Chapter 4 Test Review Solutions

1) $-435^\circ\left(\frac{\pi}{180^\circ}\right) = \frac{-435\pi}{180} \div \frac{15}{15} = \frac{-29\pi}{12}$ 1. D

2) $43^\circ 18' 35'' = 43^\circ + 18'\left(\frac{1^\circ}{60'}\right) + 35''\left(\frac{1}{3600''}\right)$

$= 43^\circ + 0.3^\circ + 0.0097^\circ \approx 43.310^\circ$ 2. J

3) 1 rotation around the tire = 1 revolution $= 2\pi$ rad

$w = 24\frac{\text{revolutions}}{\text{min}} = 24 \times 2\pi\frac{\text{rad}}{\text{min}} = 48\pi\frac{\text{rad}}{\text{min}}$ 3. G

4) $r = 8\text{cm} = 0.08\text{m}$, $1\text{rev} = 2\pi\text{rad}$

$w = 2\frac{\text{rev}}{\text{sec}}$, $w = \frac{\theta}{t}$, $v = \frac{s}{t} = \frac{r\theta}{t} \Rightarrow v = rw$ 4. J

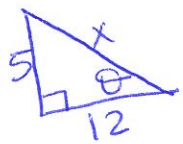
$w = 2 \times 2\pi\frac{\text{rad}}{\text{sec}}$ substitute into $v = (0.08\text{m})4 \times 3.14\frac{}{\text{sec}}$

$w = 4\pi\frac{\text{rad}}{\text{sec}}$

$v = 1.0048\text{ m/s}$

$v \approx 1.005\text{m/s}$

5) $\tan\theta = \frac{5}{12}$



$x^2 = 5^2 + 12^2$

$x^2 = 169$

$x = 13$

$\sin\theta = \frac{\text{opp}}{\text{hypo}}$ 5. A

$\sin\theta = \frac{5}{13}$

6)

$\tan\theta = \frac{\text{opp}}{8}$

$x^2 + 8^2 = 12^2$

$x^2 + 64 = 144$

$x^2 = 80$

$x = \sqrt{80} = 4\sqrt{5}$

$\tan\theta = \frac{4\sqrt{5}}{8}$

$\tan\theta = \frac{\sqrt{5}}{2}$ 6. H

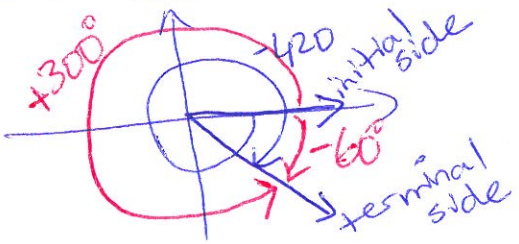
7) $s = 21\text{m}$, $\theta = 301^\circ$, Arc length, $s = r\theta$ 7. B

$21 = r \cdot 301\left(\frac{\pi}{180^\circ}\right)$

$21 = \frac{301 \times 3.14}{180} \cdot r \rightarrow r = \frac{21 \times 180}{301 \times 3.14} \approx 4\text{m}$

$d = 2r = 8\text{m}$

8)



* Coterminal angles start with same initial side & end with same terminal side.

-60° and 300°

8. F

9) $\theta = 40^\circ$, $d = 25$ in, $r = 12.5$ in

9. B

Sector area, $A = \frac{1}{2} r^2 \theta = \frac{1}{2}(12.5\text{in})^2 40^\circ \left(\frac{\pi}{180^\circ}\right)$

$A = \frac{1}{2} \frac{156.25 \times 40 \times 3.14}{180} = 54.51 \approx 54\text{in}^2$

10) $(\overset{x}{5}, \overset{y}{-2})$ $r^2 = \sqrt{5^2 + (-2)^2} \Rightarrow \sqrt{25+4} = \sqrt{29} = r$

10. F

$\csc\theta = \frac{r}{y} = \frac{\sqrt{29}}{-2} = -\frac{\sqrt{29}}{2}$

11) $\frac{17\pi}{18} = \frac{17\pi}{18}\left(\frac{180^\circ}{\pi}\right) = 170^\circ$

11. C

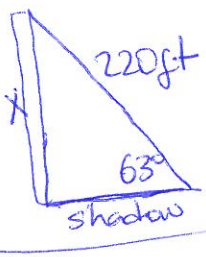
14) For $\frac{11\pi}{6}$ on the unit circle, we have $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$, $r = 1$

14. G

$\sin\frac{11\pi}{6} = \frac{y}{r} = -\frac{1}{2}$

12. J

12)

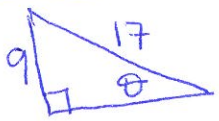


$\sin = \frac{\text{opp}}{\text{hypo}}$

$\sin 63^\circ = \frac{x}{220} \rightarrow x = 220(\sin 63^\circ) = 196\text{ft}$

13. 32°

13)



$\sin\theta = \frac{\text{opp}}{\text{hypo}} \rightarrow \sin\theta = \frac{9}{17} \rightarrow \theta = \sin^{-1}\left(\frac{9}{17}\right)$

$\theta \approx 32^\circ$

15. H

15) $e^2 = d^2 + f^2 - 2df\cos E$, Law of Cosine

$e^2 = 14^2 + 9^2 - 2 \times 14 \times 9 \times \cos 52^\circ$

$e^2 = 196 + 81 - 252\cos 52^\circ$

$e^2 = 277 - 252 \times 0.616$

$e^2 = 277 - 155 \rightarrow \sqrt{e^2} = \sqrt{122} \rightarrow e \approx 11.1$

16. G

16) $A = 27^\circ$, $B = 78^\circ$, $C = 19\text{ft}$, 2 angles and 1 side given, so, you use Law of Sines,

$\frac{\sin C}{c} = \frac{\sin A}{a} = \frac{\sin B}{b}$ (use this) $\rightarrow \frac{\sin 27^\circ}{a} = \frac{\sin 75^\circ}{19}$

$\angle C = 180^\circ - (27^\circ + 78^\circ)$

$\angle C = 75^\circ$

$a = \frac{19(\sin 27^\circ)}{\sin 75^\circ} = 8.9\text{ft}$

17) $(\overset{x}{-2}, \overset{y}{-4})$, $r^2 = \sqrt{(-2)^2+(-4)^2} \Rightarrow r^2 = \sqrt{4+16}$

$r = \sqrt{20} = 2\sqrt{5}$

$\sec\theta = \frac{r}{x} = \frac{2\sqrt{5}}{-2} = -\sqrt{5}$

17. J

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18) $E = 52°$, $d = 14$ and $f = 9$, $e = ?$

$e^2 = d^2 + f^2 - 2dxfx\cos 52°$

$e^2 = 14^2 + 9^2 - 2\times 14\times 9\times \cos 52°$

$e^2 = 196 + 81 - 252\underbrace{\cos 52°}_{=0.615}$

$e^2 = 277 - 155$

$e^2 = 122 \Rightarrow e \simeq 11.1$

18. H

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19) 3 sides of the triangle given. Using Law of Cosine, we can calculate angle included by the first 2 sides as

$40^2 = 32^2 + 26^2 - 2\times 32\times 26\cos\theta$

$1600 = 1,024 + 676 - 1,664\cos\theta$

$1600 = 1700 - 1,664\cos\theta$

$\frac{-100}{1,664} = \frac{1,664\cos\theta}{1,664} \rightarrow \cos\theta = \frac{-100}{1664} \rightarrow \theta = \cos^{-1}\left(\frac{-100}{1664}\right)$

$\theta \simeq 93°$

Area $= \frac{1}{2}\, 32\times 26\times \sin 93°$

Area $\simeq 415.2 ft^2$

19. D

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20) ΔRST, $r = 7.8$ in , $s = 4.2$ in, $t = 3.9$ in $\angle R = ?$

3 sides given, use Law of Cosine

$r^2 = s^2 + t^2 - 2sxtx\cos R$

$(7.8in)^2 = (4.2in)^2 + (3.9in)^2 - 2x(4.2)x(3.9)\cos R$

$60.84 = 17.64 + 15.21 - 32.76\cos R$

$60.84 = 32.85 - 32.76\cos R$

$-32.85 \quad -32.85$

$\frac{27.99}{-32.76} = \frac{-32.76\cos R}{-32.76} \rightarrow \cos R \simeq 148.7°$

20. J