

## PreCalc 11 Chapter 6 Rev Pack v1 Answer Section

### MULTIPLE CHOICE

1. ANS: A                   PTS: 0                   DIF: Moderate  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Conceptual Understanding | Procedural Knowledge
2. ANS: D                   PTS: 0                   DIF: Easy  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T1  
TOP: Trigonometry                   KEY: Conceptual Understanding | Procedural Knowledge
3. ANS: A                   PTS: 0                   DIF: Moderate  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Conceptual Understanding | Procedural Knowledge
4. ANS: D                   PTS: 0                   DIF: Easy  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Procedural Knowledge | Problem-Solving Skills
5. ANS: D                   PTS: 0                   DIF: Moderate  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Procedural Knowledge | Problem-Solving Skills
6. ANS: C                   PTS: 0                   DIF: Moderate  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Procedural Knowledge | Problem-Solving Skills
7. ANS: A                   PTS: 0                   DIF: Moderate  
REF: 6.1 Angles in Standard Position in Quadrant 1                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Procedural Knowledge | Problem-Solving Skills
8. ANS: B                   PTS: 0                   DIF: Easy  
REF: 6.2 Angles in Standard Position in All Quadrants                   LOC: 11.T1  
TOP: Trigonometry                   KEY: Conceptual Understanding
9. ANS: A                   PTS: 0                   DIF: Easy  
REF: 6.2 Angles in Standard Position in All Quadrants                   LOC: 11.T1  
TOP: Trigonometry                   KEY: Conceptual Understanding | Procedural Knowledge
10. ANS: A                   PTS: 0                   DIF: Moderate  
REF: 6.2 Angles in Standard Position in All Quadrants                   LOC: 11.T2  
TOP: Trigonometry                   KEY: Conceptual Understanding | Procedural Knowledge
11. ANS: D                   PTS: 0                   DIF: Moderate                   REF: 6.3 Constructing Triangles  
LOC: 11.T3                   TOP: Trigonometry                   KEY: Procedural Knowledge
12. ANS: B                   PTS: 0                   DIF: Moderate                   REF: 6.4 The Sine Law  
LOC: 11.T3                   TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge
13. ANS: D                   PTS: 0                   DIF: Moderate                   REF: 6.3 Constructing Triangles  
LOC: 11.T3                   TOP: Trigonometry                   KEY: Procedural Knowledge
14. ANS: B                   PTS: 0                   DIF: Moderate                   REF: 6.4 The Sine Law  
LOC: 11.T3                   TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge
15. ANS: C                   PTS: 0                   DIF: Moderate                   REF: 6.4 The Sine Law  
LOC: 11.T3                   TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge

16. ANS: C                      PTS: 1                      DIF: Moderate                      REF: 6.5 The Cosine Law  
 LOC: 11.T3                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge
17. ANS: A                      PTS: 1                      DIF: Moderate                      REF: 6.5 The Cosine Law  
 LOC: 11.T3                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge
18. ANS: B                      PTS: 0                      DIF: Easy                      REF: 6.4 The Sine Law  
 LOC: 11.T3                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge

**SHORT ANSWER**

19. ANS:  
 $\tan 45^\circ = 1$
- PTS: 0                      DIF: Moderate                      REF: 6.1 Angles in Standard Position in Quadrant 1  
 LOC: 11.T2                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge
20. ANS:  
 approximately 10.4 m
- PTS: 0                      DIF: Moderate                      REF: 6.1 Angles in Standard Position in Quadrant 1  
 LOC: 11.T2                      TOP: Trigonometry  
 KEY: Procedural Knowledge | Problem-Solving Skills
21. ANS:  
 approximately 7.6 m
- PTS: 0                      DIF: Moderate                      REF: 6.1 Angles in Standard Position in Quadrant 1  
 LOC: 11.T2                      TOP: Trigonometry  
 KEY: Procedural Knowledge | Problem-Solving Skills
22. ANS:  
 $\cos 30^\circ = \frac{\sqrt{3}}{2}$
- PTS: 0                      DIF: Moderate                      REF: 6.2 Angles in Standard Position in All Quadrants  
 LOC: 11.T2                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge
23. ANS:  
 $\triangle DEF$  is scalene.
- PTS: 0                      DIF: Moderate                      REF: 6.3 Constructing Triangles  
 LOC: 11.T3                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Procedural Knowledge

24. ANS:  
No, the Sine Law cannot be used because only one angle measure is given and the angle is contained between the two given sides.

PTS: 0                    DIF: Easy                    REF: 6.4 The Sine Law  
LOC: 11.T3                    TOP: Trigonometry  
KEY: Conceptual Understanding | Communication

25. ANS:  
Two triangles can be constructed.

PTS: 0                    DIF: Easy                    REF: 6.4 The Sine Law  
LOC: 11.T3                    TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge

26. ANS:  
Yes, the Cosine Law can be used;  $AC = 8.6$  cm.

PTS: 1                    DIF: Moderate                    REF: 6.5 The Cosine Law  
LOC: 11.T3                    TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge

27. ANS:  
 $\angle G = 74^\circ$   
 $\angle H = 55^\circ$   
 $\angle I = 51^\circ$

PTS: 1                    DIF: Moderate                    REF: 6.5 The Cosine Law  
LOC: 11.T3                    TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge

28. ANS:  
 $\angle C = 34^\circ$

PTS: 1                    DIF: Moderate                    REF: 6.5 The Cosine Law  
LOC: 11.T3                    TOP: Trigonometry  
KEY: Conceptual Understanding | Procedural Knowledge

## PROBLEM

29. ANS:

Label the right triangles  $\triangle ABC$  and  $\triangle DEF$ .In  $\triangle ABC$ ,  $\angle B$  represents the angle of inclination of the guy wire attached to the shorter building.In  $\triangle ABC$ ,

$$\sin B = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin B = \frac{AC}{AB}$$

$$\sin B = \frac{34}{47}$$

$$\angle B = \sin^{-1}\left(\frac{34}{47}\right)$$

$$\angle B = 46.3362\dots^\circ$$

The angle of inclination of the guy wire attached to the shorter building is approximately  $46.3^\circ$ .In  $\triangle DEF$ ,  $\angle E$  represents the angle of inclination of the guy wire attached to the taller building.In  $\triangle DEF$ ,

$$\cos E = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\cos E = \frac{EF}{DE}$$

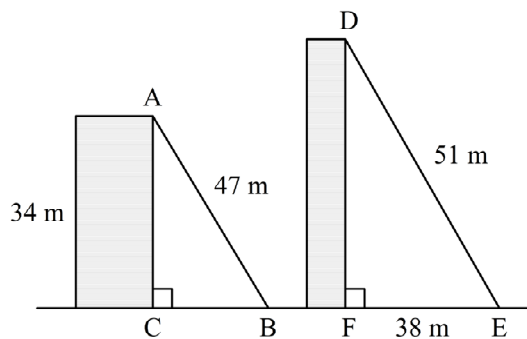
$$\cos E = \frac{38}{51}$$

$$\angle E = \cos^{-1}\left(\frac{38}{51}\right)$$

$$\angle E = 41.8324\dots^\circ$$

The angle of inclination of the guy wire attached to the taller building is approximately  $41.8^\circ$ .

The student is not correct. The angles of inclination are different.



PTS: 0 DIF: Difficult REF: 6.1 Angles in Standard Position in Quadrant 1

LOC: 11.T2 TOP: Trigonometry

KEY: Communication | Problem-Solving Skills

30. ANS:

- a) In right  $\triangle BCO$ ,  $BO$  is the hypotenuse,  $BC$  is opposite  $\angle O$ , and  $CO$  is adjacent to  $\angle O$ .  
To determine the length of  $BO$ , use the sine ratio.

$$\sin O = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin O = \frac{BC}{BO}$$

$$\sin 31^\circ = \frac{8.0}{BO}$$

Solve the equation for  $BO$ .

$$\sin 31^\circ = \frac{8.0}{BO}$$

$$BO \sin 31^\circ = 8.0$$

$$\frac{BO \sin 31^\circ}{\sin 31^\circ} = \frac{8.0}{\sin 31^\circ}$$

$$BO = \frac{8.0}{\sin 31^\circ}$$

$$BO = 15.5328\dots$$

The length of cord needed to reach corner B is approximately 15.5 m.

- b) In right  $\triangle BCO$ , to determine the length of  $CO$ , use the cosine ratio.

$$\cos O = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\cos O = \frac{CO}{BO}$$

$$\cos 31^\circ = \frac{CO}{15.5328\dots}$$

Solve the equation for  $CO$ .

$$\cos 31^\circ = \frac{CO}{15.5328\dots}$$

$$(15.5328\dots) \cos 31^\circ = CO$$

$$CO = 13.3142\dots$$

To determine the distance between the electrical outlet and corner N, subtract  $CO$  from  $CN$ .

$$NO = CN - CO$$

$$NO = 40.0 - 13.3142\dots$$

$$NO = 26.6857\dots$$

The distance between the electrical outlet and corner N is approximately 26.7 m.

PTS: 0                      DIF: Difficult                      REF: 6.1 Angles in Standard Position in Quadrant 1

LOC: 11.T2                      TOP: Trigonometry

KEY: Communication | Problem-Solving Skills

31. ANS:

a) Determine the distance  $r$  from the origin to P.

$$x = 3, y = -4$$

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{(3)^2 + (-4)^2}$$

$$r = \sqrt{25}$$

$$\cos \theta = \frac{x}{r}$$

$$\cos \theta = \frac{3}{\sqrt{25}}$$

$$\sin \theta = \frac{y}{r}$$

$$\sin \theta = \frac{-4}{\sqrt{25}}$$

$$\tan \theta = \frac{y}{x}$$

$$\tan \theta = \frac{-4}{3}$$

b) The reference angle is:  $\cos^{-1}\left(\frac{3}{\sqrt{25}}\right) = 53.1301\dots^\circ$ Since  $\theta$  is in Quadrant 4, the angle  $\theta$  is approximately:  $360^\circ - 53.1301^\circ = 306.8699^\circ$ 

PTS: 0 DIF: Moderate REF: 6.2 Angles in Standard Position in All Quadrants

LOC: 11.T2 TOP: Trigonometry

KEY: Procedural Knowledge | Communication

32. ANS:

Draw a labelled diagram to represent the problem.

In right  $\triangle FLP$ , FP is the hypotenuse and FL is the side opposite  $\angle P$ .

So, use the sine ratio to determine the length of FL.

$$\sin P = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin P = \frac{FL}{FP}$$

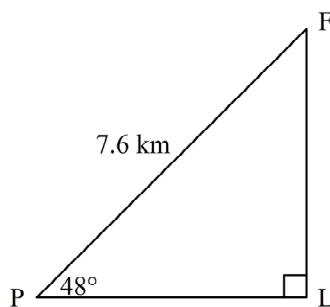
$$\sin 48^\circ = \frac{FL}{7.6}$$

Solve the equation for FL.

$$\sin 48^\circ = \frac{FL}{7.6}$$

$$7.6 \sin 48^\circ = FL$$

$$FL = 5.6479\dots$$



The distance between the fishing boat and the lighthouse is approximately 5.6 km.

PTS: 0 DIF: Moderate REF: 6.2 Angles in Standard Position in All Quadrants

LOC: 11.T2 TOP: Trigonometry

KEY: Communication | Problem-Solving Skills

33. ANS:  
Possible solution:  
 $\sin A = \sin 75^\circ$   
 $= 0.9659\dots$

Length of BC (cm)	Value of $\frac{BC}{AB}$	How does $\frac{BC}{AB}$ compare with $\sin A$ ?	Description of possible triangles
5	0.8333...	$\frac{BC}{AB} < \sin A$	No triangles are possible.
6	1	$\frac{BC}{AB} = 1 > \sin A$	1 isosceles triangle
7	1.1666...	$\frac{BC}{AB} > 1 > \sin A$	1 scalene triangle
5.9	0.9833...	$\sin A < \frac{BC}{AB} < 1$	2 scalene triangles

PTS: 0                      DIF: Moderate              REF: 6.3 Constructing Triangles  
 LOC: 11.T3                      TOP: Trigonometry  
 KEY: Conceptual Understanding | Problem-Solving Skills

34. ANS:

The treasure chest could be between the two divers or on one side of both divers.

Case 1: The treasure chest C is between the two divers, A and B.

$$\angle C = 180^\circ - (\angle A + \angle B)$$

$$\angle C = 180^\circ - (38^\circ + 51^\circ)$$

$$\angle C = 91^\circ$$

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

$$\frac{a}{\sin 38^\circ} = \frac{60}{\sin 91^\circ}$$

$$a = \frac{60 \sin 38^\circ}{\sin 91^\circ}$$

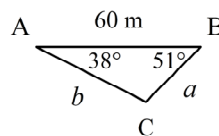
$$a \doteq 37$$

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{b}{\sin 51^\circ} = \frac{60}{\sin 91^\circ}$$

$$b = \frac{60 \sin 51^\circ}{\sin 91^\circ}$$

$$b \doteq 47$$



The treasure chest is approximately 37 m and 47 m from the divers.

Case 2: The treasure chest C is on one side of both divers A and B.

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

$$\frac{a}{\sin 38^\circ} = \frac{60}{\sin 13^\circ}$$

$$a = \frac{60 \sin 38^\circ}{\sin 13^\circ}$$

$$a \doteq 164$$

In  $\triangle ABC$ ,

$$\angle B = 180^\circ - 51^\circ$$

$$= 129^\circ$$

$$\angle C = 180^\circ - (38^\circ + 129^\circ)$$

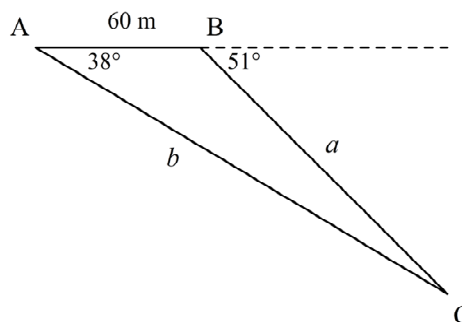
$$= 13^\circ$$

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{b}{\sin 129^\circ} = \frac{60}{\sin 13^\circ}$$

$$b = \frac{60 \sin 129^\circ}{\sin 13^\circ}$$

$$b \doteq 207$$



The treasure chest is approximately 164 m and 207 m from the divers.

PTS: 0

DIF: Difficult

REF: 6.4 The Sine Law

LOC: 11.T3

TOP: Trigonometry

KEY: Communication | Problem-Solving Skills