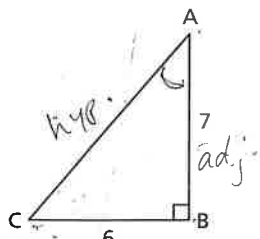
Exercises

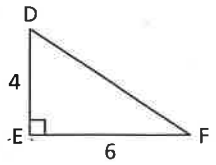
A

3. In each triangle, write the tangent ratio for each acute angle.

a)



b)



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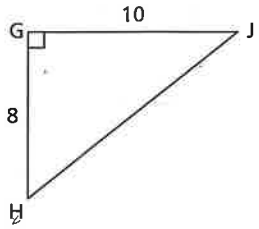
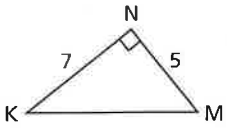


d)



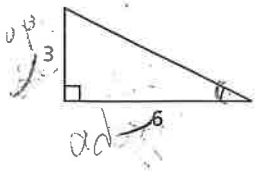
4. To the nearest degree, determine the measure of $\angle X$ for each value of tan X.

a) $\tan X = 0.25$ **b)** $\tan X = 1.25$

c) $\tan X = 2.50$ **d)** $\tan X = 20$

5. Determine the measure of each indicated angle to the nearest degree.

a)



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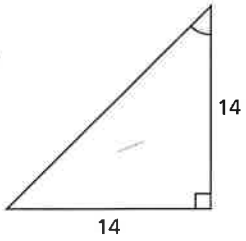

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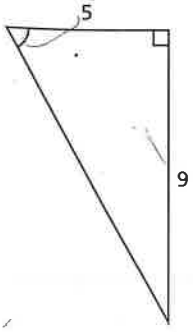
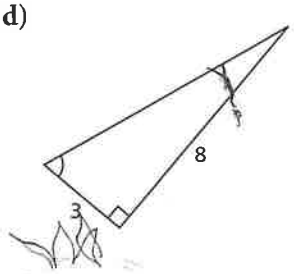


d)



B

6. Use grid paper. Illustrate each tangent ratio by sketching a right triangle, then labelling the measures of its legs.

a) $\tan B = \frac{3}{5}$ **b)** $\tan E = \frac{5}{3}$ **c)** $\tan F = \frac{1}{4}$

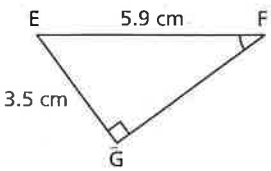
d) $\tan G = 4$ **e)** $\tan H = 1$ **f)** $\tan J = 25$

7. **a)** Is tan 60° greater than or less than 1? How do you know without using a calculator?

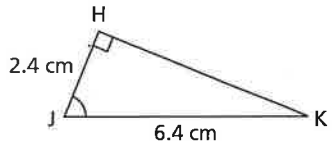
b) Is tan 30° greater than or less than 1? How do you know without using a calculator?

8. Determine the measure of each indicated angle to the nearest tenth of a degree. Describe your solution method.

a)

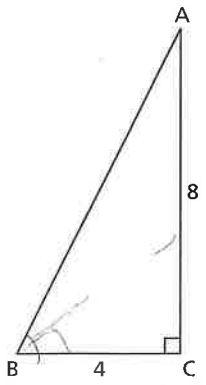


b)

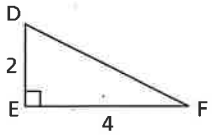


9. **a)** Why are these triangles similar?

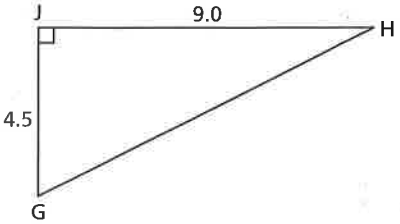
i)



ii)



iii)



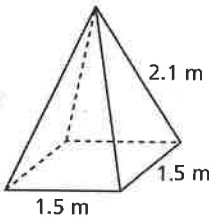
b) For each triangle in part a, determine the measures of the acute angles to the nearest tenth of a degree.

c) To complete part b, did you have to calculate the measures of all 6 acute angles? Explain.

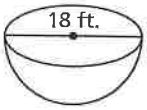
8. 93 cm^3
9. a) Circular-based bin
   b) Square-based bin
10. a) 1300.0 cm^3 b) 6.2 m^3
11. a) 856.2 cm^2 b) 24.2 m^2
12. Approximately 26.4 m^2
13. a) 1060 $in.^3$ b) 15 in. by 15 in. by 12 in.
    c) 1820 $in.^3$

Chapter 1: Review, page 64

1. Answers may vary. For example:
   a) Inch b) Foot
   c) Yard
3. a) 42 ft. b) 8800 yd.
   c) 75 in. d) 3 yd. 1 ft. 3 in.
4. 320 in., or 8 yd. 2 ft. 8 in.
6. Answers will vary depending on the conversion ratios used.
   a) 8 ft. 7 in. b) 136 yd. 2 ft. 1 in.
   c) 3 mi. 1282 yd. d) 1 ft. 2 in.
7. Answers will vary depending on the conversion ratios used.
   a) 12.5 m b) 6.8 km
   c) 48.3 cm d) 215.9 mm
8. Answers will vary depending on the conversion ratio used. 670 750 strides
9. a) 75 $ft.^2$ b) 85 cm^2
   c) 898 mm^2 d) 192 m^2
10. 160 $yd.^2$
11. a)



    b) 2.0 m
    c) 6 m^2
12. a) $8\frac{7}{10}$ in. b) 173 $in.^2$
13. 125.8 cm^2
14. 5810 $ft.^2$
15. a) 11 m^3 b) 8822 $in.^3$
    c) 7 $ft.^3$ d) 221 mm^3
16. No; approximately 132.7 cm^3
17. 12 cm
18. a) 24 $in.^3$ b) 6 in.
19. a) 2.1 m b) 2.3 cm
20. a) 254 $in.^2$, 382 $in.^3$
    b) 133 m^2, 144 m^3
21.



    a) 763 $ft.^2$ b) 1527 $ft.^3$
22. $4\frac{3}{5}$ in.
23. Approximately 98 cm^3
24. 523 $in.^3$
25. a) 480 cm^2, 595 cm^3 b) 108 $ft.^2$, 84 $ft.^3$
26. a) 113 981 cm^3 b) 11 878 cm^2
27. a) 8 cm b) 10 mm

Chapter 1: Practice Test, page 67

1. B
2. C
3. The volume of the right cylinder is 3 times the volume of the right cone.
4. a) 28.3 cm^3, 69.3 cm^2
   b) 1215.8 m^3, 647.2 m^2
5. a) A ruler with inches marked
6. 5.8 cm

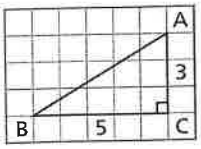
Chapter 2 Trigonometry, page 68

2.1 The Tangent Ratio, page 75

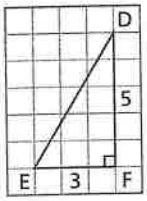
3. a) $\tan A = \frac{6}{7}$; $\tan C = \frac{7}{6}$
   b) $\tan D = \frac{3}{2}$; $\tan F = \frac{2}{3}$
   c) $\tan H = \frac{5}{4}$; $\tan J = \frac{4}{5}$
   d) $\tan K = \frac{5}{7}$; $\tan M = \frac{7}{5}$
4. a) 14° b) 51°
   c) 68° d) 87°
5. a) 27° b) 45°
   c) 61° d) 69°

6. Sketches will vary. For example:

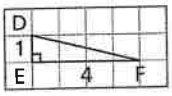
a)



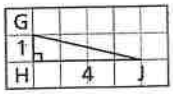
b)



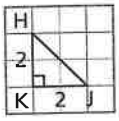
c)



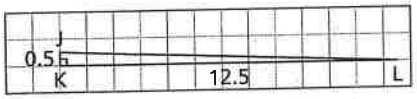
d)



e)



f)



7. a) $\tan 60° > 1$ **b)** $\tan 30° < 1$

8. a) 36.4° **b)** 68.0°

9. b) i) $\angle A \doteq 26.6°$; $\angle B \doteq 63.4°$

ii) $\angle D \doteq 63.4°$; $\angle F \doteq 26.6°$

iii) $\angle G \doteq 63.4°$; $\angle H \doteq 26.6°$

c) No

10. a) 36.0° **b)** 49.1°

c) 20.3° **d)** 82.4°

11. a) 11° **b)** 14°

c) 6° **d)** 9°

12. Whitehorse

13. $\angle P = \angle RQS \doteq 67.4°$, $\angle R = \angle PQS \doteq 22.6°$

14. 22°

15. 20.6°; 69.4°

16. The side opposite the acute angle has the same length as the side adjacent to the angle.

17. 25°

18. 22°

19. 146°

20. 76°

21. $\angle X \doteq 50.1°$, $\angle Y = \angle Z \doteq 64.9°$

22. a) There is no least possible value; the tangent can be arbitrarily close to zero.

b) There is no greatest possible value; the tangent can be arbitrarily large.

23. a) $1; \frac{1}{\sqrt{2}}; \frac{1}{\sqrt{3}}; \frac{1}{\sqrt{4}}$, or $\frac{1}{2}; \frac{1}{\sqrt{5}}$

b) $\frac{1}{\sqrt{100}}$, or $\frac{1}{10}$

2.2 Using the Tangent Ratio to Calculate Lengths, page 82

3. a) 2.5 cm **b)** 1.4 cm

c) 5.0 cm **d)** 7.5 cm

4. a) 2.2 cm **b)** 2.8 cm

c) 2.8 cm

5. a) 5.6 cm **b)** 4.1 cm

c) 3.8 cm

6. 22.8 m

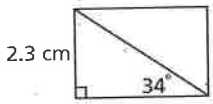
7. 3.8 m

8. 187 m

9. a) 3.6 cm **b)** 10.0 cm

10. Approximately 30 m

11. a)



b) 3.4 cm

12. 40.3 cm^2

13. Approximately 60 m

14. Approximately 58 m, assuming the balloon is directly over the store

15. $\angle QRT = \angle SRT = 26.5°$, $\angle QRS = 53.0°$,
$\angle QPT = \angle SPT = 56.3°$, $\angle QPS = 112.6°$,
$\angle RQT = \angle RST = 63.5°$,
$\angle PQT = \angle PST = 33.7°$,
$\angle PQR = \angle PSR = 97.2°$,
$\angle PTQ = \angle PTS = \angle QTR = \angle RTS = 90.0°$
$PQ = PS \doteq 3.6$ cm, $QR = SR \doteq 6.7$ cm

16. a) Approximately 38.7°

b) Approximately 63.4°