Area, volume, and surface area 2D and 3D objects

October 16, 2013

1 x06b1691221f6ea7d

The Gangas are moving from Minneapolis to Mongolia. They pack their belongings in rectangular crates and hire a boxcar to ship the crates across land and sea. The crates are made specifically to fit inside the boxcar with their bases facing down. Each crate has a base 10.1 ft long by 6 ft wide and height 10 ft. The boxcar is 50.5 ft long, 12 ft wide and 10 ft high.

How many crates can The Gangas fit into one boxcar?

Ans [[? input-number 1]] crates 10

Hint 1 Let's find the relationship between the lengths, widths and heights of the crate and boxcar:

$$10.1 \text{ ft} \times 5 = 50.5 \text{ ft}$$

$$6 \text{ ft} \times 2 = 12 \text{ ft}$$

$$10 \text{ ft} \times 1 = 10 \text{ ft}$$

Hint 2 Because the dimensions of the crate and boxcar are related, we can relate the volumes of the crate and boxcar in cubic feet. If we divide the volume of the boxcar by the volume of a crate, we can find how many crates The Gangas can fit into one boxcar.

The formula for volume V of a rectangular prism is:
$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 3 Let's find V of the boxcar in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 50.5 \times 12 \times 10 \\ &= 6060 \text{ ft}^3 \end{aligned}$$

Hint 4 Let's find V of a crate in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 10.1 \times 6 \times 10 \\ &= 606 \text{ ft}^3 \end{aligned}$$

Hint 5 Now, let's divide the volume of the boxcar by the volume of a crate to find how many crates:

$$\begin{aligned} &= 6060 \div 606 \\ &= 10 \end{aligned}$$

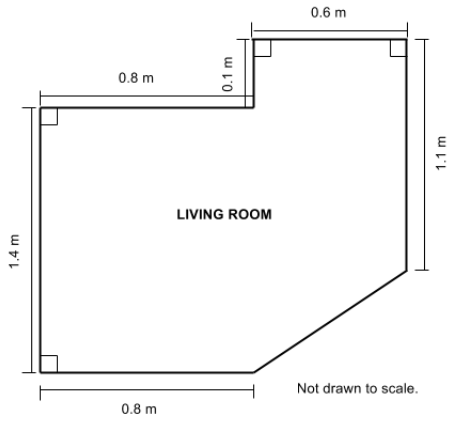
Hint 6 The Gangas can fit 10 crates into one boxcar.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 5ad75d6d.. 2013-10-14

2 x0dcefb4fdcbf8315

Abuto plans to put in wall-to-wall carpet in his living room. He measures the edges of his living room and sketches up the following floor plan. The carpet costs $30 per square meter.

How much will Abuto pay for wall-to-wall carpet for his living room?

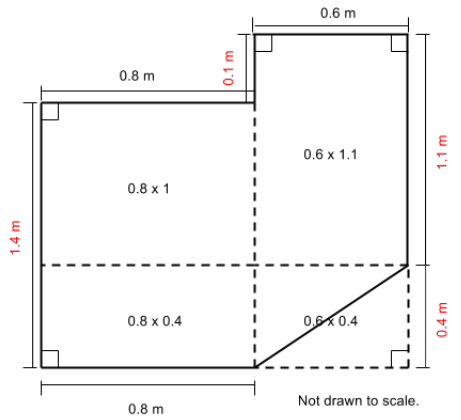


Ans $ [[? input-number 1]] 57

Hint 1 Abuto's living room has 3 rectangular areas and 1 triangular area to cover with carpet. Let's find the total area of the living room floor in square feet to find how much carpet Abuto needs.

Area of a rectangle is equal to its length times its width. Area of a triangle is equal to one half its base times its height.

Hint 2 From the vertical dimensions, we can determine the height of the triangle as 0.4 m. We can also find the dimensions of the areas.



Hint 3 Let's find the total area of the living room by adding the areas of the 3 rectangles and 1 triangle together.

$$= 0.8 \times 1 + 0.8 \times 0.4 + 0.6 \times 1.1 + 0.5 \times 0.6 \times 0.4$$

$$= 0.8 + 0.32 + 0.66 + 0.12$$

$$= 1.9 \text{ m}^2$$

Hint 4 Abuto has 1.9 m^2 to cover with carpet, and the cost of carpet is \$30 per square meter. Let's multiply the total area times the cost per area:

$$= 30 \times 1.9$$
$$= \$57$$

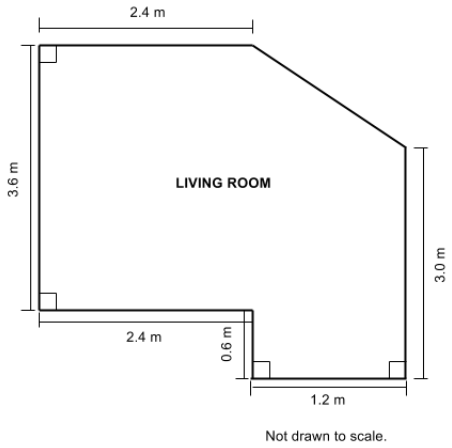
Hint 5 Abuto will pay \$57 to install wall-to-wall carpet in his living room.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: b75c2b50.. 2013-10-14

3 x0e6445ad25557e40

Tony plans to put in carpet in his living room. He measures the edges of his living room and sketches up the following floor plan.

How many square meters of carpet does Tony need to cover the entire area of his living room floor?

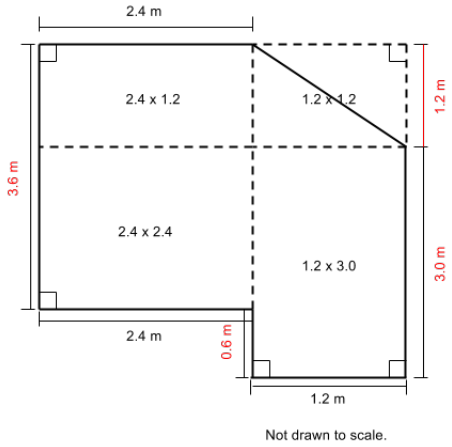


Ans [[? input-number 1]] m^2 12.96

Hint 1 Tony's living room has 3 rectangular areas and 1 triangular area to cover with carpet. Let's find the total area of the living room floor in square meters to find how much carpet Tony needs.

Area of a rectangle is equal to its length times its width. Area of a triangle is equal to one half its base times its height.

Hint 2 From the vertical dimensions, we can determine the height of the triangle as 1.2 m. We can also find the dimensions of the areas.



Hint 3 Let's find the total area of the living room by adding the areas of the 3 rectangles and 1 triangle together.

$$= 2.4 \times 1.2 + 2.4^2 + 1.2 \times 3.0 + 0.5 \times 1.2 \times 1.2$$

$$= 2.88 + 5.76 + 3.6 + 0.72$$

$$= 12.96 \text{ m}^2$$

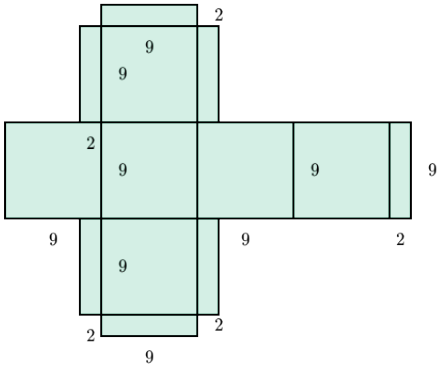
Hint 4 Tony needs 12.96 m^2 of carpet to cover the entire area of his living room floor.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 4ff39c7b.. 2013-10-11

4 x10eb0d14b6e1f311

The company Sweet as Pie has 500 mile-high pumpkin pies to make for Thanksgiving. They package their pies each in a folded box made out of cardboard. The closed box is a cube with side lengths 9 in. There are 7 rectangular tabs that wrap around the edges to make sure the pies stay fresh. The tabs are 9 in by 2 in each.

In square inches what is the minimum amount of cardboard Sweet as Pie needs to package all 500 pumpkin pies individually? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] in^2 306000

Hint 1 Lets determine the surface area (SA) of one box in square inches. Then, we can multiply the surface area of one box times 500 to find how many square inches of cardboard are needed.

The box has is a cube, so it has 6 square sides. The box also has 7 rectangular tabs.

Hint 2 Lets find the total surface area of the box. Area of a rectangle is equal to its length times its width. Let's find the surface areas of the 6 square sides and 7 rectangular tabs.

There are 6 square sides with side lengths 9 in:

$$SA = 6 \times 9 \times 9$$
$$= 486 \text{ in}^2$$

There are 7 rectangular tabs 9 in by 2 in:

$$SA = 7 \times 9 \times 2$$
$$= 126 \text{ in}^2$$

Lets sum together all the surface areas to find the total surface area of one box:

$$SA = 486 + 126$$
$$= 612 \text{ in}^2$$

Hint 3 Let's multiply the total area by 500 boxes to find the amount of cardboard:

$$SA = 500 \times 612$$
$$= 306000 \text{ in}^2$$

Hint 4 Sweet as Pie needs a minimum of $306,000$ in^2 of cardboard to package all 500 pumpkin pies individually.

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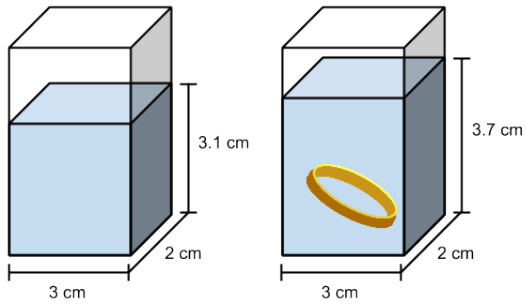
Version: 85286b7a.. 2013-10-14

5 x2303e1e7ce324859

Molly wants to know the volume of her gold ring in cubic centimeters. She gets a rectangular glass with a base 3 cm by 2 cm and fills the glass 3.1 cm high with water. Molly drops her gold ring in the glass and measures the new height of the water to be 3.7 cm.

What is the volume of Molly's ring in cubic centimeters?



Ans [[? input-number 1]] cm^3 3.6

Hint 1 The change in volume of the water is caused by adding the volume of Molly's gold ring to the volume of the water. Let's find the change in volume to find the volume of the gold ring.

Volume V of a rectangular prism can be calculated using the formula:

V = length · width · height

Hint 2 The length 3 cm and width 2 cm of the water in the rectangular glass does not change, but the height does change.

Hint 3 The change in height of the water is $(3.7 - 3.1)$ cm. Let's find V of the change in water:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 3 \cdot 2 \cdot (3.7 - 3.1) \\ &= 3 \cdot 2 \cdot (0.6) \\ &= 3.6 \text{ cm}^3 \end{aligned}$$

Hint 4 The volume of Molly's gold ring is 3.6 cm^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 3c136df5.. 2013-10-15

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6 x23beb4cd843665af

The Joneses are moving from San Francisco to South Africa. They pack their belongings in rectangular crates and hire a boxcar to ship the crates across land and sea. The crates are made specifically to fit inside the boxcar with their bases facing down. Each crate has a base 15 ft long by 5 ft wide and height 6.5 ft. The boxcar is 60 ft long, 10 ft wide and 13 ft high.

How many crates can The Joneses fit into one boxcar?

Ans [[? input-number 1]] crates 16

Hint 1 Let's find the relationship between the lengths, widths and heights of the crate and boxcar:

$$15 \text{ ft} \times 4 = 60 \text{ ft}$$

$$5 \text{ ft} \times 2 = 10 \text{ ft}$$

$$6.5 \text{ ft} \times 2 = 13 \text{ ft}$$

Hint 2 Because the dimensions of the crate and boxcar are related, we can relate the volumes of the crate and boxcar in cubic feet. If we divide the volume of the boxcar by the volume of a crate, we can find how many crates The Joneses can fit into one boxcar.

The formula for volume V of a rectangular prism is:
$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 3 Let's find V of the boxcar in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 60 \times 10 \times 13 \\ &= 7800 \text{ ft}^3 \end{aligned}$$

Hint 4 Let's find V of a crate in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 15 \times 5 \times 6.5 \\ &= 487.5 \text{ ft}^3 \end{aligned}$$

Hint 5 Now, let's divide the volume of the boxcar by the volume of a crate to find how many crates:

$$\begin{aligned} &= 7800 \div 487.5 \\ &= 16 \end{aligned}$$

Hint 6 The Joneses can fit 16 crates into one boxcar.

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Version: af6cf468.. 2013-10-14

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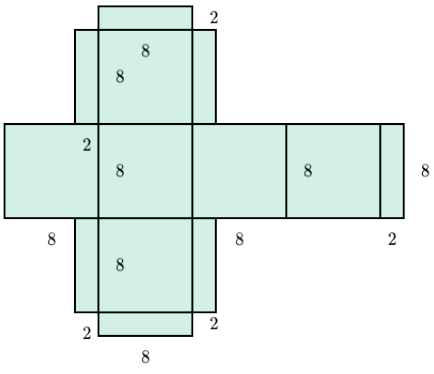
7 x276127b5872fbc61

The company Sweet as Pie has 750 mile-high apple pies to make for Thanksgiving. They package their pies each in a folded box made out of cardboard. The closed box is a cube with side lengths 8 in. There are 7 rectangular tabs that wrap around the edges to make sure the pies stay fresh. The tabs are 8 in by 2 in each.

In square inches what is the minimum amount of cardboard Sweet as Pie needs to package all 750 apple pies individually? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] in^2 650000

Hint 1 Lets determine the surface area (SA) of one box in square inches. Then, we can multiply the surface area of one box times 750 to find how many square inches of cardboard are needed.

The box has is a cube, so it has 6 square sides. The box also has 7 rectangular tabs.

Hint 2 Lets find the total surface area of the box. Area of a rectangle is equal to its length times its width. Let's find the surface areas of the 6 square sides and 7 rectangular tabs.

There are 6 square sides with side lengths 8 in:

$$\begin{aligned} SA &= 6 \times 8 \times 8 \\ &= 384 \text{ in}^2 \end{aligned}$$

There are 7 rectangular tabs 8 in by 2 in:

$$\begin{aligned} SA &= 7 \times 8 \times 2 \\ &= 112 \text{ in}^2 \end{aligned}$$

Lets sum together all the surface areas to find the total surface area of one box:

$$\begin{aligned} SA &= 384 + 112 \\ &= 496 \text{ in}^2 \end{aligned}$$

Hint 3 Let's multiply the total area by 750 boxes to find the amount of cardboard:

$$\begin{aligned} SA &= 750 \times 496 \\ &= 372000 \text{ in}^2 \end{aligned}$$

Hint 4 Sweet as Pie needs a minimum of $372,000$ in^2 of cardboard to package all 750 apple pies individually.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: d70f2a95.. 2013-10-14

8 x27952dc36dd03124

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 40 ft long, 25 ft wide, and 20 ft high. In transport to the dump site, the volume of the soil decreases 15% as it settles in the box.

What is the volume of the dirt at the dump site in cubic feet?

Ans [[? input-number 1]] ft^3 17000

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 15%.

In other words, the soil is 85% of its original height at the dump site, since $100\% - 15\% = 85\%$.

Hint 2 Let's multiply the original height 20 ft by 0.85 to find the height of the soil at the dump site:

$$\begin{aligned} h &= 0.85 \cdot 20 \\ &= 17 \text{ ft} \end{aligned}$$

Hint 3 Now, let's find the volume of the box using the formula for volume V of a rectangular prism and the dimensions of the soil at the dump site:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 40 \cdot 25 \cdot 17 \\ &= 17000 \text{ ft}^3 \end{aligned}$$

Hint 4 The volume of the dirt at the dump site is 17000 ft^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: d6fed02e.. 2013-10-14

9 x27ff33d9c309c7ce

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 40 ft long, 35 ft wide, and 30 ft high. In transport to the dump site, the volume of the soil decreases 20% as it settles in the box.

What is the height in feet of the dirt at the dump site?

Ans [[? input-number 1]] ft 24

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 20%. So, the soil is 80% of its original height.

Hint 2 Let's multiply the height 30 ft by 0.8 to find the height of the soil at the dump site:

$$\begin{aligned} h &= 0.8 \cdot 30 \\ &= 24 \text{ ft} \end{aligned}$$

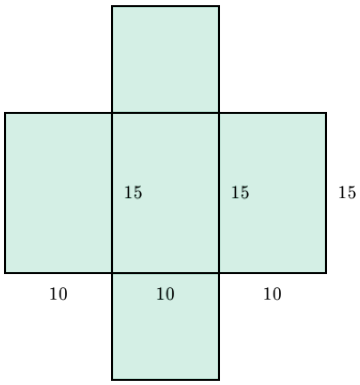
Hint 3 The soil is 24 ft at the dump site.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 72a8546b.. 2013-10-14

10 x2d596dc8eec89b08

The company Digit Tech designs a new SmartPhone. The packaging includes an open box made out of cardboard. The dimensions of the box are 15 cm long, 10 cm wide and 10 cm high. Digit Tech expects to sell 1000 phones and package each phone individually in a box.

In square centimeters what is the minimum amount of cardboard Digit Tech needs to package all 1000 new SmartPhones? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] cm^2 650000

Hint 1 Lets determine the surface area (SA) of one box in square centimeters. Then, we can multiply the surface area of one box times 1000 to find how many square centimeters of cardboard are needed.

The box has 5 sides: 1 bottom and 2 sets of equal sides opposite each other.

Hint 2 Lets find the total surface area of the box. Area of a rectangle is equal to its length times its width. Let's find the surface areas of the 5 rectangular sides.

There are 2 sides 15 cm long and 10 cm high:

$$\begin{aligned} SA &= 2 \times 15 \times 10 \\ &= 300 \text{ cm}^2 \end{aligned}$$

There are 2 sides 10 cm wide and 10 cm high:

$$\begin{aligned} SA &= 2 \times 10 \times 10 \\ &= 200 \text{ cm}^2 \end{aligned}$$

There is 1 side (the bottom) 15 cm long and 10 cm wide:

$$\begin{aligned} SA &= 1 \times 15 \times 10 \\ &= 150 \text{ cm}^2 \end{aligned}$$

Lets sum together all the surface areas to find the total surface area of one box:

$$\begin{aligned} SA &= 300 + 200 + 150 \\ &= 650 \text{ cm}^2 \end{aligned}$$

Hint 3 Let's multiply the total area by 1000 boxes to find the amount of cardboard:

$$\begin{aligned} SA &= 1000 \times 650 \\ &= 650000 \text{ cm}^2 \end{aligned}$$

Hint 4 Digit Tech needs a minimum of $650,000$ cm^2 of cardboard to package all 1000 new SmartPhones individually.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 207d6a6d.. 2013-10-14

11 x33396169090e3680

The Smiths are moving from New York to Shanghai. They pack their belongings in rectangular crates and hire a boxcar to ship the crates across land and sea. The crates are made specifically to fit inside the boxcar with their bases facing down. Each crate has a base 10 ft long by 4.5 ft

wide and height 6 ft. The boxcar is 50 ft long, 9 ft wide and 12 ft high.

How many crates can The Smiths fit into one boxcar?

Ans [[? input-number 1]] crates 20

Hint 1 Let's find the relationship between the lengths, widths and heights of the crate and boxcar:

$$10 \text{ ft} \times 5 = 50 \text{ ft}$$

$$4.5 \text{ ft} \times 2 = 9 \text{ ft}$$

$$6 \text{ ft} \times 2 = 12 \text{ ft}$$

Hint 2 Because the dimensions of the crate and boxcar are related, we can relate the volumes of the crate and boxcar in cubic feet. If we divide the volume of the boxcar by the volume of a crate, we can find how many crates The Smiths can fit into one boxcar.

The formula for volume V of a rectangular prism is:
$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 3 Let's find V of the boxcar in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 50 \times 9 \times 12 \\ &= 5400 \text{ ft}^3 \end{aligned}$$

Hint 4 Let's find V of a crate in cubic feet:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 10 \times 4.5 \times 6 \\ &= 270 \text{ ft}^3 \end{aligned}$$

Hint 5 Now, let's divide the volume of the boxcar by the volume of a crate to find how many crates:

$$\begin{aligned} &= 5400 \div 270 \\ &= 20 \end{aligned}$$

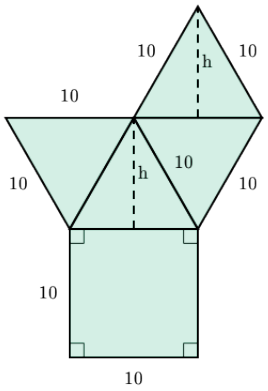
Hint 6 The Smiths can fit 20 crates into one boxcar.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 39d1acc8.. 2013-10-14

12 x3e93af40b7f72c90

Molly made each of her 12 girlfriends a pair of earrings. To wrap the pairs individually, she creates a simple cardboard gift box to fold into a pyramid. The base is a square with side lengths 10 in. The sides are 4 equilateral triangles with side lengths 10 in and height h. The height h is equal to $8\frac{2}{3}$ in.

In square inches what is the minimum amount of cardboard Molly needs to create 12 gift boxes to wrap each pair of earrings individually? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] in^2 3280

Hint 1 Lets determine the surface area (SA) of one box in square inches. Then, we can multiply the surface area of one box times 12 to find how many square inches of cardboard are needed.

Let's use fractions throughout our calculations to avoid any rounding errors.

Hint 2 Lets find the total surface area of the box by finding the surface areas of 1 square and 4 triangles.

Area of a square is equal to its length squared. There is 1 square side with side lengths 10 in:

$$\begin{aligned} SA &= 10^2 \\ &= 100 \text{ in}^2 \end{aligned}$$

Area of a triangle is equal to one half its base times its height h. There are 4 triangles with a base of 10 in and height of $8\frac{2}{3}$ in:

$$SA = 4 \times \frac{1}{2} \times 10 \times 8\frac{2}{3}$$

$$= 4 \times 10 \times \frac{1}{2} \times \frac{26}{3}$$

$$= \frac{1040}{6}$$

$$= \frac{520}{3} \text{ in}^2$$

Lets sum together all the surface areas to find the total surface area of one box:

$$SA = 100 + \frac{520}{3}$$

$$= \frac{300}{3} + \frac{520}{3}$$

$$= \frac{820}{3} \text{ in}^2$$

Hint 3 Let's multiply the total area by 12 boxes to find the amount of cardboard:

$$SA = 12 \times \frac{820}{3}$$
$$= 3280 \text{ in}^2$$

Hint 4 Molly needs a minimum of 3280 in^2 of cardboard to package all 12 pairs of earrings individually.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 43de7f04.. 2013-10-14

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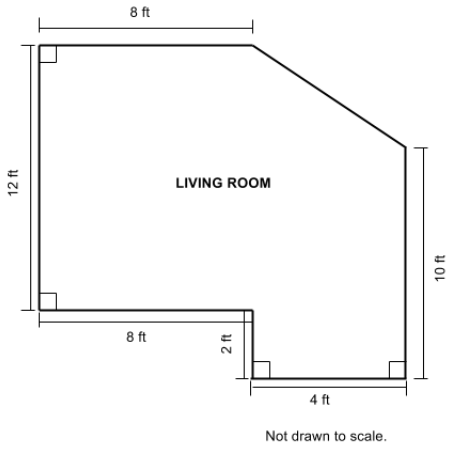
13 x4e644b9868f4e7bb

Eric plans to put in carpet in his living room. He measures the edges of his living room and sketches up the following floor plan.

How many square feet of carpet does Eric need to cover the entire area of his living room floor?

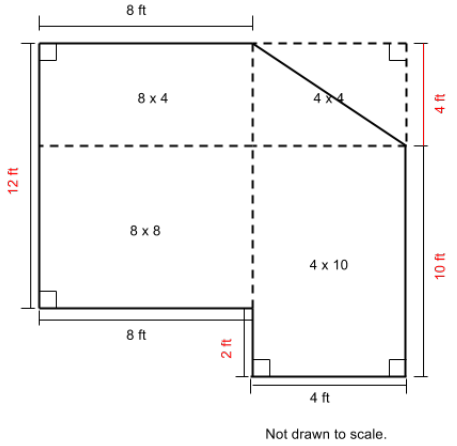


Ans [[? input-number 1]] ft^2 144

Hint 1 Eric's living room has 3 rectangular areas and 1 triangular area to cover with carpet. Let's find the total area of the living room floor in square feet to find how much carpet Eric needs.

Area of a rectangle is equal to its length times its width. Area of a triangle is equal to one half its base times its height.

Hint 2 From the vertical dimensions, we can determine the height of the triangle as 4 ft. We can also find the dimensions of the areas.



Hint 3 Let's find the total area of the living room by adding the areas of the 3 rectangles and 1 triangle together.

$$= 8 \times 4 + 8^2 + 4 \times 10 + \frac{1}{2} \times 4 \times 4$$

$$= 32 + 64 + 40 + 8$$

$$= 144 \text{ ft}^2$$

Hint 4 Eric needs 144 ft^2 of carpet to cover the entire area of his living room floor.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 17ad5acd.. 2013-10-11

14 x5482354a69951a95

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 13 m long, 10 m wide, and 10 m high. In transport to the dump site, the volume of the soil decreases 12% as it settles in the box.

What is the volume of the dirt at the dump site in cubic meters?

Ans [[? input-number 1]] m^3 1144

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 12%.

In other words, the soil is 88% of its original height at the dump site, since $100\% - 12\% = 88\%$.

Hint 2 Let's multiply the original height 10 m by 0.88 to find the height of the soil at the dump site:

$$h = 0.88 \cdot 10$$
$$= 8.8 \text{ m}$$

Hint 3 Now, let's find the volume of the box using the formula for volume V of a rectangular prism and the dimensions of the soil at the dump site:

$$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$$
$$= 13 \cdot 10 \cdot 8.8$$
$$= 1144 \text{ m}^3$$

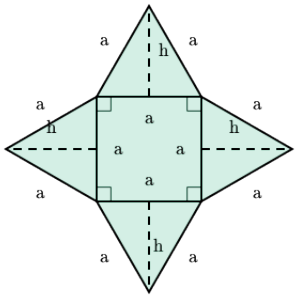
Hint 4 The volume of the dirt at the dump site is 1144 m^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 72648da6.. 2013-10-14

15 x63b88eeb5015ba3c

Jose is making a crazy math construction. He creates 360 small pyramids out of paper he folds, then glues together identical sides until he makes a large pyramid. One small pyramid contains a square base with side lengths a and 4 equilateral triangles with base a and height h. The height h is 1.7 cm. The length a is 2 cm.

In square centimeters what is the minimum amount of paper Jose uses to create 360 small pyramids? (Assume there is no wasted paper.)



Ans [[? input-number 1]] cm^2 3888

Hint 1 Lets determine the surface area (SA) of one small pyramid in square centimeters. Then, we can multiply the surface area of one small pyramid times 360 to find how many square centimeters of paper Jose needs.

Hint 2 Lets find the total surface area of a small pyramaid by finding the surface areas of 1 square and 4 triangles.

Area of a square is equal to its length squared. There is 1 square side with side lengths 2 cm:

$$SA = 2^2$$
$$= 4 \text{ cm}^2$$

Area of a triangle is equal to one half its base times its height h. There are 4 triangles with a base of 2 and height of 1.7 cm:

$$SA = 4 \times \frac{1}{2} \times 2 \times 1.7$$
$$= 6.8 \text{ cm}^2$$

Lets sum together all the surface areas to find the total surface area of one box:

$$SA = 4 + 6.8$$
$$= 10.8 \text{ cm}^2$$

Hint 3 Let's multiply the total area by 360 to find the amount of paper Jose needs:

$$SA = 360 \times 10.8$$
$$= 3888 \text{ cm}^2$$

Hint 4 Jose needs a minimum of 3888 cm^2 of paper to create 360 small pyramids.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 925df6e3.. 2013-10-14

16 x6648cea11832855f

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 12 m long, 10 m wide, and 10 m high. In transport to the dump site, the volume of the soil decreases 10% as it settles in the box.

What is the volume of the dirt at the dump site in cubic meters?

Ans [[? input-number 1]] m^3 1080

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 10%.

In other words, the soil is 90% of its original height at the dump site, since 100% − 12% = 90%.

Hint 2 Let's multiply the original height 10 m by 0.9 to find the height of the soil at the dump site:

$$h = 0.9 \cdot 10$$
$$= 9 \text{ m}$$

Hint 3 Now, let's find the volume of the box using the formula for volume V of a rectangular prism and the dimensions of the soil at the dump site:

$$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$$
$$= 12 \cdot 10 \cdot 9$$
$$= 1080 \text{ m}^3$$

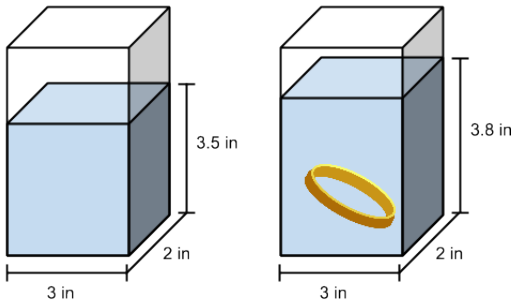
Hint 4 The volume of the dirt at the dump site is 1080 m^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: f00d0545.. 2013-10-14

17 x6ed17026d8bfe0bb

Laura wants to know the volume of her gold ring in cubic inches. She gets a rectangular glass with a base 3 in by 2 in and fills the glass 3.5 in high with water. Laura drops her gold ring in the glass and measures the new height of the water to be 3.8 in.

What is the volume of Laura's ring in cubic inches?



Ans [[? input-number 1]] in^3 1.8

Hint 1 The change in volume of the water is caused by adding the volume of Laura's gold ring to the volume of the water. Let's find the change in volume to find the volume of the gold ring.

Volume V of a rectangular prism can be calculated using the formula:

V = length · width · height

Hint 2 The length 3 in and width 2 in of the water in the rectangular glass does not change, but the height does change.

Hint 3 The change in height of the water is $(3.8 - 3.5)$ in. Let's find V of the change in water:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 3 \cdot 2 \cdot (3.8 - 3.5) \\ &= 3 \cdot 2 \cdot (0.3) \\ &= 1.8 \text{ in}^3 \end{aligned}$$

Hint 4 The volume of Laura's gold ring is 1.8 in^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 40c1d84c.. 2013-10-14

18 x7624e1cba96b8577

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 48 ft long, 24 ft wide, and 24 ft high. In transport to the dump site, the volume of the soil decreases 25% as it settles in the box.

What is the height in feet of the dirt at the dump site?

Ans [[? input-number 1]] ft 18

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 25%. So, the soil is 75% of its original height.

Hint 2 Let's multiply the height 24 ft by 0.75 to find the height of the soil at the dump site:

$$\begin{aligned} h &= 0.75 \cdot 24 \\ &= 18 \text{ ft} \end{aligned}$$

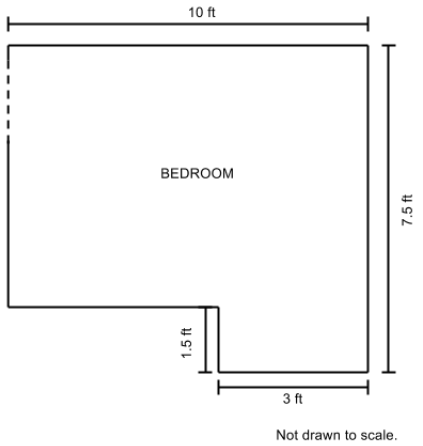
Hint 3 The soil is 18 ft at the dump site.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 76d1d943.. 2013-10-14

19 x7cadfb512d9fc1d4

Sarah plans to put in wall-to-wall carpet in her bedroom. She measures the dimensions of her bedroom and sketches up the following floor plan. The carpet costs $4.50 per square foot.

How much will Sarah pay for wall-to-wall carpet for her bedroom?



Ans $ [[? input-number 1]] 290.25

Hint 1 Sarahs bedroom has two rectangular areas, large and small, to cover with carpet. Area of a rectangle is equal to its length times its width.

The small rectangle is 3 ft long and 1.5 ft wide. The small rectangle has an area of:

$$\begin{aligned} A &= 3 \cdot 1.5 \\ &= 4.5 \text{ sq ft} \end{aligned}$$

Hint 2 The large rectangle is 10 ft long and $(7.5 - 1.5)$ ft wide. The large rectangle has an area of:

$$\begin{aligned} A &= 10 \cdot (7.5 - 1.5) \\ &= 10 \cdot 6 \\ &= 60 \text{ sq ft} \end{aligned}$$

Hint 3 Let's find the total area of Sarahs bedroom by adding the areas of the large and small rectangles together:

$$\begin{aligned} A &= 4.5 + 60 \\ &= 64.5 \text{ ft}^2 \end{aligned}$$

Hint 4 Sarah has 64.5 ft^2 to cover with carpet, and the cost of carpet is \$4.50 per square foot. Let's multiply the total area times the cost per area:

$$= 4.50 \cdot 64.5$$
$$= \$290.25$$

Hint 5 Sarah will pay \$290.25 to install wall-to-wall carpet in her bedroom.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 76730e30.. 2013-10-14

20 xb0e4e814268fd586

The Ubas are moving from Houston to Egypt. They pack their belongings in rectangular crates and hire a boxcar to ship the crates across land and sea. The crates are made specifically to fit inside the boxcar with their bases facing down. Each crate has a base 5 m long by 1.5 m wide and height 2 m. The boxcar is 15 m long, 3 m wide and 4 m high.

How many crates can The Ubas fit into one boxcar?

Ans [[? input-number 1]] crates 12

Hint 1 Let's find the relationship between the lengths, widths and heights of the crate and boxcar:

$$5 \text{ m} \times 3 = 15 \text{ m}$$

$$1.5 \text{ m} \times 2 = 3 \text{ m}$$

$$2 \text{ m} \times 2 = 4 \text{ m}$$

Hint 2 Because the dimensions of the crate and boxcar are related, we can relate the volumes of the crate and boxcar in cubic meters. If we divide the volume of the boxcar by the volume of a crate, we can find how many crates The Ubas can fit into one boxcar.

The formula for volume V of a rectangular prism is:
$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 3 Let's find V of the boxcar in cubic meters:

$$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$$
$$= 15 \times 3 \times 4$$
$$= 180 \text{ m}^3$$

Hint 4 Let's find V of a crate in cubic meters:

$$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$$
$$= 5 \times 1.5 \times 2$$
$$= 15 \text{ m}^3$$

Hint 5 Now, let's divide the volume of the boxcar by the volume of a crate to find how many crates:

$$= 180 \div 15$$
$$= 12$$

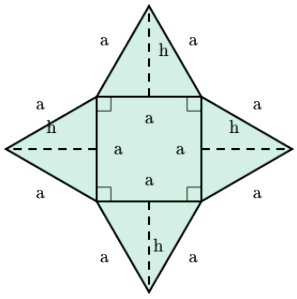
Hint 6 The Ubas can fit 12 crates into one boxcar.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 37895a06.. 2013-10-14

21 xb2ab1d8c26fd802e

Matt is making a crazy math construction. He wants to create 360 small pyramids out of paper he folds, then glue together identical sides until he makes a large pyramid. One small pyramid contains a square base with side lengths a and 4 equilateral triangles with base a and height h. The height h is 3 cm. The length a is 3.5 cm.

In square centimeters what is the minimum amount of paper Matt needs to create 360 small pyramids? (Assume there is no wasted paper.)



Ans [[? input-number 1]] cm^2 11970

Hint 1 Lets determine the surface area (SA) of one small pyramid in square centimeters. Then, we can multiply the surface area of one small pyramid times 360 to find how many square centimeters of paper Matt needs.

Hint 2 Lets find the total surface area of a small pyramaid by finding the surface areas of 1 square and 4 triangles.

Area of a square is equal to its length squared. There is 1 square side with side lengths 3.5 cm:

$$SA = 3.5^2$$
$$= 12.25 \text{ cm}^2$$

Area of a triangle is equal to one half its base times its height h. There are 4 triangles with a base of 3.5 and height of 3 cm:

$$SA = 4 \times \frac{1}{2} \times 3.5 \times 3$$
$$= 21 \text{ cm}^2$$

Lets sum together all the surface areas to find the total surface area of one box:

$$SA = 12.25 + 21$$
$$= 33.25 \text{ cm}^2$$

Hint 3 Let's multiply the total area by 360 to find the amount of paper Matt needs:

$$SA = 360 \times 33.25$$
$$= 11970 \text{ cm}^2$$

Hint 4 Matt needs a minimum of 11970 cm^2 of paper to create 360 small pyramids.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 29f350c3.. 2013-10-14

22 xbab0d531f221f744

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 16 m long, 3 m wide, and 8 m high. In transport to the dump site, the volume of the soil decreases 20% as it settles in the box.

What is the height in feet of the dirt at the dump site?

Ans [[? input-number 1]] m 6.4

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 20%. So, the soil is 80% of its original height.

Hint 2 Let's multiply the height 8 m by 0.8 to find the height of the soil at the dump site:

$$h = 0.8 \cdot 8$$
$$= 6.4 \text{ m}$$

Hint 3 The soil is 6.4 m at the dump site.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 256e2635.. 2013-10-14

23 xc3f3208be4a5eaec

A crew is excavating a construction site to build a new swimming pool. The crew fills the box of a dump truck to the top with dirt. The box is 45 ft long, 20 ft wide, and 23 ft high. In transport to the dump site, the volume of the soil decreases 10% as it settles in the box.

What is the volume of the dirt at the dump site in cubic feet?

Ans [[? input-number 1]] ft^3 18630

Hint 1 The length and width of the soil in the box does not change, but the height does change. Only the height of the soil decreases 10%.

In other words, the soil is 90% of its original height at the dump site, since 100% − 10% = 90%.

Hint 2 Let's multiply the original height 23 ft by 0.9 to find the height of the soil at the dump site:

$$h = 0.9 \cdot 23$$
$$= 20.7 \text{ ft}$$

Hint 3 Now, let's find the volume of the box using the formula for volume V of a rectangular prism and the dimensions of the soil at the dump site:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 45 \cdot 20 \cdot 20.7 \\ &= 18630 \text{ ft}^3 \end{aligned}$$

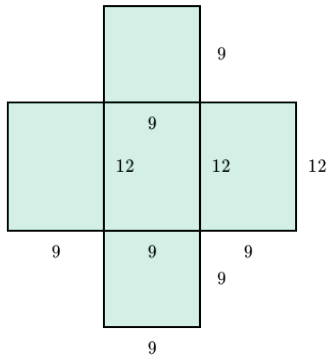
Hint 4 The volume of the dirt at the dump site is 18630 ft^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 80bf6c9f.. 2013-10-14

24 xd0f91d87d96a4556

The company Digit Tech designs a new SmartPhone. The packaging includes an open box made out of cardboard. The dimensions of the box are 12 cm long, 9 cm wide and 9 cm high. Digit Tech expects to sell 1500 phones and package each phone individually in a box.

In square centimeters what is the minimum amount of cardboard Digit Tech needs to package all 1500 new SmartPhones? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] cm^2 729000

Hint 1 Lets determine the surface area (SA) of one box in square centimeters. Then, we can multiply the surface area of one box times 1500 to find how many square centimeters of cardboard are needed.

The box has 5 sides: 1 bottom and 2 sets of equal sides opposite each other.

Hint 2 Lets find the total surface area of the box. Area of a rectangle is equal to its length times its width. Let's find the surface areas of the 5 rectangular sides.

There are 2 sides 12 cm long and 9 cm high:

$$\begin{aligned} SA &= 2 \times 12 \times 9 \\ &= 216 \text{ cm}^2 \end{aligned}$$

There are 2 sides 9 cm wide and 9 cm high:

$$\begin{aligned} SA &= 2 \times 9 \times 9 \\ &= 162 \text{ cm}^2 \end{aligned}$$

There is 1 side (the bottom) 12 cm long and 9 cm wide:

$$\begin{aligned} SA &= 1 \times 12 \times 9 \\ &= 108 \text{ cm}^2 \end{aligned}$$

Lets sum together all the surface areas to find the total surface area of one box:

$$\begin{aligned} SA &= 216 + 162 + 108 \\ &= 486 \text{ cm}^2 \end{aligned}$$

Hint 3 Let's multiply the total area by 1500 boxes to find the amount of cardboard:

$$\begin{aligned} SA &= 1500 \times 486 \\ &= 729000 \text{ cm}^2 \end{aligned}$$

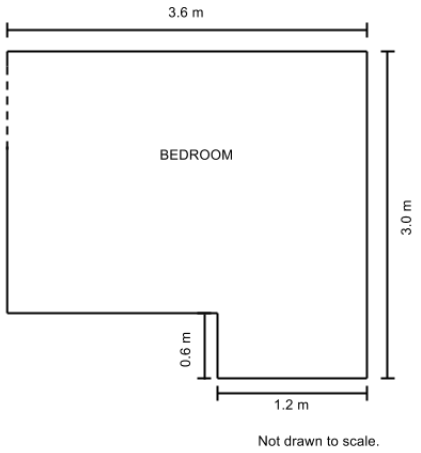
Hint 4 Digit Tech needs a minimum of $729,000$ cm^2 of cardboard to package all 1500 new SmartPhones individually.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 6b330ffc.. 2013-10-14

25 xd27f560044011f21

Abby plans to put in wall-to-wall carpet in her bedroom. She measures the dimensions of her bedroom and sketches up the following floor plan. The carpet costs $9.50 per square meter.

How much will Abby pay for wall-to-wall carpet for her bedroom?



Ans $ [[? input-number 1]] 88.92

Hint 1 Abbys bedroom has two rectangular areas, large and small, to cover with carpet. Area of a rectangle is equal to its length times its width.

The small rectangle is 0.6 m long and 1.2 m wide. The small rectangle has an area of:

$$\begin{aligned} A &= 0.6 \times 1.2 \\ &= 0.72 \text{ m}^2 \end{aligned}$$

Hint 2 The large rectangle is 3.6 m long and $(3.0 - 0.6)$ m wide. The large rectangle has an area of:

$$\begin{aligned} A &= 3.6 \times (3.0 - 0.6) \\ &= 3.6 \times 2.4 \\ &= 8.64 \text{ m}^2 \end{aligned}$$

Hint 3 Let's find the total area of Abbys bedroom by adding the areas of the large and small rectangles together:

$$\begin{aligned} A &= 0.72 + 8.64 \\ &= 9.36 \text{ m}^2 \end{aligned}$$

Hint 4 Abby has 9.36 m^2 to cover with carpet, and the cost of carpet is $9.50 per square foot. Let's multiply the total area times the cost per area:

$$\begin{aligned} &= 9.50 \times 9.36 \\ &= \$88.92 \end{aligned}$$

Hint 5 Abby will pay $88.92 to install wall-to-wall carpet in her bedroom.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 7e971689.. 2013-10-14

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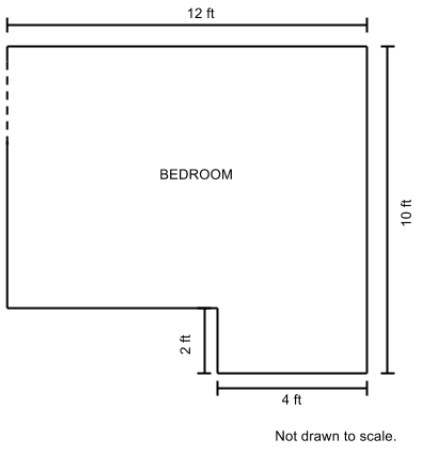
26 xd6227f8ede3bdcf6

Priya plans to put in wall-to-wall carpet in her bedroom. She measures the dimensions of her bedroom and sketches up the following floor plan. The carpet costs $3.75 per square foot.

How much will Priya pay for wall-to-wall carpet for her bedroom?



Ans $ [[? input-number 1]] 390

Hint 1 Priyas bedroom has two rectangular areas, large and small, to cover with carpet. Area of a rectangle is equal to its length times its width.

The small rectangle is 4 ft long and 2 ft wide. The small rectangle has an area of:

$$\begin{aligned} A &= 4 \cdot 2 \\ &= 8 \text{ sq ft} \end{aligned}$$

Hint 2 The large rectangle is 12 ft long and $(10 - 2)$ ft wide. The large rectangle has an area of:

$$\begin{aligned} A &= 12 \cdot (10 - 2) \\ &= 12 \cdot 8 \\ &= 96 \text{ sq ft} \end{aligned}$$

Hint 3 Let's find the total area of Priyas bedroom by adding the areas of the large and small rectangles together:

$$\begin{aligned} A &= 8 + 96 \\ &= 104 \text{ sq ft} \end{aligned}$$

Hint 4 Priya has 104 sq ft to cover with carpet, and the cost of carpet is $3.75 per square foot. Let's multiply the total area times the cost per area:

$$\begin{aligned} &= 3.75 \cdot 104 \\ &= \$390 \end{aligned}$$

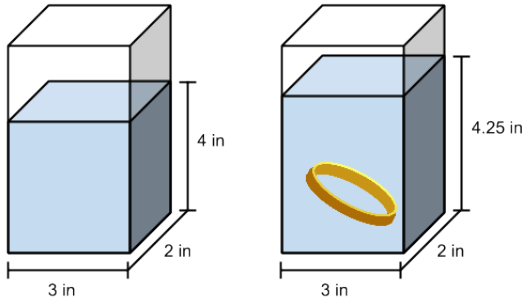
Hint 5 Priya will pay $390 to install wall-to-wall carpet in her bedroom.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: d95c8310.. 2013-10-14

27 xd9d03a194cdc8ae4

Jamie wants to know the volume of her gold ring in cubic inches. She gets a rectangular glass with a base 3 in by 2 in and fills the glass 4 in high with water. Jamie drops her gold ring in the glass and measures the new height of the water to be 4.25 in.

What is the volume of Jamie's ring in cubic inches?



Ans [[? input-number 1]] in^3 1.5

Hint 1 The change in volume of the water is caused by adding the volume of Jamie's gold ring to the volume of the water. Let's find the change in volume to find the volume of the gold ring.

Volume V of a rectangular prism can be calculated using the formula:

$\text{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 2 The length 3 in and width 2 in of the water in the rectangular glass does not change, but the height does change.

Hint 3 The change in height of the water is $(4.25 - 4)$ in. Let's find V of the change in water:

$$\begin{aligned} \text{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 3 \cdot 2 \cdot (4.25 - 4) \\ &= 3 \cdot 2 \cdot (0.25) \\ &= 1.5 \text{ in}^3 \end{aligned}$$

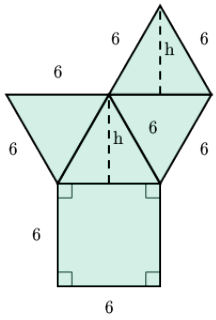
Hint 4 The volume of Jamie's gold ring is 1.5 in^3.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: a2cf8da3.. 2013-10-14

28 xe36af4fb7a84ecf5

Meghan made each of her 10 girlfriends a pair of earrings. To wrap the pairs individually, she creates a simple cardboard gift box to fold into a pyramid. The base is a square with side lengths 6 in. The sides are 4 equilateral triangles with side lengths 6 in and height h. The height h is equal to $5\frac{1}{5}$ in.

In square inches what is the minimum amount of cardboard Meghan needs to create 10 gift boxes to wrap each pair of earrings individually? (Assume there is no wasted cardboard.)



Ans [[? input-number 1]] in^2 984

Hint 1 Lets determine the surface area (SA) of one box in square inches. Then, we can multiply the surface area of one box times 10 to find how many square inches of cardboard are needed.

Let's use fractions throughout our calculations to avoid any rounding errors.

Hint 2 Lets find the total surface area of the box by finding the surface areas of 1 square and 4 triangles.

Area of a square is equal to its length squared. There is 1 square side with side lengths 6 in:

$$\begin{aligned} SA &= 6^2 \\ &= 36 \text{ in}^2 \end{aligned}$$

Area of a triangle is equal to one half its base times its height h. There are 4 triangles with a base of 6 in and height of $5\frac{1}{5}$ in:

$$SA = 4 \times \frac{1}{2} \times 6 \times 5\frac{1}{5}$$

$$= 4 \times 6 \times \frac{1}{2} \times \frac{26}{5}$$

$$= \frac{624}{10}$$

$$= 62.4 \text{ in}^2$$

Lets sum together all the surface areas to find the total surface area of one box:

$$SA = 36 + 62.4$$
$$= 98.4 \text{ in}^2$$

Hint 3 Let's multiply the total area by 10 boxes to find the amount of cardboard:

$$SA = 10 \times 98.4$$
$$= 984 \text{ in}^2$$

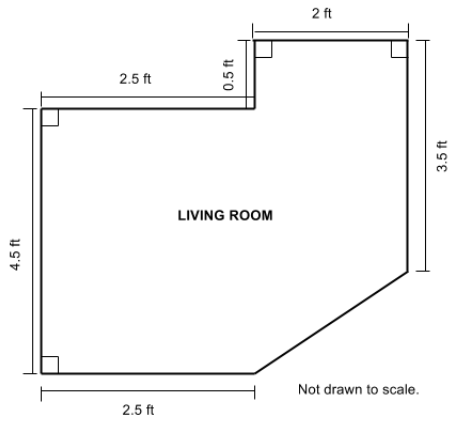
Hint 4 Meghan needs a minimum of 984 in^2 of cardboard to package all 10 pairs of earrings individually.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: 274aea9a.. 2013-10-14

29 xec1dd6aec52f6d8f

Samuel plans to put in wall-to-wall carpet in his living room. He measures the edges of his living room and sketches up the following floor plan. The carpet costs $10 per square foot.

How much will Samuel pay for wall-to-wall carpet for his living room?

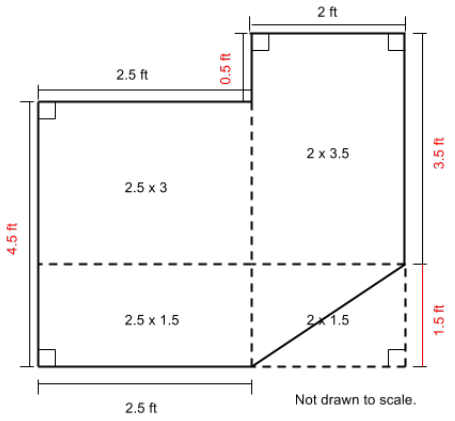


Ans $ [[? input-number 1]] 197.5

Hint 1 Samuel's living room has 3 rectangular areas and 1 triangular area to cover with carpet. Let's find the total area of the living room floor in square feet to find how much carpet Samuel needs.

Area of a rectangle is equal to its length times its width. Area of a triangle is equal to one half its base times its height.

Hint 2 From the vertical dimensions, we can determine the height of the triangle as 1.5 ft. We can also find the dimensions of the areas.



Hint 3 Let's find the total area of the living room by adding the areas of the 3 rectangles and 1 triangle together.

$$= 2.5 \times 3 + 2 \times 3.5 + 2.5 \times 1.5 + 0.5 \times 2 \times 1.5$$

$$= 7.5 + 7 + 3.75 + 1.5$$

$$= 19.75 \text{ ft}^2$$

Hint 4 Samuel has 19.75 ft^2 to cover with carpet, and the cost of carpet is $10 per square foot. Let's multiply the total area times the cost per area:

$$= 10 \times 19.75$$
$$= \$197.50$$

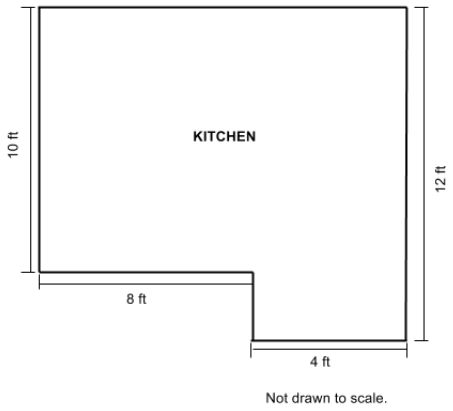
Hint 5 Samuel will pay $197.50 to install wall-to-wall carpet in his living room.

Tags: Images with English text, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6
Version: c9bed14b.. 2013-10-14

30 xef699039b85ac16e

Phung plans to put in square tile flooring in his kitchen. The square tile has an 8 inch side length. He measures the dimensions of his kitchen and sketches up the following floor plan.

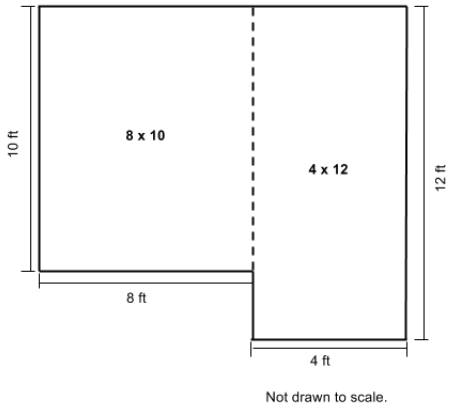
How many tiles does Phung need to cover the entire area of his kitchen floor?



Ans [[? input-number 1]] tiles 288

Hint 1 Phung's kitchen has 2 rectangular areas to cover with tiles. Let's find the total area of the kitchen floor in square feet, then divide by the area of one square tile to find how many tiles Phung needs.

Hint 2 Let's choose 2 rectangular areas that will fit the 8 in square tiles.



Hint 3 Now we can find the total area of the kitchen by adding the areas of the rectangles together. Area of a rectangle is equal to its length times its width.

$$= 8 \times 10 + 4 \times 12$$

$$= 80 + 48$$

$$= 128 \text{ ft}^2$$

The kitchen floor is 128 ft^2.

Hint 4 In feet each tile is a square with side length $\frac{8}{12}$ ft.

The area of one tile is $(\frac{8}{12})^2 = \frac{64}{144}$ ft^2.

Let's divide the area of the kitchen floor by the area of one tile:

$$= 128 \div \frac{64}{144}$$

$$= 128 \times \frac{144}{64}$$

$$= 288$$

Hint 5 Phung needs 288 tiles to cover the entire area of his kitchen floor.

Tags: CC.7.G.B.6
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The Connors are moving from Boston to Iceland. They pack their belongings in rectangular crates and hire a boxcar to ship the crates across land and sea. The crates are made specifically to fit inside the boxcar with their bases facing down. Each crate has a base 4 m long by 2 m wide and height 2.5 m. The boxcar is 16 m long, 4 m wide and 5 m high.

How many crates can The Connors fit into one boxcar?

Ans [[? input-number 1]] crates 16

Hint 1 Let's find the relationship between the lengths, widths and heights of the crate and boxcar:

$$4 \text{ m} \times 3 = 16 \text{ m}$$

$$2 \text{ m} \times 2 = 4 \text{ m}$$

$$2.5 \text{ m} \times 2 = 5 \text{ m}$$

Hint 2 Because the dimensions of the crate and boxcar are related, we can relate the volumes of the crate and boxcar in cubic meters. If we divide the volume of the boxcar by the volume of a crate, we can find how many crates The Connors can fit into one boxcar.

The formula for volume V of a rectangular prism is:

$\mathrm{V} = \text{length} \cdot \text{width} \cdot \text{height}$

Hint 3 Let's find V of the boxcar in cubic meters:

$$\begin{aligned} \mathrm{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 16 \times 4 \times 5 \\ &= 320 \text{ m}^3 \end{aligned}$$

Hint 4 Let's find V of a crate in cubic meters:

$$\begin{aligned} \mathrm{V} &= \text{length} \cdot \text{width} \cdot \text{height} \\ &= 4 \times 2 \times 2.5 \\ &= 20 \text{ m}^3 \end{aligned}$$

Hint 5 Now, let's divide the volume of the boxcar by the volume of a crate to find how many crates:

$$\begin{aligned} &= 320 \div 20 \\ &= 16 \end{aligned}$$

Hint 6 The Connors can fit 16 crates into one boxcar.

Tags: Image needs attribution, Area, volume, and surface area of 2d and 3d objects, CC.7.G.B.6

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