Learning Outcome:

Students will be able to solve real-world and mathematical problems on the surface area of pyramids, prisms, and cylinders.

CCSS.MATH.CONTENT.7.G.B.6 | IA_EN_07_MAT_C34_WS_m1

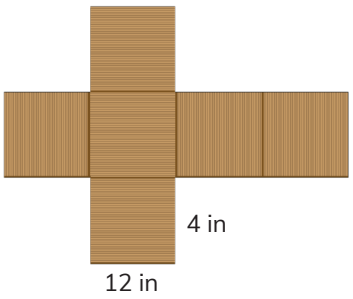
Your business needs some decorative packaging. You and your team are going to design the packaging.

1 Calculate the surface area of a packaging box shaped like a cube. Write your answer in the boxes given below.

Area of 1 rectangle = ☐☐ × ☐ = ☐☐ sq in

Surface area of the packaging box = ☐ × ☐☐ sq in

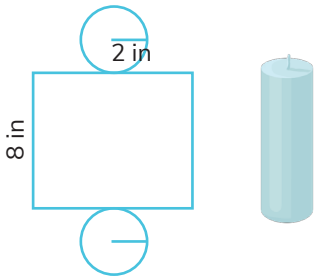
= ☐☐☐ sq in



2 Calculate the minimum amount of wrapper required to wrap a single candle as shown below. Round it off answer to the nearest whole number. Write your answer in the boxes given below.

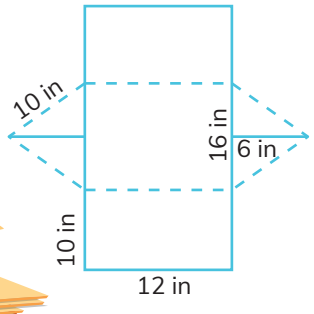
Surface area = $2\pi \times$ ☐^{2} + $2\pi \times 2 \times$ ☐ sq in

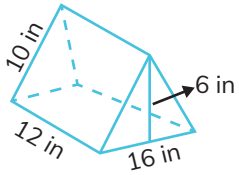
= ☐☐☐ sq in



3 A prism-shaped box is used for packaging. Find the surface area to determine how much cardboard is required to make the box. Circle the correct answer.

120 sq in 420 sq in 528 sq in





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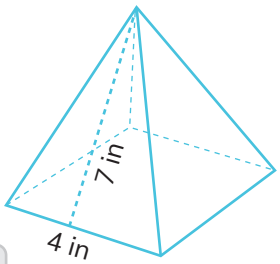
4 You need to make a package in the shape of a square pyramid. Calculate the surface area to determine the amount of cardboard needed to create the package. Write your answer in the boxes given below.

Total area of faces $= 4 \times \frac{1}{2} \times \square \times \square = \square\square$ sq in

Area of the base $= \square \times \square = \square\square$ sq in

Total area $= \square\square + \square\square = \square\square$ sq in

Area of faces Area of base



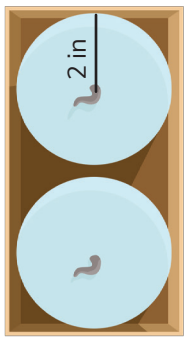
5 A box of height 6 in needs to be made. The box is required to fit 2 cylindrical candles, each with a radius of 2 in. Calculate the surface area of the cardboard box. Tick ✓ the correct answer.

☐ 154 sq in

☐ 126 sq in

☐ 192 sq in

☐ 208 sq in



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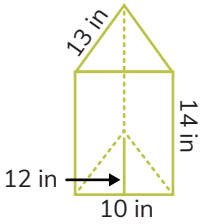
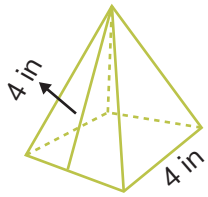
As your business is now on the roll, you're getting big orders from companies. Let's examine each company's requests.

1 For a particular order, a cylindrical candle and a triangular prism-shaped candle need to be wrapped separately. Match the candles with the approximate area of wrapping paper required to pack it.



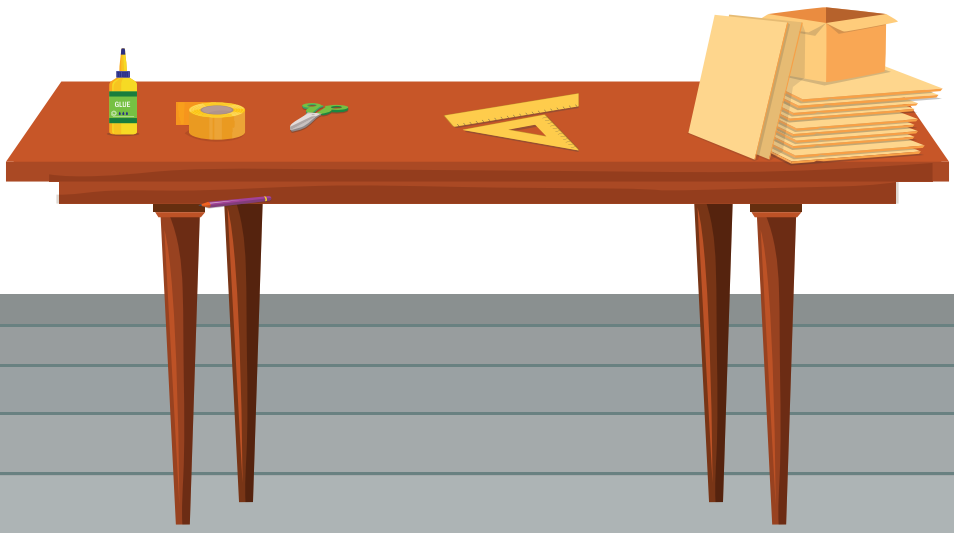
- 100 sq in
- 624 sq in

2 A client orders 30 square pyramid-shaped candles, as shown below. Calculate the minimum amount of wrapper needed to wrap the 30 candles separately. Check ✓ the correct box.



☐ 1028 sq in

☐ 1440 sq in



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3 An order requests 3 cylindrical candles. The height of each candle is 10 in and the diameter is 6 in. How much wrapper is required to wrap 3 candles? Round it off to the nearest whole number and write your answer in the boxes given below.

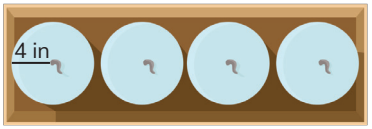
Radius = ☐ ÷ ☐ = ☐ in

Wrapper needed for 1 candle = $2\pi \times \square^2 + 2\pi \times \square \times \square\square = \square\square\square$ sq in

Total amount of wrapper required = ☐ × ☐☐☐ = ☐☐☐ sq in

4 Four cylindrical candles of radius 4 in and height 8 in are required to be packed in a cardboard box, as shown below. Find out the amount of cardboard required to make the packaging box. Tick ☑ the correct answer.

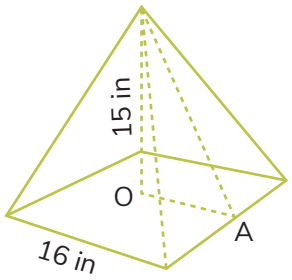
☐ 1024 sq in ☐ 1152 sq in



5 An order for a special candle gift box is received. The client wants the gift box to be in the shape of a square prism. Get the measurements and calculate the amount of cardboard needed. Write your answer in the boxes given below.

OA = ☐☐ ÷ ☐ = ☐ in

Slant height = $\sqrt{\square\square^2 + \square^2} = \square\square$ in



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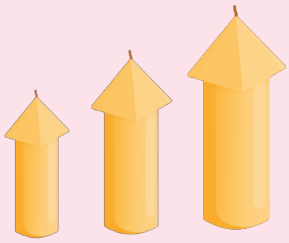
You create some decorated special edition candles that have a cylindrical base and square pyramid shape on top.

1 You and your team have decided to make special decorated candles as a special edition product. Help your team create the candle. Follow the guidelines given below.

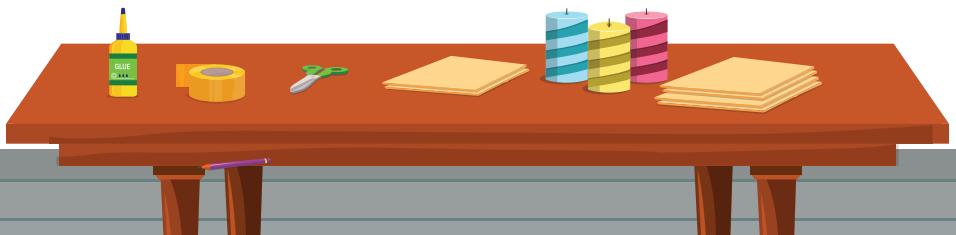
Guidelines:

- The diameter of the cylindrical base should match the length of the base of the square pyramid-shaped candles.
- Height of the cylindrical base should be twice the slant height of the pyramid shape.



Let's decide the dimensions of the cylindrical base first.

Type	Diameter (in)	Height (in)	Surface area (sq in) **Hint:** Here you don't need to add the top circle. Use the formula: $\pi r^2 + 2\pi rh$ Round off to nearest whole number.
Small (Diameter: 2 - 4 in Height: 4 - 7 in)			
Medium (Diameter: It will be same as for small size. Height: 7 - 9 in)			
Large (Diameter: 4 - 6 in Height: 8 in or 9 in)			



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Now, let's get the dimensions of the square pyramid.			
Type	Length of the base (in)	Slant height (in)	Surface area (sq in) **Hint:** You don't need to add the base of the pyramid.
Small			
Medium			
Large			

2 Now, let's get the packaging done. Calculate the total area of each candle and estimate how much wrapper is required.Write your answers in the boxes given below.

Size of the candle	Number of candles in that particular size (can order: 3-10 candles of a size)	Total area of 1 candle (sq in) **Hint:** Area of the cylindrical part + area of the square pyramid part	Minimum amount of wrapper required (sq in)
Small			
Medium			
Large