) + 9 ft² =
12 ft²) + 9 ft² = 21 ft²

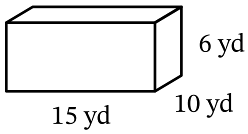
6.



Area of each face: 9 in × 9 in = 81 in²

Surface Area: 6 (81 in²) = 486 in²

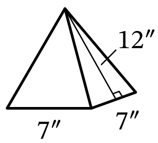
7.



Front (and Back): $15 \text{ yd} \times 6 \text{ yd} = 90 \text{ yd}^2$
Right (and Left): $10 \text{ yd} \times 6 \text{ yd} = 60 \text{ yd}^2$
Top (and Bottom): $15 \text{ yd} \times 10 \text{ yd} = 150 \text{ yd}^2$

Surface Area: $2\ (90 \text{ yd}^2) + 2\ (60 \text{ yd}^2) + 2\ (150 \text{ yd}^2) =$
$180 \text{ yd}^2 + 120 \text{ yd}^2 + 300 \text{ yd}^2 = 600 \text{ yd}^2$

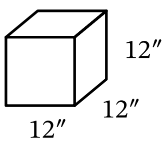
8.



Area of each triangular face: $\frac{1}{2} \times 7 \text{ in} \times 12 \text{ in} = \frac{1}{2} \times 84 \text{ in}^2 = 42 \text{ in}^2$
Area of square base: $7 \text{ in} \times 7 \text{ in} = 49 \text{ in}^2$

Surface Area: $4\ (\frac{1}{2} \times 7 \text{ in} \times 12 \text{ in}) + (7 \text{ in} \times 7 \text{ in}) =$
$4\ (42 \text{ in}^2) + 49 \text{ in}^2 =$
$168 \text{ in}^2 + 49 \text{ in}^2 = 217 \text{ in}^2$

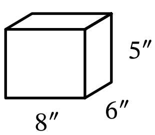
9.



Area of each face: $12 \text{ in} \times 12 \text{ in} = 144 \text{ in}^2$

Surface Area: $6\ (144 \text{ in}^2) = 864 \text{ in}^2$

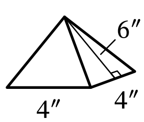
10.



Front (and Back): $8 \text{ in} \times 5 \text{ in} = 40 \text{ in}^2$
Right (and Left): $6 \text{ in} \times 5 \text{ in} = 30 \text{ in}^2$
Top (and Bottom): $8 \text{ in} \times 6 \text{ in} = 48 \text{ in}^2$

Surface Area: $2\ (40 \text{ in}^2) + 2\ (30 \text{ in}^2) + 2\ (48 \text{ in}^2) =$
$80 \text{ in}^2 + 60 \text{ in}^2 + 96 \text{ in}^2 = 236 \text{ in}^2$

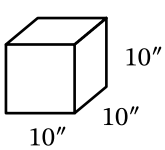
11.



Area of each triangular face: $\frac{1}{2} \times 4 \text{ ft} \times 6 \text{ ft} = \frac{1}{2} \times 24 \text{ ft}^2 = 12 \text{ ft}^2$
Area of square base: $4 \text{ ft} \times 4 \text{ ft} = 16 \text{ ft}^2$

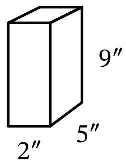
Surface Area: $4\ (\frac{1}{2} \times 4 \text{ ft} \times 6 \text{ ft}) + (4 \text{ ft} \times 4 \text{ ft}) =$
$4\ (12 \text{ ft}^2) + 16 \text{ ft}^2 =$
$48 \text{ ft}^2 + 16 \text{ ft}^2 = 64 \text{ ft}^2$

12.



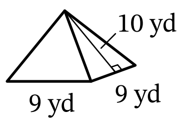
Area of each face: $10 \text{ in} \times 10 \text{ in} = 100 \text{ in}^2$

Surface Area: $6\ (100 \text{ in}^2) = 600 \text{ in}^2$

13. 

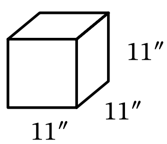
Front (and Back): 2 in × 9 in = 18 in²
Right (and Left): 5 in × 9 in = 45 in²
Top (and Bottom): 2 in × 5 in = 10 in²

Surface Area: 2 (18 in²) + 2 (45 in²) + 2 (10 in²) =
36 in² + 90 in² + 20 in² = 146 in²

14. 

Area of each triangular face: $\frac{1}{2}$ × 9 yd × 10 yd = $\frac{1}{2}$ × 90 yd² = 45 yd²
Area of square base: 9 yd × 9 yd = 81 yd²

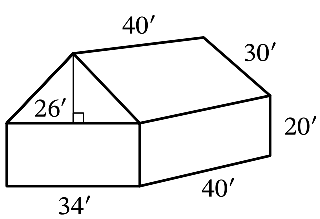
Surface Area: 4 ($\frac{1}{2}$ × 9 yd × 10 yd) + (9 yd × 9 yd) =
4 (45 yd²) + 81 yd² =
180 yd² + 81 yd² = 261 yd²

15. 

Area of each face: 11 in × 11 in = 121 in²

Surface Area: 6 (121 in²) = 726 in²

Use the diagram below to answer questions 16–19.



16. What is the surface area of the rooftop of the house?

Area of right (and left) side of roof: 40 ft × 30 ft = 1,200 ft²
Surface area of rooftop: 2 (1,200 ft²) = 2,400 ft²

17. A "square" of shingling material is 10′ × 10′ or 100 square feet.
Using your answer from #16, tell how many squares of asphalt shingles are needed to cover the roof.

2,400 ft² ÷ $\frac{100 \text{ ft}^2}{1 \text{ “square”}}$ = 24 squares

18. Find the surface area of the sides of the house.

Area of Rectangular Sides:
Front (and Back): 2 in × 9 in = 18 in²
Right (and Left): 5 in × 9 in = 45 in²

Four Sides: 2 (680 ft²) + 2 (800 ft²) =
1,360 ft² + 1,600 ft² = 2,960 ft²

Area of Triangular Sides:
Front (and Back): $\frac{1}{2}$ × 34 ft × 26 ft =
$\frac{1}{2}$ × 884 ft² = 442 ft²

Two Sides: 2 (442 ft²) = 884 ft²

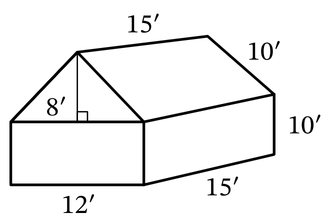
Total Area of Sides: Area of Rectangular Sides + Area of Triangular Sides = 2,690 ft² + 884 ft² = 3,844 ft²

19. A "square" of vinyl siding is also 10′ × 10′ or 100 square feet. Using your answer from #18, tell how many squares of vinyl siding you would need to buy to cover the sides of the house. You cannot buy part of a square.

$$3{,}844\text{ ft}^2 \div \frac{100\text{ ft}^2}{1\text{ "square"}} = 38.44\text{ squares}$$

Round up to the next whole number = 39 squares

Use the diagram below to answer questions 20–22.



20. The exterior of the storage unit shown above needs to be painted (not including the roof). The paint will cover 400 square feet per gallon. Determine how many gallons of paint that you will need to buy for one coat. Remember that you cannot buy part of a can of paint.

Area of Rectangular Sides:

Front (and Back): $12\text{ ft} \times 10\text{ ft} = 120\text{ ft}^2$

Right (and Left): $15\text{ ft} \times 10\text{ ft} = 150\text{ ft}^2$

Four Sides: $2\,(120\text{ ft}^2) + 2\,(150\text{ ft}^2) = 240\text{ ft}^2 + 300\text{ ft}^2 = 540\text{ ft}^2$

Area of Triangular Sides:

Front (and Back): $\frac{1}{2} \times 12\text{ ft} \times 8\text{ ft} = \frac{1}{2} \times 96\text{ ft}^2 = 48\text{ ft}^2$

Two Sides: $2\,(48\text{ ft}^2) = 96\text{ ft}^2$

Total Area of Sides: Area of Rectangular Sides + Area of Triangular Sides $= 540\text{ ft}^2 + 96\text{ ft}^2 = 636\text{ ft}^2$

Gallons of Paint Needed: $636\text{ ft}^2 \div \frac{400\text{ ft}^2}{1\text{ gallon}} = 1.59\text{ gallons}$

Round up to the next whole gallon = 2 gallons must be purchased

21. Use your answer from #20 to help you. You decide to paint one coat of primer and two coats of finish paint. How many gallons of paint will you need to paint two coats? How many gallons of primer will you need to paint one coat?

Gallons of Finish Paint Needed: $1.59\text{ gal} \times 2\text{ coats} = 3.18\text{ gal}$

Round up to the next whole gallon = 4 gallons of finish paint must be purchased

Gallons of Primer Needed: $1.59\text{ gal} \times 1\text{ coat} = 1.59\text{ gal}$

Round up to the next whole gallon = 2 gallons of primer must be purchased

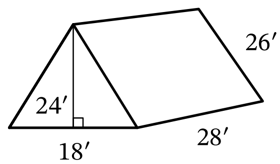
22. Use your answer from #21 to help you.
Find the total cost for the paint and the primer if paint costs \$35 per gallon and primer costs \$30 per gallon.

Cost for Paint: $4\text{ gal} \times \frac{\$35}{1\text{ gal}} = \$140$

Cost for Primer: $2\text{ gal} \times \frac{\$30}{1\text{ gal}} = \$60$

Total Cost: $\$140 + \$60 = \$200$

23. Find the surface area of the triangular front and back walls of the tent.



Front (and Back): $\frac{1}{2} \times 18 \text{ ft} \times 24 \text{ ft} =$
$\frac{1}{2} \times 432 \text{ ft}^2 = 216 \text{ ft}^2$

Total Area of Front and Back: $2\,(216 \text{ ft}^2) = 432 \text{ ft}^2$

24. Alice wants to wrap a gift box of length 8 inch, height 6 inch, and width 4 inch. How many square inches of wrapping paper does Alice need?

Front (and Back): $8 \text{ in} \times 6 \text{ in} = 48 \text{ in}^2$
Right (and Left): $8 \text{ in} \times 4 \text{ in} = 32 \text{ in}^2$
Top (and Bottom): $6 \text{ in} \times 4 \text{ in} = 24 \text{ in}^2$

Surface Area of Box: $2\,(48 \text{ in}^2) + 2\,(32 \text{ in}^2) + 2\,(24 \text{ in}^2) =$
$96 \text{ in}^2 + 64 \text{ in}^2 + 48 \text{ in}^2 = 208 \text{ in}^2$

25. A cereal company wants to change the dimensions of its cereal box to attract the attention of shoppers. The original cereal box has dimensions of 8” × 3” × 11”. The new box would have dimensions of 10” × 10” × 3”. Which box would require more materials to make (i.e. has a larger surface area)?

Original Cereal Box:
Front (and Back): $8 \text{ in} \times 11 \text{ in} = 88 \text{ in}^2$
Right (and Left): $3 \text{ in} \times 11 \text{ in} = 33 \text{ in}^2$
Right (and Bottom): $8 \text{ in} \times 3 \text{ in} = 24 \text{ in}^2$

Surface Area of Original Box:
$2\,(88 \text{ in}^2) + 2\,(33 \text{ in}^2) + 2\,(24 \text{ in}^2) =$
$176 \text{ in}^2 + 66 \text{ in}^2 + 48 \text{ in}^2 = 290 \text{ in}^2$

New Cereal Box:
Front (and Back): $10 \text{ in} \times 10 \text{ in} = 100 \text{ in}^2$
Right (and Left): $10 \text{ in} \times 3 \text{ in} = 30 \text{ in}^2$
Right (and Bottom): $10 \text{ in} \times 3 \text{ in} = 30 \text{ in}^2$

Surface Area of New Box:
$2\,(100 \text{ in}^2) + 2\,(30 \text{ in}^2) + 2\,(30 \text{ in}^2) =$
$200 \text{ in}^2 + 60 \text{ in}^2 + 60 \text{ in}^2 = 320 \text{ in}^2$

Since 320 in^2 is greater than 290 in^2, then the new box has a larger surface area and would require more materials to produce.