(A = Algebra Text, T = Trigonometry Text, S = Supplemental Text, W=Workbook)

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1. Find the product AB when

$$A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \\ 0 & 6 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 5 & 2 \\ -4 & 8 \end{bmatrix}$$

(S 5.1 or W 5.1)

2. For the system $\begin{array}{rcl} 7y + 23x & = & 41 - 3y \\ 20y - 9x & = & 38 \end{array}$,

a) Solve the first equation for y ;
b) Substitute the result from part a) into the second equation to find x, and then use the result from part a) to find y. Round to the nearest hundredth.

(S 3.1 or W 7.3)

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3. If $\vec{A} = 60$ lbs @ $164°$ and $\vec{B} = 32$ lbs @ $222°$, find the sum of vectors $\vec{A}$ and $\vec{B}$.

(S 10.1 or W 10.1)

4. Express in simplest radical form and simplify:

$$6\sqrt{18} - 3\sqrt{2} + \sqrt{32}$$

(A 19 or W 6.1)

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5. a) Change 2.45 hm to cm
   b) Using dimensional analysis, convert 3.5 yds to cm.
      (1 yard = 91.44 cm)
   c) Determine the precision of the measurement: 12.4 mg.
   d) Determine the greatest possible error of 12.4 mg.

(S 2.2, 2.3, 2.4 or W 2.2, 2.3, 2.4)

6. If w varies directly as x and the square of y and inversely as z; and $w = 18$ when $x = 4$, $y = 6$ and $z = 12$. Find w when $x = 3$, $y = 4$ and $z = 9$.

(S 3.1 or W 3.3, 3.4)

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7. Solve $S = \dfrac{T_1 + 3T_2}{4T_1}$ for T_1

(S 3.1 or W 3.2)

8. If $f(x) = 3x^2 + 4x - 18$, evaluate: $f(-4)$

(A 3 or W 4.2)

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9. The force, F, between two parallel wires carrying electric currents varies inversely with the distance, d, between the wires. If a force of 0.250 N exists between wires that are 1.75 cm apart, what is the force between them if they are separated by 1.25 cm?

(S 3.1 or W 3.3, 3.4)

10. Determine the slope-intercept equation of the line that is perpendicular to $y = -\dfrac{1}{3}x + 5$ and that passes through $(-6, 8)$.

(A 5 or W 4.4)

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11. If Isabella earns $2,400 after working 80 hours, at the same pay scale, how much will she earn if she works 25 hours?

(S 3.1 or W 3.3)

12. Simplify and express in $a + bi$ form:

$$(8 - 2i)(6 + 3i)$$

(A 22 or W 6.2)

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13. Solve the following system of equations by using the inverse of the coefficient matrix:

$$\begin{array}{rcl} 8.4x - 1.2y & = & 10.8 \\ 3.5x + 2.6y & = & 6.4 \end{array}$$

(Round to the nearest tenth)

(S 5.2 or W 5.2)

14. A jet takes off at a 30° angle. The runway (from takeoff) is 875 feet long. Find the airplane's altitude as it flies over the end of the runway, to the nearest tenth of a foot.

(T 2 or W 9.2)

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15. Using the quadratic formula, solve for x to the nearest tenth: $2x^2 - 3x = 10$

(A 24 or W 8.1)

16. Solve and express the solution in $a + bi$ form.

$$x^2 + 4x + 29 = 0$$

(A 24 or W 8.1)

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17. Rationalize the denominator and simplify: $\dfrac{4 - 3\sqrt{2}}{6 + \sqrt{2}}$

(A 20 or W 6.1)

18. Simplify: $\dfrac{\dfrac{3}{2} + \dfrac{4}{x}}{\dfrac{1}{x} - \dfrac{2}{3x}}$

(A 14 or W 6.1)

19. a) Convert $330°$ to radian measure. (Leave the answer in terms of π or round it to the nearest tenth.)

    b) Convert $\dfrac{5\pi}{3}$ to degrees.

(S 9.1 or W 9.1)

20. For $y = -x^2 - 4x + 12$, find
    a) The axis of symmetry.
    b) The coordinates of the vertex.
    c) The **coordinates** of the y-intercept.
    d) The **coordinates** of the x-intercepts (if any).

(A 25 or W 8.2)

21. In triangle ABC, if $\angle C = 90°$, $AC = 32$ cm and $\angle B = 42°$, determine the length of AB and the length of BC to the nearest tenth of a centimeter.

(T 2 or W 9.2)

22. a) For $0 < \theta < \frac{\pi}{2}$, find the value of θ in radians when $\sin(\theta) = 0.436$ and round your answer to the nearest thousandth.
    b) Find $\cos 240°$.

    c) Determine $\tan \dfrac{5\pi}{6}$ to 3 significant digits or exact radical form.   (T 2 and T 3 or W 9.2 and W 9.3)

23. Find the arc length and area to the nearest tenth of the sector of a circle with a radius of 12 inches and a central angle of $120°$. Note: $s = r\theta$ and $A = \dfrac{1}{2}\theta r^2$ where θ is in radians.

(S 9.1 or W 9.1)

24. a) For $y = -3\sin(2x)$, determine the amplitude and the period. Sketch at least one cycle on graph paper. Label and indicate the scale on the axes.
    b) For $y = 4\cos\left(\dfrac{\pi x}{3}\right)$, determine the amplitude and the period. Sketch at least one cycle on graph paper. Label and indicate the scale on the axes.

(T 4 and T5 or W 9.4)

ANSWER KEY

1. $\begin{bmatrix} 22 & -20 \\ 16 & 16 \\ -24 & 48 \end{bmatrix}$

2. a) $y = 4.1 - 2.3x$
    b) $(x, y) = (0.80, 2.26)$

3. $\vec{R} = 82$ lbs @ $183°$

4. $19\sqrt{2}$

5. a) 24,500 cm
    b) 320 cm
    c) 0.1 mg
    d) 0.05 mg

6. $w = 8$

7. $T_1 = \dfrac{3T_2}{4S-1}$

8. 14

9. $F = 0.350$ N

10. $y = 3x + 26$

11. \$750

12. $54 + 12i$

13. $x = 1.4$ $y = 0.6$

14. 505.2 feet

15. $x = 3.1$, $x = -1.6$

16. $x = -2 \pm 5i$

17. $\dfrac{15 - 11\sqrt{2}}{17}$

18. $\dfrac{9x + 24}{2}$

19. a) $\dfrac{11\pi}{6}$ or 5.8
    b) $300°$

20. a) $x = -2$
    b) $(-2, 16)$
    c) $(0, 12)$
    d) $(-6, 0)$ $(2, 0)$

21. $AB = 47.8$ cm,
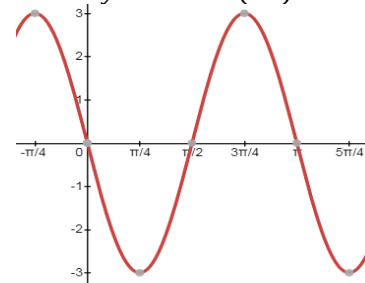 $BC = 35.5$ cm

22. a) $\theta = 0.451$
    b) -0.5
    c) -0.577 or $-\dfrac{\sqrt{3}}{3}$

23. Arc length $s = 25.1$ in
    Area $A = 150.8$ in^2

24. a) Amplitude $= 3$
    Period $= 180°$ or π
    $y = -3\sin(2x)$

    b) Amplitude $= 4$
    Period $= 6$
    $y = 4\cos\left(\dfrac{\pi x}{3}\right)$