

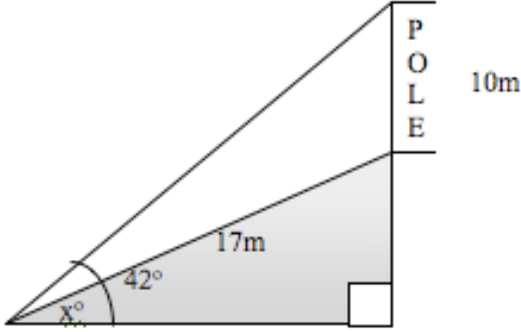
The exam is identical in format to this review sheet. Only the actual numerical values and equations will vary.

Multiple-Choice:

Record all answers to the multiple-choice questions here. To clearly distinguish between A and D, it is recommended that you use capital letters. *(2 points each)*

Free-Response: *(40 points...points are listed in italics next to each problem)*

You must show a reasonable amount of work that leads to your answer. Where it is impossible to show your work, explain the mental leaps that you made to draw your conclusion. Where estimation is required, round or truncate all answer to the thousandths place.

31	An airplane has an airspeed of 724 kilometers per hour at a bearing of 30° . The wind velocity is 32 kilometers per hour from the west. Draw a diagram of this situation. What are the ground speed and the direction of the plane? <i>(8 points)</i>
32	A surveyor finds that a tree on the opposite bank of a river flowing due east has a bearing of $N 22^\circ E$ from a certain point and a bearing of $N 15^\circ W$ from a point 400 feet downstream. Draw a diagram for this situation. What is the width of the river? <i>(9 points)</i>
33	Two planes leave Raliegh-Durham Airport at approximately the same time. One is flying 425 miles per hour at a bearing 355° and the other is flying 530 miles per hour at a bearing of 67° . Draw a figure that gives a visual representation of this problem after they have flown 2 hours AND find the distance between the two planes. <i>(10 points)</i>
34	<p><i>(5 points)</i> A 10-meter telephone pole casts a 17-meter shadow directly down the slope when the angle of elevation of the sun is 42° (see figure). Find x, the angle of elevation of the ground.</p>  <p>The diagram shows a right-angled triangle representing the sun's rays. The vertical side is a telephone pole labeled 'P O L E' with a height of 10m. The horizontal side is the ground, with an angle of elevation x° at the bottom-left vertex. The hypotenuse is the shadow, labeled 17m, which is cast down the slope. The angle between the sun's rays and the ground is 42°. A right-angle symbol is shown at the base of the pole.</p>
35	Decompose fully into partial fractions. <i>(8 points)</i> $\frac{3x + 13}{3x^2 - 16x + 5}$

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the triangle.

- 1) $A = 48^\circ, a = 33, b = 26$ 1) _____
A) $B = 35.8^\circ, C = 96.2^\circ, c \approx 44.1$ B) Cannot be solved
C) $B = 35.8^\circ, C = 116.2^\circ, c \approx 35.3$ D) $B = 35.8^\circ, C = 96.2^\circ, c \approx 26.5$
- 2) $C = 103^\circ, b = 45, c = 63$ 2) _____
A) $B = 89.1^\circ, A = 77.9^\circ, a \approx 35.1$ B) Cannot be solved
C) $B = 44.1^\circ, A = 32.9^\circ, a \approx 35.1$ D) $B = 44.1^\circ, A = 77.9^\circ, a \approx 35.1$

The given measurements may or may not determine a triangle. If not, then state that no triangle is formed. If a triangle is formed, then use the Law of Sines to solve the triangle, if it is possible, or state that the Law of Sines cannot be used.

- 3) $C = 43^\circ, a = 18, c = 9$ 3) _____
A) The triangle cannot be solved with the Law of Sines.
B) $A = 83.5^\circ, B = 53.5^\circ, b \approx 13.5$
C) $A = 53.5^\circ, B = 83.5^\circ, b \approx 13.5$
D) No triangle is formed.
- 4) $B = 152^\circ, c = 10, b = 15$ 4) _____
A) No triangle is formed.
B) $C = 9.8^\circ, A = 18.2^\circ, a \approx 5.4$
C) The triangle cannot be solved with the Law of Sines.
D) $C = 18.2^\circ, A = 9.8^\circ, a \approx 5.4$

Solve.

- 5) Two tracking stations are on the equator 125 miles apart. A weather balloon is located on a bearing of N 43° E from the western station and on a bearing of N 21° E from the eastern station. How far is the balloon from the western station? 5) _____
A) 321 miles B) 300 miles C) 312 miles D) 291 miles
- 6) A guy wire to a tower makes a 68° angle with level ground. At a point 39 ft farther from the tower than the wire but on the same side as the base of the wire, the angle of elevation to the top of the tower is 37° . Find the length of the wire (to the nearest foot). 6) _____
A) 97 ft B) 92 ft C) 46 ft D) 51 ft

Solve the triangle.

- 7) $a = 11, b = 21, C = 96^\circ$ 7) _____
A) $c \approx 23.8, A \approx 30.3^\circ, B \approx 53.7^\circ$ B) $c \approx 24.7, A \approx 54.7^\circ, B \approx 29.3^\circ$
C) $c \approx 24.7, A \approx 26.3^\circ, B \approx 57.7^\circ$ D) $c \approx 23.8, A \approx 26.3^\circ, B \approx 57.7^\circ$

Decide whether a triangle can be formed with the given side lengths. If so, use Heron's formula to find the area of the triangle.

- 8) $a = 240$ 8) _____
 $b = 133$
 $c = 317$
 A) 14,663.96 B) 28,412.53
 C) No triangle is formed. D) 28,398.43

- 9) $a = 13$ 9) _____
 $b = 6$
 $c = 5$
 A) No triangle is formed. B) 21.49
 C) 23.37 D) 22.45

Solve the problem.

- 10) An airplane leaves an airport and flies due west 170 miles and then 220 miles in the direction S 79.33° W. How far is the plane from the airport at this time (to the nearest mile)? 10) _____
 A) 366 mi B) 388 mi C) 356 mi D) 378 mi
- 11) A tower is supported by a guy wire 494 ft long. If the wire makes an angle of 51° with respect to the ground and the distance from the point where the wire is attached to the ground and the tower is 108 ft, how tall is the tower? Round your answer to the nearest tenth. 11) _____
 A) 537.8 ft B) 568.2 ft C) 471.3 ft D) 434.2 ft
- 12) Two factories blow their whistles at exactly the same time. If a man hears the two blasts exactly 2.4 seconds and 7.6 seconds after they are blown and the angle between his lines of sight to the two factories is 50.5° , how far apart are the factories? Give your result to the nearest meter. (Use the fact that sound travels at 344 m/sec.) 12) _____
 A) 2479 meters B) 2982 meters C) 3204 meters D) 2184 meters

Find the component form and magnitude of the indicated vector.

- 13) Given that $P = (7, 2)$ and $Q = (9, 3)$, find the component form and magnitude of the vector \overrightarrow{PQ} . 13) _____
 A) $\langle 2, 1 \rangle, \sqrt{5}$ B) $\langle -2, -1 \rangle, 5$ C) $\langle 2, 1 \rangle, 5$ D) $\langle -2, -1 \rangle, \sqrt{5}$
- 14) Given that $P = (-2, 2)$ and $Q = (-4, 3)$, find the component form and magnitude of the vector \overrightarrow{QP} . 14) _____
 A) $\langle 2, -1 \rangle, 5$ B) $\langle -2, 1 \rangle, \sqrt{5}$ C) $\langle -6, -1 \rangle, \sqrt{-5}$ D) $\langle 2, -1 \rangle, \sqrt{5}$

Find the component form of the indicated vector.

- 15) Let $\mathbf{u} = \langle 6, 4 \rangle$, $\mathbf{v} = \langle -9, 3 \rangle$. Find $\mathbf{u} + \mathbf{v}$. 15) _____
 A) $\langle 15, 1 \rangle$ B) $\langle -3, 7 \rangle$ C) $\langle 9, -5 \rangle$ D) $\langle 10, -6 \rangle$
- 16) Let $\mathbf{u} = \langle 7, -3 \rangle$, $\mathbf{v} = \langle 4, -8 \rangle$. Find $\mathbf{v} - \mathbf{u}$. 16) _____
 A) $\langle -10, -12 \rangle$ B) $\langle -3, -5 \rangle$ C) $\langle -15, 7 \rangle$ D) $\langle 11, -11 \rangle$
- 17) Let $\mathbf{u} = \langle 2, -8 \rangle$, $\mathbf{v} = \langle 5, -4 \rangle$. Find $-5\mathbf{u} - 2\mathbf{v}$. 17) _____
 A) $\langle 0, 32 \rangle$ B) $\langle -20, 48 \rangle$ C) $\langle -35, 24 \rangle$ D) $\langle 30, -2 \rangle$

Solve the problem.

- 18) An airplane flies on a compass heading of 90.0° at 350 mph. The wind affecting the plane is blowing from 337° at 24.0 mph. What is the true course and ground speed of the airplane? Round results to an appropriate number of significant digits. 18) _____
 A) 93° , 372 mph B) 94° , 360 mph C) 89° , 359 mph D) 89° , 372 mph

- 19) Two forces of 470 N and 206 N act at a point. The resultant force is 542 N. Find the angle between the forces. 19) _____
 A) 99.0° B) 81.0° C) 88.0° D) 165.6°

Find $\mathbf{a} \cdot \mathbf{b}$.

- 20) $\mathbf{a} = \langle 4, 7 \rangle$, $\mathbf{b} = \langle 3, 5 \rangle$ 20) _____
 A) 47 B) $\langle 7, 12 \rangle$ C) $\langle 12, 35 \rangle$ D) 23

Find the angle between the given vectors to the nearest tenth of a degree.

- 21) $\mathbf{u} = \langle -7, -5 \rangle$, $\mathbf{v} = \langle -3, 4 \rangle$ 21) _____
 A) 34.4° B) 44.4° C) 88.7° D) 98.7°

- 22) $\mathbf{u} = \mathbf{i} + \sqrt{7}\mathbf{j}$, $\mathbf{v} = -\mathbf{i} + 6\mathbf{j}$ 22) _____
 A) 11.2° B) 17.6° C) 69.2° D) 30.2°

- 23) $\mathbf{u} = \left(2 \cos \frac{\pi}{6} \right) \mathbf{i} + \left(2 \sin \frac{\pi}{6} \right) \mathbf{j}$, $\mathbf{v} = \left(\cos \frac{4\pi}{3} \right) \mathbf{i} + \left(\sin \frac{4\pi}{3} \right) \mathbf{j}$ 23) _____
 A) 120° B) 150° C) 240° D) 210°

Determine whether the vectors \mathbf{u} and \mathbf{v} are parallel, orthogonal, or neither.

- 24) $\mathbf{u} = \langle 7, -2 \rangle$, $\mathbf{v} = \langle -14, 4 \rangle$ 24) _____
 A) Neither B) Parallel C) Orthogonal

- 25) $\mathbf{u} = \langle 7, 6 \rangle$, $\mathbf{v} = \langle -7, 5 \rangle$ 25) _____
 A) Parallel B) Orthogonal C) Neither

Express the complex number in trigonometric form.

- 26) $4i$ 26) _____
 A) $4(\cos 180^\circ + i \sin 180^\circ)$ B) $4(\cos 270^\circ + i \sin 270^\circ)$
 C) $4(\cos 90^\circ + i \sin 90^\circ)$ D) $4(\cos 0^\circ + i \sin 0^\circ)$

- 27) $3 - 3i$ 27) _____
 A) $3 \left\{ \cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right\}$ B) $3\sqrt{2} \left\{ \cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right\}$
 C) $3 \left\{ \cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right\}$ D) $3\sqrt{2} \left\{ \cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right\}$

Find the partial fraction decomposition.

28) $\frac{13x - 31}{x^2 - 5x + 6}$ 28) _____

A) $\frac{5}{x - 2} + \frac{8}{x - 3}$

B) $\frac{5}{x + 2} + \frac{8}{x + 3}$

C) $\frac{1}{x - 2} + \frac{1}{x - 3}$

D) $\frac{8}{x - 2} + \frac{5}{x - 3}$

29) $\frac{2x^2 - 12x + 22}{(x + 1)(x - 2)^2}$ 29) _____

A) $\frac{4}{x + 1} + \frac{-2}{x - 2} + \frac{2}{(x - 2)^2}$

B) $\frac{-2}{x + 1} + \frac{4}{x - 2} + \frac{2}{(x - 2)^2}$

C) $\frac{4}{x + 1} + \frac{2}{(x - 2)^2}$

D) $\frac{4}{x + 1} + \frac{2}{x - 2} + \frac{-2}{(x - 2)^2}$

Decompose into partial fractions.

30) $\frac{-4x^2 - 5x - 69}{(x - 3)(x^2 + 6)}$ 30) _____

A) $\frac{4x + 8}{x^2 + 6} - \frac{8}{x - 3}$

B) $\frac{4x + 7}{x^2 + 6} - \frac{8}{x - 3}$

C) $\frac{7x + 4}{x^2 + 6} - \frac{8}{x - 3}$

D) $\frac{4x + 7}{x^2 + 6} + \frac{8}{x - 3}$

Answer Key

Testname: HA2PC_CH6(PC)_REVIEWMC

- 1) A
- 2) C
- 3) D
- 4) D
- 5) C
- 6) C
- 7) C
- 8) A
- 9) A
- 10) B
- 11) D
- 12) D
- 13) A
- 14) D
- 15) B
- 16) B
- 17) B
- 18) B
- 19) B
- 20) A
- 21) C
- 22) D
- 23) B
- 24) B
- 25) C
- 26) C
- 27) B
- 28) A
- 29) A
- 30) B