**SAMPLE CHAPTER TEST SOLUTIONS**

***Part A: True or False?***

1. (T)

Side QR is opposite ∠P.

Side *p,* or QR, is in the interior of ∠P.

2. (T)

Side PQ is the longest side.

PQ = *r*

Side *r* is the hypotenuse.

3. (T)

*r*2 − *p*2 = *q*2

From the Pythagorean theorem.

*r*2 = *q*2 + *p*2

Subtract *p*2 from both sides.

*r*2 − *p*2 = *q*2

4. (F)

∠P = 53°

53° + ∠Q = 90°

∠Q = 90° − 53°

∠Q = 37°

5. (F)

cos ∠Q = $\frac{adj}{hyp}$

cos ∠Q = $\frac{p}{r}$

6. (T)

cos ∠P = $\frac{q}{r}$

$\frac{q}{r}$ = sin ∠Q

7. (F)

∠P + ∠Q + ∠R = 180°

∠P + ∠Q = 180° − ∠R

∠P + ∠Q = 90°

8. (T)

tan ∠Q = $\frac{opp}{adj}$

tan ∠Q = $\frac{q}{p}$

9. (T)

tan ∠P = $\frac{opp}{adj}$

tan ∠P = $\frac{p}{q}$

10. (F)

PR is opposite ∠Q*,* or adjacent ∠P.

***Part B: Short Answer***

11. a)

tan A = $\frac{6.3}{5.9}$

tan A $≈$ 1.1

b)

∠A = tan-1 $\left(\frac{6.3}{5.9}\right)$

∠A $≈$ 47°

12. 92 + 122 = *b*2

81 + 144 = *b*2

225 = *b*2

*b* = $\sqrt{225}$

*b* = 15

**Alternative Solution**

Since 9 equals 3 multiplied by 3 and 12 equals 3 multiplied by 4, the hypotenuse is 3 multiplied by 5 equals 15, multiples of the 3-4-5 right triangle.

13. a) sin 12° = $\frac{l}{9.6}$

*l* = 9.6 sin 12°

*l* = 2

b) ∠L + ∠M + ∠N = 180°

12° + 90° + ∠N = 180°

102° + ∠N = 180°

∠N = 180° – 102°

∠N = 78°

14. a) PS = 2 + 2

PS = 4

$$\frac{6}{x}=\frac{4}{2}$$

4*x* = 12

*x* = $\frac{12}{4}$

*x* = 3

b) ∠P = tan-1 $\left(\frac{6}{4}\right)$

∠A = 56°

c) 22 + 32 = PQ2

4 + 9 = PQ2

13 = PQ2

PQ = $\sqrt{13}$

PQ $≈$ 3.6

***Part C: Extended Answer***

15. AB2 + AD2 = BD2

102 + 82 = BD2

100 + 64 = BD2

BD2 = 164

PQ = $\sqrt{164}$

PQ $≈$ 12.8

It is approximately 12.8 m from one vertex to the opposite.

16.



4.22 + *x*2 = 52

*x*2 = 52 – 4.22

*x* = $\sqrt{25 –17.64}$

*x* = $\sqrt{7.36}$

*x* $≈$ 2.7

The base of the ladder is approximately 2.7 m from the house.

17. *a*2 + *b*2 = *c*2

*a*2 + 362 = 452

*a*2 + 1296 = 2025

*a*2 = 2025 – 1296

*a*2 = 729

*a* = $\sqrt{729}$

*a* = 27

The vertical distances between the centres is approximately 27 in.

**Alternative Solution**

Students may realize that 45 equals 9 times 5 and 36 equals 9 times 4, so this represents a 3-4-5 right triangle and the other leg would be 9 times 3 equals 27 in.

18. Change 4′9″ to feet by first changing 9″ to a fraction of a foot.

$$\frac{9}{12}=\frac{3}{4}$$

$\frac{3}{4}$ = 0.75 ft

sin 32° = $\frac{4.75}{r}$

*r* sin 32° = 4.75

*r* = $\frac{4.75}{\sin(32°)}$

*r* $≈$ 9.0

The rafter is approximately 9 ft long.

19.



sin 32° = $\frac{x}{4.3}$

*x* = 4.3 sin 32°

*x* = 2.3

It would be about 2.3 m up the tree.

20. cos 70° = $\frac{d}{6}$

6 cos 70° = *d*

*r* $≈$ 2.1

It is approximately 2.1 m from the wall.

21.



cos 50° = $\frac{x}{120}$

120 cos 50° = *x*

*x* $≈$ 77.1 m

The width of the pyramid is therefore approximately 2 $×$ 77.1 m or 154.2 m.

22. Since this is a 45-45-90 triangle, AC equals BC, which equals 120 yards.

**Alternative Solution**

tan 45° = $\frac{AC}{BC}$

tan 45° = $\frac{AC}{120}$

AC = 120 tan 45°

AC = 120

Therefore, it is 120 yards across the river.

23.



tan X = $\frac{45}{100}$

X = tan-1 $\left(\frac{45}{100}\right)$

X $≈$ 24°

Therefore, the angle of elevation is approximately 24°.



24. a) Let the height of the stump be *x*.

tan 37° = $\frac{x}{6.5}$

*x* = 6.5 tan 37°

*x* $≈$ 4.9 m

The tree broke 4.9 m from the ground.

b) Let the length of the piece that broke off be *y.*

cos 37° = $\frac{6.5}{y}$

*y* cos 37° = 6.5

*y* = $\frac{6.5}{\cos(37°)}$

*y* $≈$ 8.1 m

4.9 + 8.1 = 13

The tree was 13 m tall.

Note: Students should not use the Pythagorean theorem to determine the length of the broken piece, as they will be compounding rounding errors.