

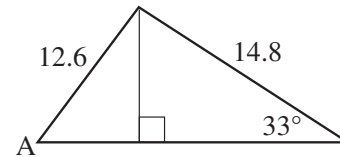
- (1.1) What is the measure of the angle between the hands of a clock when it reads 3:40?
- (1.1) In $\triangle ABC$, $m\angle C = 90^\circ$, $AB = 10$ and $BC = 5\sqrt{2}$. Find AC .
- (1.2) Find the distance between the points $(-1, 4)$ and $(-5, 6)$.
- (1.2) Find one positive and one negative angle that is coterminal with 173° (answers may vary).
- (1.3) Consider the angle $\theta = 120^\circ$
 - Draw θ in the standard position on the coordinate axes.
 - Find a point on the terminal side (answers may vary).
 - Find $\sin \theta$, $\cos \theta$ and $\tan \theta$.
- (1.3) Find $\tan \phi$ if $\sin \phi = \frac{2}{\sqrt{5}}$ and ϕ terminates in QII.
- (1.3) Find $\cos \theta$ if the terminal side of θ lies on the line $y = -\frac{1}{4}x$ in QII.
- (1.4) From memory, state all three Pythagorean identities.
- (1.5) Simplify the expression $\sqrt{16 - x^2}$ as much as possible after substituting $4 \sin \phi$ for x .
- (1.5) Show that the following statement is an identity by transforming the left side until it matches the right side. Be organized and do not skip steps.

$$\frac{\cos^2 \theta}{\sin \theta} = \csc \theta - \sin \theta$$

- (2.1) Consider a right triangle with one acute angle labeled θ and the appropriate sides labeled “opposite”, “adjacent” and “hypotenuse.” From memory, list the ratios representing all six trigonometric functions of the angle θ .

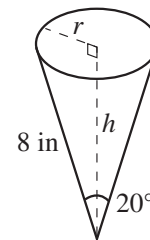
- (2.1) Without the use of a calculator, find the exact value for each of the following:
 - $\sin 60^\circ$
 - $\tan 30^\circ$
 - $\cos 0^\circ$
 - $\sec 45^\circ$
- (2.2) Subtract: $45^\circ 13' - 22^\circ 32'$
- (2.2) Use a calculator to approximate each of the following. Round each answer to the nearest thousandth.
 - $\sin 12.5^\circ$
 - $\cot 77^\circ 29'$
 - $\sec 81^\circ 17' 50''$
- (2.3) In $\triangle ABC$, $m\angle C = 90^\circ$, $AC = 55$ m and $m\angle B = 17^\circ$. Find AB rounded to the nearest tenth of a meter.

- (2.3) In the triangle below, find the measure of angle A to the nearest minute.



- (2.4) An icicle in the shape of a cone, measures 8 inches down the side and the angle at the tip is 20° . Find the volume of the icicle to the nearest hundredth of a cubic inch. The formula for the volume of a cone is

$$V = \frac{1}{3}\pi r^2 h.$$



18. (2.4) Two ships leave a harbor at the same time, one with a bearing of $N 57^\circ W$ and the other with a bearing of $N 57^\circ E$, and both travel for 80 miles. What is the distance between the ships?
19. (2.5) A cannonball is fired with an initial velocity of 200 feet per second at an angle of 43° above horizontal. Find the magnitudes of the horizontal and vertical vector components of the velocity vector. Round your answer to one decimal place.

MATH 142 EXAM 1 REVIEW – ANSWERS

1. 130°
2. $AC = 5\sqrt{2}$
3. $2\sqrt{5}$
4. 533° and -187°
5. (b) $(-1, \sqrt{3})$; (c) $\sin \theta = \frac{\sqrt{3}}{2}$, $\cos \theta = -\frac{1}{2}$, $\tan \theta = -\sqrt{3}$,
6. $\tan \phi = -2$
7. $-\frac{4\sqrt{17}}{17}$
8. $\cos^2 \theta + \sin^2 \theta = 1$, $\sec^2 \theta = \tan^2 \theta + 1$, $\csc^2 \theta = \cot^2 \theta + 1$
9. $4|\cos \phi|$
10. $\frac{\cos^2 \theta}{\sin \theta} = \frac{1 - \sin^2 \theta}{\sin \theta} = \frac{1}{\sin \theta} - \sin \theta = \csc \theta - \sin \theta$
11. $\sin \theta = \frac{\text{opp}}{\text{hyp}}$, $\cos \theta = \frac{\text{adj}}{\text{hyp}}$, $\tan \theta = \frac{\text{opp}}{\text{adj}}$, $\csc \theta = \frac{\text{hyp}}{\text{opp}}$, $\sec \theta = \frac{\text{hyp}}{\text{adj}}$, $\cot \theta = \frac{\text{adj}}{\text{opp}}$,
12. (a) $\frac{\sqrt{3}}{2}$; (b) $\frac{\sqrt{3}}{3}$; (c) 1; (d) $\sqrt{2}$
13. $22^\circ 41'$
14. (a) 0.216; (b) 0.222; (c) 6.609
15. $AB \approx 188.1$ m
16. $A \approx 39^\circ 46'$
17. about 15.92 in^3
18. about 134.2 miles
19. horizontal is about 146.3 ft/sec, vertical is about 136.4 ft/sec