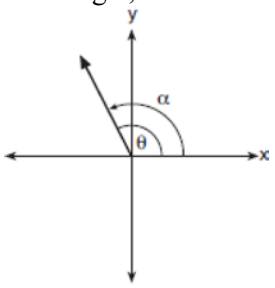
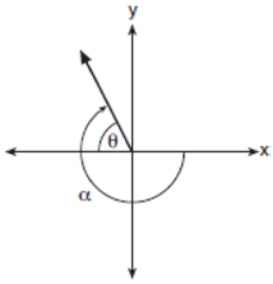
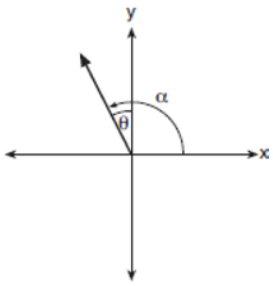
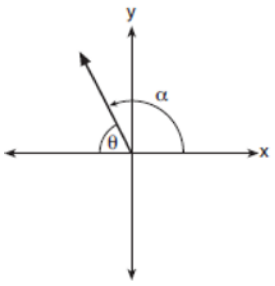
F.TF.A.2: Reference Angles

1 Which diagram represents an angle, α, measuring $\frac{13\pi}{20}$ radians drawn in standard position, and its reference angle, θ?

1)


2)


3)


4)


2 Sin 190° is equal to
1) sin 10°
2) cos 10°
3) –sin 10°
4) –cos 10°

3 Which expression is equivalent to sin(200°)?
1) –sin 20°
2) cos 20°
3) cos 70°
4) –sin 70°

4 Expressed as a function of a positive acute angle, sin 230° is equal to
1) –sin 40°
2) –sin 50°
3) sin 40°
4) sin 50°

5 The expression sin 240° is equivalent to
1) sin 60°
2) cos 60°
3) –sin 60°
4) –cos 60°

6 Which expression is equivalent to sin(–120°)?
1) sin 60°
2) –sin 60°
3) cos 30°
4) –cos 60°

7 Expressed as a function of a positive acute angle, sin(–230°) is equal to
1) sin 50°
2) –sin 50°
3) cos 50°
4) –cos 50°

8 Which expression is *not* equivalent to sin 150°?
1) sin 30°
2) –sin 210°
3) cos 60°
4) –cos 60°

Name: _____

9 Which expression is equivalent to $\cos 120°$?
1) $\cos 60°$
2) $\cos 30°$
3) $-\sin 60°$
4) $-\sin 30°$

10 Two straight roads intersect at an angle whose measure is 125°. Which expression is equivalent to the cosine of this angle?
1) $\cos 35°$
2) $-\cos 35°$
3) $\cos 55°$
4) $-\cos 55°$

11 Expressed as a function of a positive acute angle, $\cos(-305°)$ is equal to
1) $-\cos 55°$
2) $\cos 55°$
3) $-\sin 55°$
4) $\sin 55°$

12 The expression $\tan(-240°)$ is equivalent to
1) $\tan 60°$
2) $-\tan 30°$
3) $-\tan 60°$
4) $\tan 30°$

13 Expressed as a function of a positive acute angle, $\cot(-120)°$ is equivalent to
1) $-\tan 60°$
2) $\cot 60°$
3) $-\cot 30°$
4) $\cot 30°$

14 The expression $\cot(-200°)$ is equivalent to
1) $-\tan 20°$
2) $\tan 70°$
3) $-\cot 20°$
4) $\cot 70°$

15 Express $\sin(-170°)$ as a function of a positive acute angle.

16 Express $\sin(-215°)$ as a function of a positive acute angle.

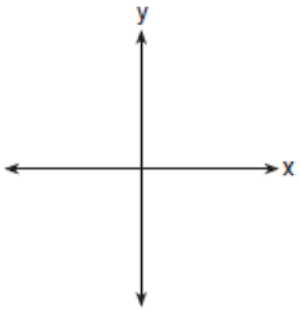
17 Express $\cos(-155°)$ as a function of a positive acute angle.

18 Express $\cos(-220°)$ as a function of a positive acute angle.

19 Express $\tan 230°$ as a function of a positive acute angle.

20 Express $\tan(-140°)$ as a function of a positive acute angle.

21 Sketch an angle of 250° in standard position and then express $\cos 250°$ as a cosine function of a positive acute angle.



F.TF.A.2: Reference Angles
Answer Section

1 ANS: 4 REF: 081707aii
2 ANS: 3 REF: 068429siii
3 ANS: 1 REF: 088915siii
4 ANS: 2 REF: 081515a2
5 ANS: 3 REF: 010418siii
6 ANS: 2
The choices were originally: 1) $\sin 60°$; 2) $-\sin 60°$; 3) $\cos 30°$; 4) $-\cos 30°$, so that (2) and (4) were correct responses.

REF: 018919siii
7 ANS: 1
Expressed as a positive angle, $\sin(-230) = \sin 130$. $-230 + 360 = 130$. For the reference angle of a Quadrant II angle, $\sin\theta = \sin(180 - \theta) = \sin(180 - 130) = \sin 50$.

REF: 060503b
8 ANS: 4 REF: 010120siii
9 ANS: 4 REF: 060215siii
10 ANS: 4
The terminal side of the angle lies in Quadrant II.

$$\cos\theta = -\cos(180° - \theta)$$
$$\cos 125 = -\cos(180 - 125)$$
$$= -\cos 55°$$

REF: 080511b
11 ANS: 2
$\cos(-305° + 360°) = \cos(55°)$

REF: 061104a2
12 ANS: 3 REF: 068535siii
13 ANS: 2 REF: 080330siii
14 ANS: 3 REF: 069933siii
15 ANS:
$-\sin 10°$ or $-\cos 80°$

REF: 068014siii
16 ANS:
$\sin 35°$ or $\cos 55°$

REF: 068617siii
17 ANS:
$-\sin 65°$ or $-\cos 25°$

REF: 088416siii

18 ANS:
$-\cos 40°$ or $-\sin 50°$

REF: 018406siii

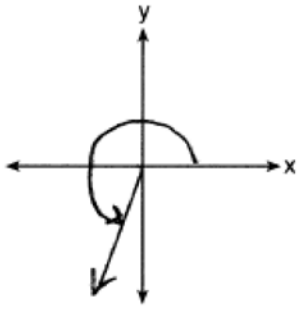
19 ANS:
$\tan 50°$ or $\cot 40°$

REF: 068811siii

20 ANS:
$\tan 40°$ or $\cot 50°$

REF: 068912siii

21 ANS:



$-\cos 70°$

REF: 011734a2