

# FOM & PRE-CALC 10

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## Final Exam



BOOK 1:

- MEASUREMENT
- TRIGONOMETRY

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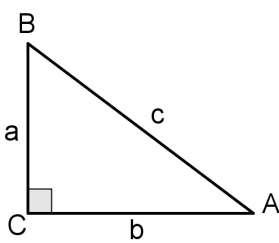
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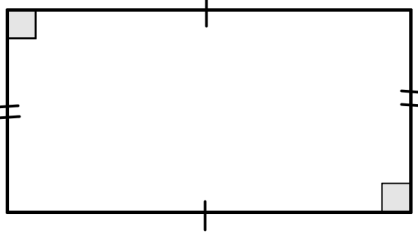
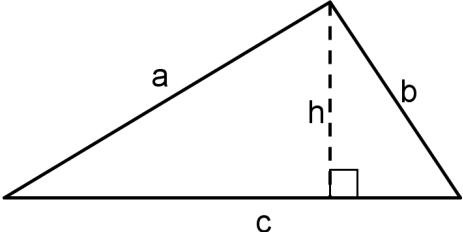
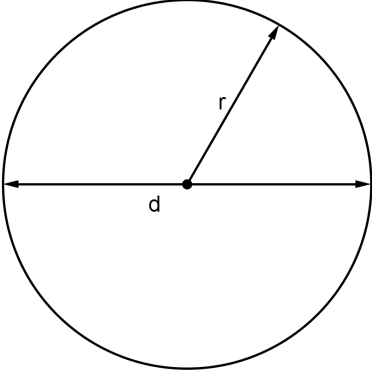


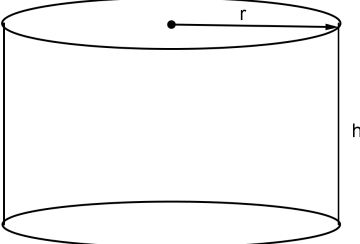
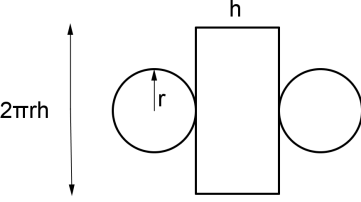
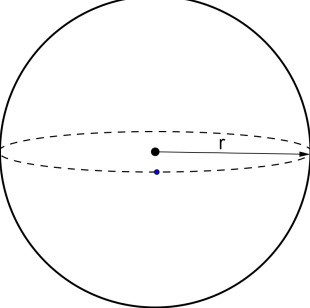
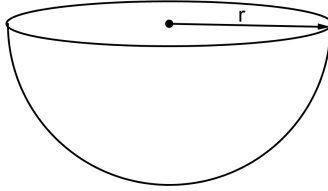
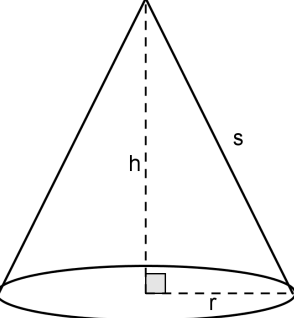
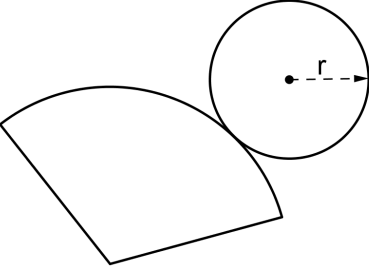
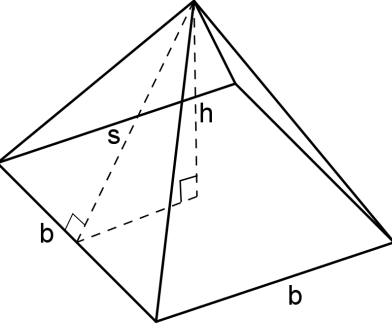
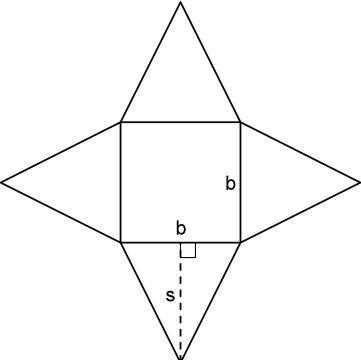
**Unit Conversions** (as they may appear on an exam formula sheet)

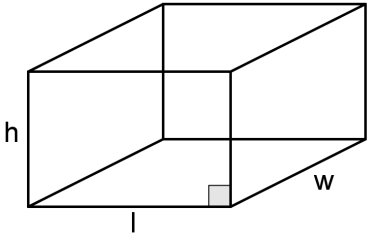
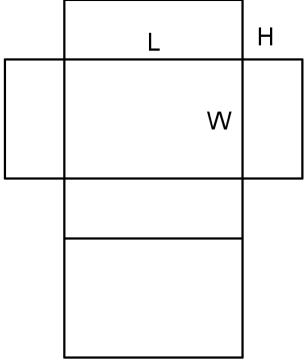
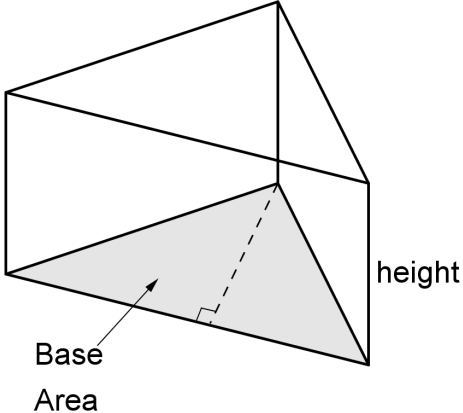
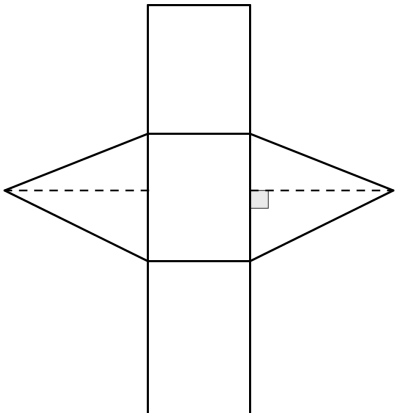
	Common Imperial	Imperial and Metric	Metric
Length	1 mile = 1760 yards 1 mile = 5280 feet 1 yard = 3 feet 1 yard = 36 inches 1 foot = 12 inches	1 mile $\approx$ 1.609 km 1 yard $\approx$ 0.9144 m 1 foot $\approx$ 0.3048 m 1 foot $\approx$ 30.48 cm 1 inch $\approx$ 2.54 cm	1 km = 1000 m 1 m = 100 cm 1 cm = 10 mm
Mass (Weight)	1 ton = 2000 pounds 1 pound = 16 ounces	1 pound $\approx$ 0.454 kg 1 ounce $\approx$ 28.35 g	1 t = 1000 kg 1 kg = 1000 g
Common Abbreviations	mile = mi yard = yd ton = ton feet = ft or ' inch = in or " pound = lb ounce = oz		kilometre = km metre = m centimetre = cm millimetre = mm tonne (metric ton) = t gram = g

**Formula**

Triangles	Lines
<p>Trigonometry:</p> $\sin A = \frac{\textit{opposite}}{\textit{hypotenuse}}$ $\cos A = \frac{\textit{adjacent}}{\textit{hypotenuse}}$ $\tan A = \frac{\textit{opposite}}{\textit{adjacent}}$ <p>Pythagorean Theorem:</p> $a^2 + b^2 = c^2$ 	<p>The equation of a line:</p> <p>Slope-intercept form:  <math display="block">y = mx + b</math></p> <p>Standard Form:  <math display="block">Ax + By + C = 0</math></p> <p>Point-slope form:  <math display="block">y - y_1 = m(x - x_1)</math></p> <p>Slope formula:  <math display="block">m = \frac{y_2 - y_1}{x_2 - x_1}</math></p>

2-Dimensional Figure	Perimeter	Area
<p>Rectangle</p> 	<p>or</p> $P = 2l + 2w$ $P = 2(l + w)$	$A = lw$
<p>Triangle</p> 	$P = a + b + c$	<p>or</p> $A = \frac{bh}{2}$ $A = \frac{1}{2}bh$
<p>Circle</p> 	<p>or</p> $C = 2\pi r$ $C = \pi d$	$A = \pi r^2$

3-Dimensional figures:		
<p>Right Cylinder:</p> 	$A_{top} = \pi r^2$ $A_{bottom} = \pi r^2$ $A_{side} = 2\pi r h$ $SA_{total} = 2\pi r^2 + 2\pi r h$ $V = (\text{Base Area})h$	<p>Net:</p> 
<p>Sphere:</p> 	<p>Sphere:</p> $SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$ <p>Hemisphere:</p> $SA = 3\pi r^2$ $V = \frac{2}{3}\pi r^3$	<p>Hemisphere:</p> 
<p>Cone:</p> 	<p>Side: <math>A = \pi r s</math>            Base: <math>A = \pi r^2</math></p> $SA = \pi r^2 + \pi r s$ $V = \frac{1}{3}(\pi r^2)h$	<p>Net:</p> 
<p>Square-Based Pyramid:</p> 	$A_{triangle} = \frac{1}{2}bs$ $A_{base} = b^2$ $SA = 2bs + b^2$ $V = \frac{1}{3}(\text{base area})h$	<p>Net:</p> 

<p>Rectangular (Right) Prism:</p> 	$SA = 2(hl + lw + hw)$ <p>Or</p> $V = lwh$ $V = (\text{base area})h$	<p>Net:</p> 
<p>Triangular Prism</p> 	$SA = \text{sum of all faces}$ $V = (\text{base area})h$	<p>Net:</p> 

# UNIT 1: MEASUREMENT

MY NOTES AND THINGS TO REMEMBER...

**Measurement and Surface Area**

36. A road sign says to turn right in 1000 feet. Approximately how far is this distance in kilometres?

- NC
- A. 0.3 km
  - B. 0.6 km
  - C. 1 km
  - D. 1.5 km

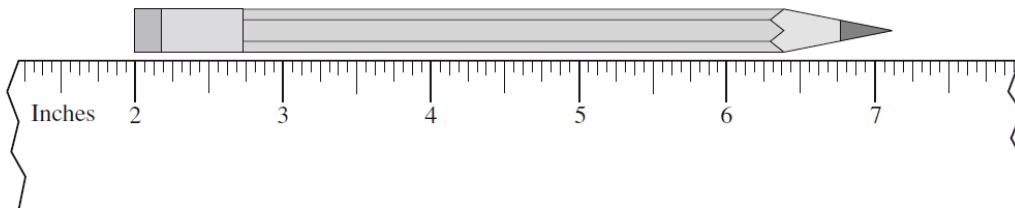
37. Which of the following calculations converts 4 yards into centimetres?

- NC
- A.  $4 \text{ yd} \times \frac{2.54 \text{ cm}}{1 \text{ in}}$
  - B.  $4 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{2.54 \text{ cm}}{1 \text{ ft}}$
  - C.  $4 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}$
  - D.  $4 \text{ yd} \times \frac{1 \text{ ft}}{3 \text{ yd}} \times \frac{1 \text{ in}}{12 \text{ ft}} \times \frac{1 \text{ cm}}{2.54 \text{ in}}$

38. A cylinder with a diameter of 10 cm and a height of 12 cm is half full of water. A sphere with a diameter of 5 cm is dropped into the cylinder. How far will the water level rise once the sphere is completely under the water?

- A. 0.57 cm
- B. 0.83 cm
- C. 5 cm
- D. 6 cm

39. Using the ruler below, determine the length of the pencil.



- A.  $5 \frac{1}{8}''$
- B. 5.2"
- C.  $5 \frac{1}{4}''$
- D.  $7 \frac{1}{8}''$



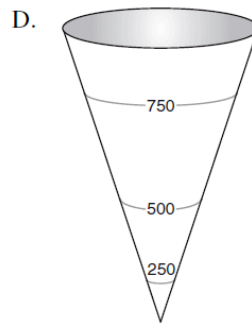
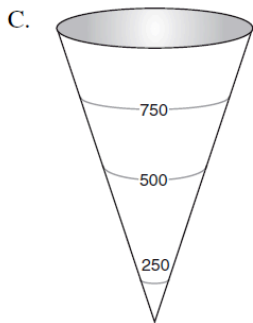
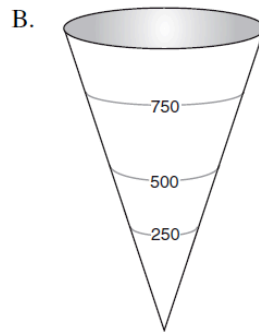
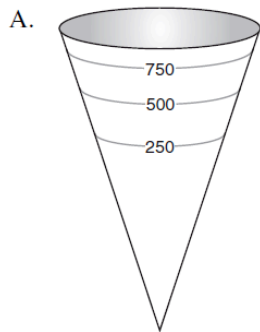
40. Jung was told to plant trees two steps apart. Which of the following estimates is closest to “two steps apart”?
- A. 6 ft
  - B. 3 m
  - C. 60 cm
  - D. 30 in

41. Which distance below is the longest?

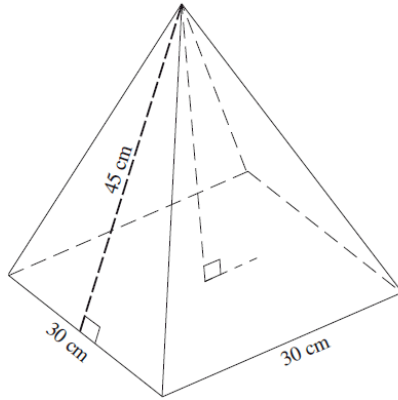
0.6 mi, 1000 yd, 1 km, 900 m

- A. 0.6 mi
- B. 1000 yd
- C. 1 km
- D. 900 m

42. A cone-shaped water tank has a volume of 1000 litres. Which diagram best represents the 250 L, 500 L and 750 L marks outside of the water tank?

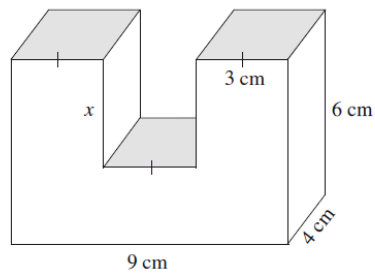


43. The slant height of the pyramid below is 45 cm. Calculate its volume.



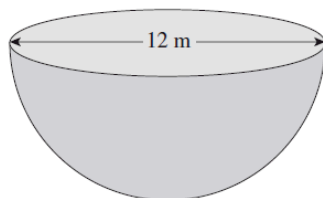
- A.  $10\,062\text{ cm}^3$
- B.  $12\,728\text{ cm}^3$
- C.  $13\,500\text{ cm}^3$
- D.  $40\,500\text{ cm}^3$

44. The volume of the object below is  $186\text{ cm}^3$ . Calculate the length of  $x$ .



- A. 3.1 cm
- B. 2.5 cm
- C. 1.75 cm
- D. 1.25 cm

45. Calculate the surface area of the solid hemisphere below. Answer to the nearest square metre.



46. On a quiz, students were asked to convert 5 lbs 4 oz to a metric weight.

	Stan's Solution	Erin's Solution
Step 1	$4 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 0.25 \text{ lb}$	$5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz}$
Step 2	$5.25 \text{ lb} \times \frac{0.454 \text{ kg}}{1 \text{ lb}} \approx 2.3835 \text{ kg}$	$84 \text{ oz} \times \frac{28.35 \text{ g}}{1 \text{ oz}} \approx 2381.4 \text{ g}$

How should the teacher mark these two solutions?

- A. Only Erin's solution is correct.  
 B. Only Stan's solution is correct.  
 C. Both Stan and Erin gave a correct solution.  
 D. Neither Stan nor Erin gave a correct solution.
47. A baker gets his muffin boxes from the United States. The tallest muffins he bakes are 11 cm. Estimate the height of the smallest box in which the muffins will fit.

NC

- A. 30 inches tall  
 B. 10 inches tall  
 C. 5 inches tall  
 D. 4 inches tall

48. Jasdeep and Kelsey converted 177 ounces into kilograms, as shown below.

NC

Jasdeep's Solution	Kelsey's Solution
$177 \text{ oz} \times \frac{28.35 \text{ g}}{1 \text{ oz}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 5 \text{ 017 950 kg}$	$177 \text{ oz} \times \frac{1 \text{ oz}}{28.35 \text{ g}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 0.0062 \text{ kg}$

Which statement below is true?

- A. Only Kelsey is correct because the units cancel.  
 B. Only Jasdeep is correct because the units cancel.  
 C. Only Kelsey is incorrect because the conversion factors are incorrect.  
 D. They are both incorrect for different reasons.
49. As an estimation strategy, what could be used to best approximate one centimetre?
- A. the length of your foot  
 B. the width of your hand  
 C. the width of your finger  
 D. the width of a pencil lead

51. Two isosceles triangles have the same height. The slopes of the sides of triangle A are double the slopes of the corresponding sides of triangle B. How do the lengths of their bases compare?

- A. The base of A is quadruple that of B.
- B. The base of A is double that of B.
- C. The base of A is half that of B.
- D. The base of A is one quarter that of B.

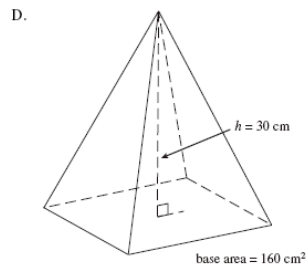
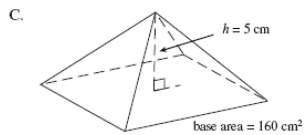
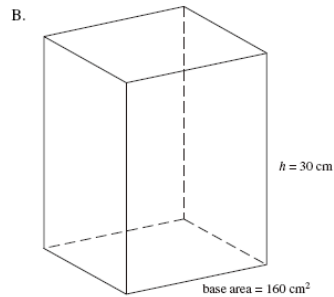
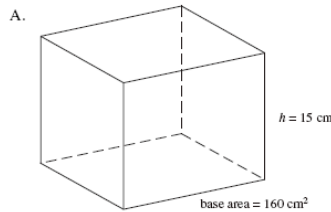
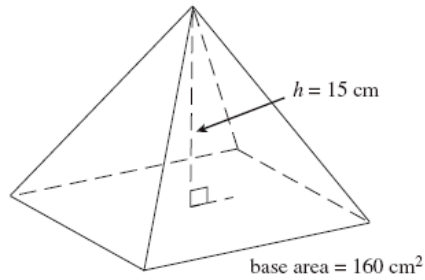
52. A cylinder has a surface area of  $402 \text{ cm}^2$ . The height is three times greater than the radius. What is the height of the cylinder?

- A. 8.00 cm
- B. 10.48 cm
- C. 12.00 cm
- D. 16.97 cm

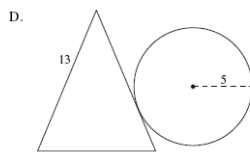
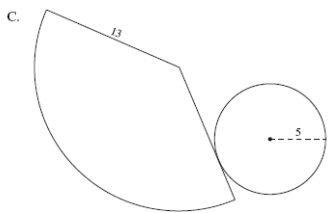
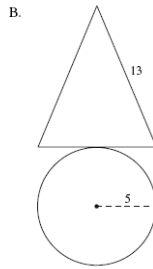
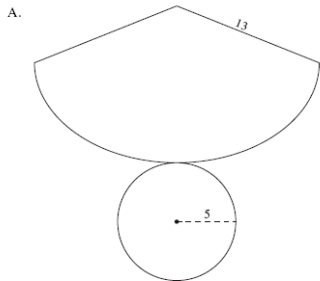
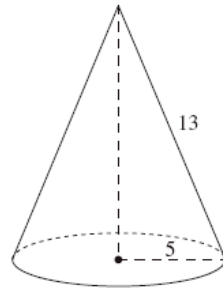
54. A bowling ball measures 264 cm in circumference. What is the volume of the smallest cube that will hold this ball?

- A. approximately  $75\,000 \text{ cm}^3$
- B. approximately  $311\,000 \text{ cm}^3$
- C. approximately  $594\,000 \text{ cm}^3$
- D. approximately  $2\,300\,000 \text{ cm}^3$

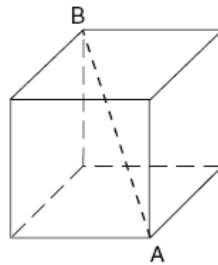
47. Which of the following shapes has a volume three times larger than the pyramid below?



56. Which of the following net diagrams best constructs the cone below?



57. Polar Company has designed an ice block in the shape of a cube. The volume of the cube is  $15\,625\text{ cm}^3$ . Which of the following dimensions is the smallest opening of an ice dispenser that will accommodate length AB?



- A. 25 cm wide
- B. 40 cm wide
- C. 45 cm wide
- D. over 50 cm wide

59. Convert 150 pounds into kilograms. Answer to the nearest kilogram.

**Record your answer neatly on the Answer Sheet.**

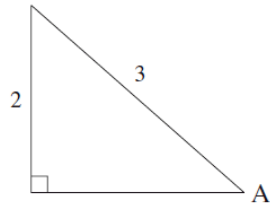
# UNIT 2: TRIGONOMETRY

MY NOTES AND THINGS TO REMEMBER...

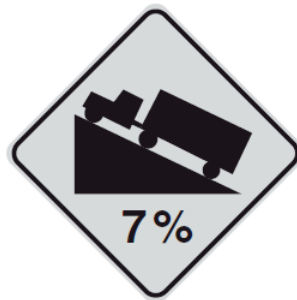
## Trigonometry

58. Determine the ratio of  $\cos A$ .

NC

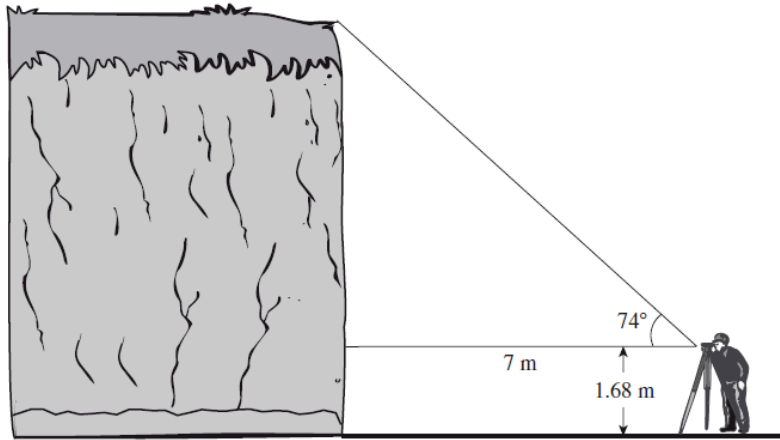


- A.  $\cos A = \frac{2}{3}$
- B.  $\cos A = \frac{\sqrt{5}}{3}$
- C.  $\cos A = \frac{\sqrt{13}}{3}$
- D.  $\cos A = \frac{3}{\sqrt{5}}$
59. The angle of elevation of the sun is  $15^\circ$ . How long is the shadow of a 64 m tall building?
- A. 17 m
- B. 66 m
- C. 239 m
- D. 247 m
60. As Tracey is driving, she sees a sign telling her the road has a 7% grade (i.e., a rise of 7 metres for a horizontal change of 100 m). Which of the following expressions will calculate the angle between the road and the horizontal?



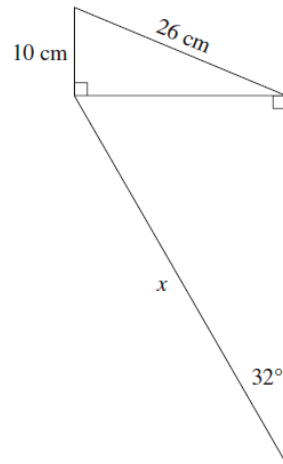
- A.  $\tan\left(\frac{7}{100}\right)$
- B.  $\sin\left(\frac{7}{100}\right)$
- C.  $\tan^{-1}\left(\frac{7}{100}\right)$
- D.  $\sin^{-1}\left(\frac{7}{100}\right)$

61. Mission's outdoor club collected the following data to determine the height of a cliff.



Calculate the height of the cliff.

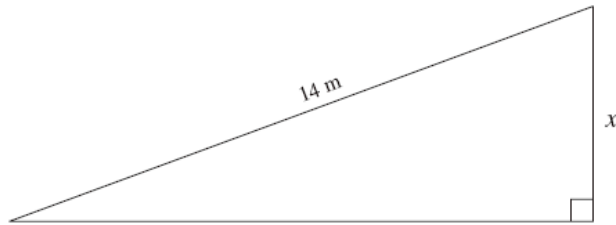
- A. 3.7 m
  - B. 8.4 m
  - C. 24.4 m
  - D. 26.1 m
62. Calculate the length of side  $x$  on the diagram below. Answer to the nearest centimetre.



63. In  $\triangle ABC$ ,  $\angle C = 90^\circ$ ,  $AB = 17$  cm and  $AC = 15$  cm. Calculate the measure of  $\angle ABC$ .
- A.  $28^\circ$
  - B.  $41^\circ$
  - C.  $49^\circ$
  - D.  $62^\circ$

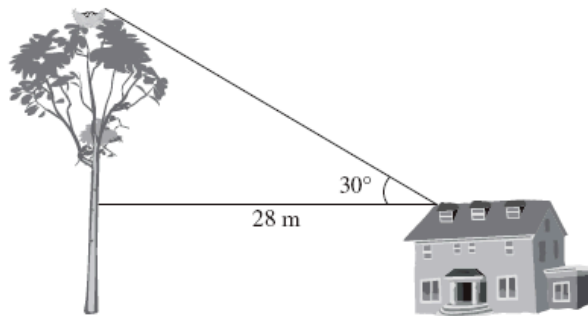


64. Using a protractor, measure one of the unknown angles and determine the length of side  $x$ .



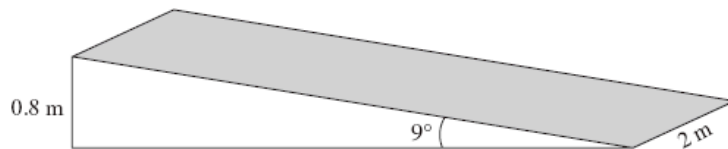
Note: This diagram is drawn to scale.

- A. 3.5 m
  - B. 4.8 m
  - C. 5.1 m
  - D. 13.2 m
65. A 10 metre tall farmhouse is located 28.0 m away from a tree with an eagle's nest. The angle of elevation from the roof of the farmhouse to the eagle's nest is  $30^\circ$ .



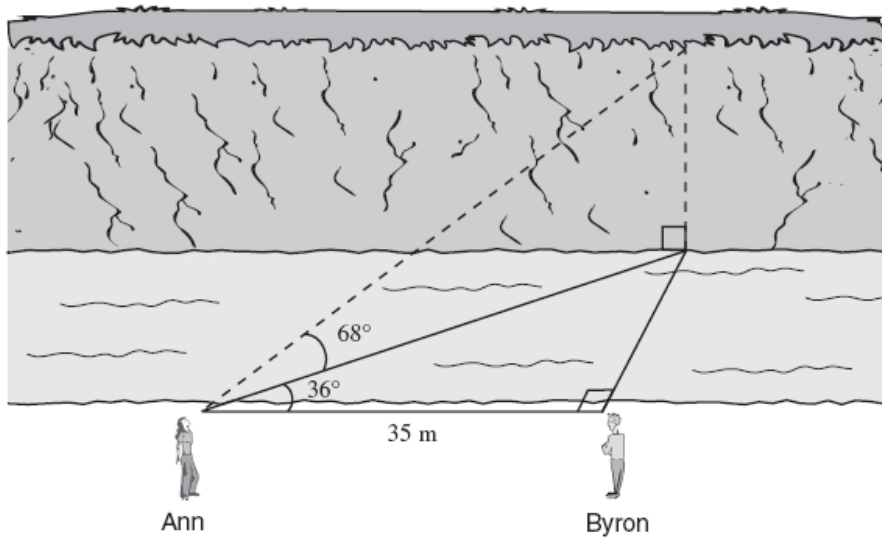
What is the height of the eagle's nest?

- A. 16 m
  - B. 24 m
  - C. 26 m
  - D. 48 m
66. A ramp is set up using a rectangular piece of plywood (shaded region) as shown below.



Calculate the area of the plywood. Answer in square metres to one decimal place.

67. Ann and Byron positioned themselves 35 m apart on one side of a stream. Ann measured the angles, as shown below.



Calculate the height of the cliff on the other side of the stream.

- A. 17.5 m
- B. 62.9 m
- C. 70.1 m
- D. 107.1 m

## 8.6

## Chapter Review

## Section 8.1

1. Find each ratio to four decimal places using a calculator.

a)  $\sin 63^\circ$  \_\_\_\_\_ b)  $\cos 63^\circ$  \_\_\_\_\_

c)  $\tan 63^\circ$  \_\_\_\_\_ d)  $\sin 27^\circ$  \_\_\_\_\_

e)  $\cos 27^\circ$  \_\_\_\_\_ f)  $\tan 27^\circ$  \_\_\_\_\_

2. Find the measure of the acute angle  $\theta$  to one decimal place.

a)  $\sin \theta = 0.1348$  \_\_\_\_\_ b)  $\cos \theta = 0.1348$  \_\_\_\_\_

c)  $\tan \theta = 0.1348$  \_\_\_\_\_ d)  $\sin \theta = 0.6213$  \_\_\_\_\_

e)  $\cos \theta = 0.6213$  \_\_\_\_\_ f)  $\tan \theta = 0.6213$  \_\_\_\_\_

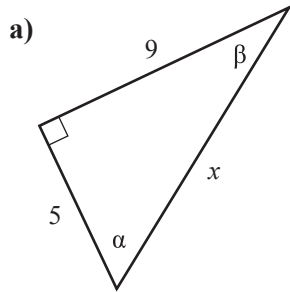
3. Solve.

a)  $\sin 20^\circ = \cos$  \_\_\_\_\_ $^\circ$  b)  $\cos 40^\circ = \sin$  \_\_\_\_\_ $^\circ$

c)  $\frac{\sin 20^\circ}{\cos 20^\circ} = \tan$  \_\_\_\_\_ $^\circ$  d)  $\frac{\sin 40^\circ}{\cos 40^\circ} = \tan$  \_\_\_\_\_ $^\circ$

e)  $\frac{\cos 30^\circ}{\cos 60^\circ} = \tan$  \_\_\_\_\_ $^\circ$  f)  $\frac{\sin 30^\circ}{\sin 60^\circ} = \tan$  \_\_\_\_\_ $^\circ$

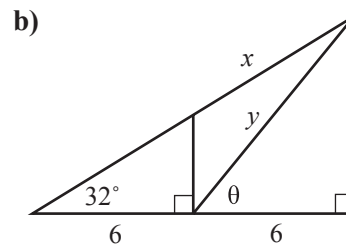
4. Solve the triangle.



$$x = \underline{\hspace{2cm}}$$

$$\alpha = \underline{\hspace{2cm}}$$

$$\beta = \underline{\hspace{2cm}}$$



$$x = \underline{\hspace{2cm}}$$

$$y = \underline{\hspace{2cm}}$$

$$\theta = \underline{\hspace{2cm}}$$

### Section 8.2

5. Solve without the use of a calculator.

a)  $2 \sin^2 \theta + 2 \cos^2 \theta = \underline{\hspace{2cm}}$

b)  $\frac{\sin 10^\circ}{\sin 80^\circ} = \tan \underline{\hspace{2cm}}^\circ$

c)  $-\sin^2 \theta - \cos^2 \theta - 1 = \underline{\hspace{2cm}}$

d)  $\frac{\sin 20^\circ}{\cos 70^\circ} = \underline{\hspace{2cm}}$

6. Find the value of each of the two remaining trigonometric functions of the acute angle  $\theta$ .

a)  $\sin \theta = \frac{3}{4}$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

b)  $\cos \theta = \frac{12}{13}$

$$\sin \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

c)  $\tan \theta = 2\sqrt{2}$

$$\sin \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

d)  $\sin \theta = 0.2561$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

**Section 8.4**

8. The angle of depression from the top of a lighthouse 75 ft above the surface of the water to a distant ship is  $0.8^\circ$ . How many miles is the ship from the base of the lighthouse? (1 mile = 5280 ft)
9. A cat is on a tree branch 5.8 m above the ground. If a ladder 6.5 metres long is placed on the branch, what angle does the ladder make with the ground?
10. From point  $A$ , the angle of elevation to the top of a building is  $32^\circ$ . Walking 70 m closer, the angle changes to  $44^\circ$ . How high is the building?
11. A tree grows vertically on the side of a hill. The hill makes a  $18^\circ$  angle with the horizon. The angle of elevation of the sun is  $40^\circ$ , and the tree casts a shadow 80 ft long on the slope of the hill. How tall is the tree?

**Section 8.5**

12. A ship sails from port 100 km due west, then turns and sails 40 km at a heading of  $N 70^\circ W$ . Find the bearing, and the distance of the ship from port.
13. The three sides of a triangle are 10 m, 15 m and 20 m. What is the measure of the smallest angle of the triangle? What is the area of the triangle?